

# OHIO NORTHERN UNIVERSITY



*Catalog 1999-2000*

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# THE GETTY COLLEGE OF Arts and Sciences

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**Byron L. Hawbecker,**  
*Dean*

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## Accredited by

The American Chemical Society  
The Commission on Accreditation of Allied  
Health Education Programs (CAAHEP)  
National Association of Schools of Music

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## Membership in

American Association for Higher Education  
American Historical Association  
American Institute of Biological Sciences  
American Political Science Association  
American Theatre Association  
Association for Computing Machinery  
College Art Association  
Council of Colleges of Arts and Sciences  
Council on Undergraduate Research  
Mathematical Association of America  
Modern Language Association of America  
National Association of Industrial Technology  
National Association for Sports & Physical  
Education  
Public Relations Society of America  
Speech Communication Association

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## Departments

Art; Biological Sciences; Chemistry;  
Communication Arts; Computer Science;  
Education; English; Health, Physical Education  
and Sport Studies; History, Political Science  
and Criminal Justice; Mathematics; Modern  
Languages; Music; Philosophy and Religion;  
Physics; Psychology and Sociology; Technology.

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## Endowed Chairs

**The Eleanor H. and Robert W. Biggs  
Chair in Chemistry** was established in 1992. The  
1998-99 recipient is Dr. Jeffrey A. Gray.

**The Eleanor H. and Robert W. Biggs  
Chair in the Arts** was established in 1992. The  
1998-99 recipient is Dr. Stephen D. Iseman.

**The Eleanor H. and Robert W. Biggs Chair  
in Sciences** was established in 1992. The 1998-  
99 recipient is Dr. Eric V. Nelson.

**The Wilfred E. Binkley Chair of History  
and Political Science**, inaugurated in 1971,  
has been made possible by a grant from the  
Scaife Foundation of Pittsburgh. The 1998-99  
recipient is Dr. David P. Peltier.

**The Irene Casteel Chair in Education,  
Professional and Social Sciences**, was es-  
tablished in 1992 and funded by a bequest from  
Irene Casteel in 1998. The 1998-99 recipient is  
Dr. Charles A. Shearrow.

**The Mary Reichelderfer Chair in Math-  
ematics and Computer Science** was estab-  
lished in 1983 with funds from the estate of  
Mary K. Werkman. Dr. Danhong Song is the  
1998-99 recipient.

**The Sara A. Ridenour Chair of Human-  
ities** was established in 1983 from funds pro-  
vided by her daughter. The recipient for  
1998-99 is Professor Robert J. Lietz.

**The Kernan Robson Chair of Govern-  
ment**, inaugurated in 1972, has been made  
possible by a trust established by the late  
Kernan Robson. The 1998-99 recipient is Dr.  
Andrew Ludanyi.

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## Mission Statement

The Getty College of Arts and Sciences is  
a community of students and faculty committed  
to academic, moral, and spiritual development.  
The rich diversity of studies available in the col-  
lege challenges community members to de-  
velop personal goals and to discover means of  
achieving them.

The educational program of the college  
provides a coherent framework that equips  
each student to flourish in a world of rapidly  
changing conditions. Academic growth will be  
demonstrated through achieving special profi-  
ciency in the student's major field or fields of  
study. Specific cognitive goals include knowl-  
edge of the origins and content of contempo-  
rary culture, effective communication based on  
logical thinking, competence in quantitative rea-  
soning, a rational approach to the physical and  
biological world, and sensitivity to artistic ex-  
pression. This foundation for lifelong learning is  
designed to equip students to function as free  
persons in a free society and to support per-  
sonal commitment to ethical and religious ide-  
als that are vital for humanity.

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## Admission Standards

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

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## The First Year Experience

The College of Arts and Sciences has established a “First Year Experience” program which particularly meets the needs of new students at Ohio Northern University. This First Year Experience program includes the Freshman Seminar course, department orientation courses, and pre-professional orientation courses. Although the specific selection of courses within this group is a function of the student’s interests, major field, and career aspirations, each student will meet the general goals of the overall program through a set of common experiences. The general goals of the First Year Experience program are as follows:

1. It is designed to help new students make the transition from high school to college life. In particular, it attempts to integrate new students into the Ohio Northern University campus community.
2. It helps acquaint new students with the facilities, operations, and procedures of the University. Specific attention is given to those matters that directly impact the student’s major program and/or career path.
3. It encourages new students to take full advantage of the many opportunities for growth available to them at Ohio Northern University, including participation in cultural, social, and intellectual activities designed to provide for their adjustment to the campus and to enrich their college experience.

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## The Senior Capstone Experience

All students graduating from the College of Arts and Sciences participate in a “Senior Capstone Experience” which allows them to integrate many concepts from their major course of study into a final project or activity. The exact nature of the capstone experience is dependent upon the specific departmental major, and the requirement may be fulfilled by a variety of senior-level events such as seminars, research projects/papers, recitals, exhibitions, or practicums.

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## Degree Requirements

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### Bachelor of Arts

The following are the prescribed general education courses required of all students enrolled in a Bachelor of Arts degree program. This degree is available to students in most of the majors within the College of Arts and Sciences (see “Completing a Major” on page 50). Specific requirements for the Bachelor of Music are listed under the department of music.

#### **Basic Requirements**

- First Year Experience—Orientation or Freshman Seminar
- English 110 and 111
- English 204 (Great Works)
- Public Speaking 211 or Interpersonal Communication 225
- Western Civilization 110 and 111
- Philosophy—one four-credit course (see department listing for appropriate courses)
- Religion—one four-credit course (see department listing for appropriate courses)
- Foreign language—first-year competency (three courses in one modern spoken language).  
This requirement may be waived for students whose native language is other than English.

#### **Distributional Requirements**

- a. Fine Arts  
two courses (or equivalent totaling eight credit hours) in at least two disciplines: art, music, theatre. One of these must be a classroom course, but six hours of a single, continuing activity course from the following list may fulfill the second four hour course requirement. The maximum number of activity hours allowed to count toward graduation, whether fulfilling the fine arts requirement or free elective credit, is twelve.

AMUS 080	Chorus
AMUS 081	Chapel Choir
AMUS 082	Added Attraction
AMUS 083	University Singers
AMUS 084	Wind Ensemble
AMUS 085	Chamber Chorale
AMUS 086	Pep Band
AMUS 087	Symphonic Band
AMUS 088	Jazz Ensemble
AMUS 089	Opera Workshop
AMUS 090	Marching Band
AMUS 091	Chapel Band
AMUS 092	Woodwind Ensemble
AMUS 094	Brass Ensemble
AMUS 095	Percussion Ensemble
AMUS 096	Orchestra
AMUS 097	Northernaires
AMUS 098	String Ensemble
AMUS 099	New Music Ensemble
COMM 204	Dance Practicum
COMM 261	Performance Practicum
COMM 276	Production Practicum
COMM 378	Design Practicum
COMM 387	Directing Practicum

- b. Humanities  
one course (4 credits) not in discipline of primary major: foreign language, history, literature or creative writing, philosophy, religion.
- c. Social Sciences  
two courses (8 credits) not in discipline of primary major selected from economics, geography, political science, psychology, sociology.
- d. Mathematics/Natural Sciences  
three courses (12 credits) which include: one in biological science, one in physical science, and one mathematics course.

Students seeking teacher licensure must take at least one computer science course and one mathematics course.

### Graduation Requirements

Although there is no college computer literacy requirement, each student will experience the use of the computer or substantial exposure to or study of the uses and implications of computer technology as determined by the specific program major.

The following are specific requirements in the student's total educational program:

- a. at least four credits which involve substantial exposure to or study of a non-Western people, society, or culture;
- b. at least three 1-hour physical education activity courses with 6 hours maximum counted toward the degree, except for physical education majors (see course distribution requirement under Physical Education Service Courses on page 49);
- c. completion of all major requirements, including the senior capstone experience, as stipulated by the appropriate program faculty.

## Bachelor of Science

The following are the prescribed general education courses required of all students enrolled in a Bachelor of Science degree program. A candidate for the Bachelor of Science degree may major in biology, environmental studies, molecular biology, chemistry, biochemistry, medicinal chemistry, physics, mathematics, mathematics/statistics, computer science, health, physical education and sport studies, or technology. Specific requirements for the B.S. in Medical Technology are listed under the department of biological sciences.

### Basic Requirements

- First Year Experience—Orientation or Freshman Seminar
- English 110 and 111
- English 204 (Great Works)
- Public Speaking 211 or Interpersonal Communication 225
- Western Civilization 110 and 111
- Philosophy—one four-credit course (see department listing for appropriate courses)
- Religion—one four-credit course (see department listing for appropriate courses)
- Mathematics—three courses (12 credits) at the level of College Algebra (120) or above

### Distributional Requirements

- Science component—four courses (16 credits outside the major program of study) from the biological or physical sciences.
- Two courses (8 credits) in social sciences selected from economics, geography, political science, psychology, sociology.
- One course (4 credits) in fine arts - A total of 6 approved activity hours will meet this requirement. (See list and policy under B.A. degree.)

### Graduation Requirements

Although there is no college computer literacy requirement, each student will experience the use of the computer or substantial exposure to or study of the uses and implications of computer technology as determined by the specific program major.

The following are specific requirements in the student's total educational program:

- a. at least four credits which involve substantial exposure to or study of a non-Western people, society, or culture;
- b. at least three 1-hour physical education activity courses with 6 hours maximum counted toward the degree, except for physical education majors (see course distribution requirement under Physical Education Service Courses on page 49);
- c. completion of all major requirements, including the senior capstone experience, as stipulated by the appropriate program faculty.

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## Bachelor of Fine Arts

The following are the prescribed general education courses required of all students enrolled in a Bachelor of Fine Arts degree program. This degree is available to students majoring in art or communication arts and is applicable to concentrations in graphic design and studio arts. All teacher licensure students seeking the Bachelor of Fine Arts degree must take at least one four-hour computer science course and one four-hour mathematics course.

### Basic Requirements

First Year Experience—Orientation or Freshman Seminar  
English 110 and 111  
English 204 (Great Works)  
Public Speaking 211 or Interpersonal Communication 225  
Western Civilization 110 and 111  
Philosophy—one four-credit course (see department listing for appropriate courses)  
Religion—one four-credit course (see department listing for appropriate courses)  
Foreign Language—competency in the first two courses in one modern, spoken language

### Distributional Requirements

- Fine Arts  
two courses (or equivalent totaling eight credit hours) not applicable to the major in at least two disciplines: art, music, theatre. A total of six approved activity hours will satisfy the requirement for one of the two courses. (See list and policy under B.A. degree.)
- Social Sciences  
one course (4 credits) selected from economics, geography, political science, psychology, sociology
- Mathematics/Natural Sciences  
two courses (8 credits) in two areas selected from biological science, physical science, mathematics

### Graduation Requirements

Although there is no college computer literacy requirement, each student will experience the use of the computer or substantial exposure to or study of the uses and implications of computer technology as determined by the specific program major.

The following are specific requirements in the student's total educational program:

- at least four credits which involve substantial exposure to or study of a non-Western people, society, or culture;
- at least three 1-hour physical education activity courses with 6 hours maximum counted toward the degree, except for physical education majors (see course distribution requirement under Physical Education Service Courses on page 49);
- completion of all major requirements, including the senior capstone experience, as stipulated by the appropriate program faculty.

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## Graduation Requirements: Non-Western Culture Courses

The following courses will meet the general education graduation requirement in non-Western culture study. Some courses may have prerequisites.

COMM 291	World Theatre History
ENGL 219	Non-Western Literature
ENGL 262	African Literature
ENGL 432	Studies in Comparative Literature
FREN 329	Civilisation Francaise: Les Cultures Francophones
FREN 418	Francophone Literature of the Twentieth Century
GEOG 226	World Regional Geography
HIST 415	Russian History To 1815
HIST 471	History of the Ottoman Empire
HSPS 222	Contemporary Asia
HSPS 223	Contemporary Africa
HSPS 224	Contemporary Middle East
HSPS 225	Contemporary Latin America
MUSC 200	Non-Western Music
PLSC 107	International Studies and World Problems
PLSC 336	Developing Political Systems
RELG 231	Religious Experience
RELG 241	Islam and Christianity
RELG 243	The Bible and the Third World
RELG 264	Buddhism
SOC 250	Cultural Anthropology
SOC 351	World Criminal Justice Systems
SPAN 351	Hispanic Cultural Perspectives
SPAN 354	Latin American Civilization
SPAN 357	Latin American Art, Music, and Dance

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

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## Physical Education Service Courses (All Degrees)

Students will be required to take three physical education courses with one course from the fitness area, one course from the lifetime activities area, and one course from the wellness area. See the department of health, physical education and sport studies for definition of the areas. A student is not restricted to the required three credit hours of physical education. A student can receive, in addition to the three required physical education credits, three additional physical education credits that may be applied toward graduation by participation in intercollegiate athletics or by taking other courses within the physical education service program. A maximum of six physical education hours may be counted toward graduation.

In order to receive physical education credit for participation in intercollegiate athletics, a stu-

dent/athlete must complete the entire season in good standing. An unsatisfactory grade will be assigned if a student/athlete: a) quits the team, b) is dismissed from the team, or c) participates in less than 50 percent of the season. Participation in intercollegiate athletics constitutes one hour of physical education credit per sport to a maximum of three sports. Only one credit of intercollegiate participation in each sport may be counted toward graduation.

## Completing a Major

The degree candidate is required to complete in a logical sequence a major of not less than 44 quarter hours. Students may be listed as majoring in general studies during their freshman and sophomore years, but they must select a distinct major with an appropriate degree by the start of their junior year of study. Students who have a particular interest in **science** may be listed as majoring in general science to insure an appropriate course selection in preparation for an eventual major in one of the basic or professional science programs. General science students should select a distinct major with an appropriate degree by the start of their sophomore year.

Candidates for the degree of Bachelor of Arts who expect to teach in the public school are required to satisfy professional education requirements and will have a member of the Center for Teacher Education for a professional advisor. In some majors, areas of concentration requiring at least 21 quarter hours are provided allowing the student to focus on a specific area within a major.

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

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

Major, Concentration	Degree
Art	BA, BFA
Graphic Design	BFA
Studio Arts	BFA
Athletic Training (Sports medicine)	BA, BS
Biochemistry	BS
Biology	BA, BS
Chemistry	BA, BS
Communication Arts	BA
Musical Theatre	BFA
Professional and Organizational Communication	BA
Public Relations	BA
Telecommunications	BA
Theatre	BA

Computer Science	BA, BS
Criminal Justice	BA
Education-Early Childhood	BA
Education-Middle Childhood	BA
English/Creative Writing	BA
English/Language Arts	BA
English/Literature	BA
English/Professional Writing	BA
Environmental Studies	BS
French	BA
Health Education	BA, BS
History	BA
International Studies	BA
Journalism	BA
Mathematics	BA, BS
Mathematics/Statistics	BA, BS
Medical Technology	BSMT
Medicinal Chemistry	BS
Molecular Biology	BS
Music	BA
Music Composition	BM
Music Education	BM
Music Performance	BM
Music with Elective Studies	
In Business	BM
Philosophy	BA
Philosophy and Religion	BA
Physical Education	BA, BS
Physics	BA, BS
Political Science	BA
Psychology	BA
Religion	BA
Social Studies	BA
Sociology	BA
Spanish	BA
Sport Management	BA, BS
Technology	BA, BS
Wellness	BA, BS

### The Bachelor of Music and Bachelor of Science in Medical Technology Degree Programs

A candidate for the Bachelor of Music degree may major in music composition, education, music with elective studies in business or performance (see p. 142). A candidate for the Bachelor of Science in Medical Technology degree must complete the clinical year as well as other prescribed requirements (see p. 65). All teacher licensure students seeking the Bachelor of Music degree must take at least one four hour computer science course and one four hour mathematics course.

**Minors** A formal program of academic minors is available in several of the subject matter areas. Consult the chair of the department in question for specific procedural instructions. Minors require a minimum of 28 quarter hours of approved courses, including some work above the 200 level. Minors are for students who wish to pursue organized study in a discipline without completing a major.

**Options** A specific program of academic options is available in conjunction with several of the majors in the college. Included are options in advanced manufacturing, church vocations, design analysis, and graphic communications. The courses involved are listed under the department of the primary major. Business-related options are also available to all students in the College of Arts and Sciences. They are as follows:

#### Accounting Option

ACCT 211	Principles of Accounting 1	4 hrs
ACCT 212	Principles of Accounting 2	4 hrs
One of the following sequences:		
ACCT 301/302	Intermediate Accounting 1 & 2	8 hrs
ACCT 314/315	Intermediate Managerial Accounting 1 & 2	

Three additional 300/400 level business courses approved by the department of the student's major, at least two of which are accounting courses. 12 hrs  
28 hrs

#### Business Option

ACCT 211	Principles of Accounting 1	4 hrs
ACCT 212	Principles of Accounting 2	4 hrs
ABUS 312	Business Law 1	4 hrs
One of the following courses:		
MGMT 333	Management and Organizational Behavior	4 hrs

MRKT 351 Principles of Marketing  
FINC 362 Managerial Finance  
Three additional 300/400 level business courses approved by the department of the student's major. 12 hrs  
28 hrs

#### Economics Option

IBEC 202	Prin. of Microeconomics	4 hrs
IBEC 203	Prin. of Macroeconomics	4 hrs
IBEC 383	Intermed. Microecon. Theory	4 hrs
IBEC 384	Intermed. Macroecon. Theory	4 hrs
Three additional 300/400 level business courses approved by the department of the student's major, at least two of which are economics courses <u>12 hrs</u> 28 hrs		

**An option requires a minimum of 28 quarter hours in coursework related to a specified department or discipline, but its original conception and continued integrity as a dynamic program may come from a source external to that department or discipline. Students should consult the chair of their major department for specific procedural instructions on all options.**

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## Dual Degree Programs

Information concerning dual degree programs involving the College of Arts and Sciences appears on page 33 of this catalog. Students may receive further details in the office of the dean of the college.

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## Teacher Education

Ohio Northern University is vitally concerned with preparing effective and efficient teachers. Programs are offered within the degree requirements in almost every department.

Students preparing to teach are expected to make formal application for admission into the teacher education program during the quarter in which they will complete 90-quarter hours of course work if they have completed all prerequisites. To be accepted, the student must have an overall accumulative point average of at least 2.50 with no grade less than "C." The Center for Teacher Education establishes policies for admission into the program of teacher education and considers all application for admission to the program.

The Center is nationally accredited by the National Council for the Accreditation of Teacher Education (NCATE).

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

Students entering teacher education prior to September 1998 will seek certification in areas listed on pages 91-94. Freshmen starting September 1998 and after will work toward licensure areas listed on pages 91-94.

Students with degrees from other accredited universities must complete all requirements to be admitted to the teacher education program and the required professional education courses in the Center for Teacher Education.

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## Preprofessional Programs

**Medical Sciences Programs** A Medical Sciences Advisory Committee has been established for the purpose of advising students in the areas of the medical sciences (premedicine, predentistry, preveterinary medicine, etc.). The general objectives of the committee are to counsel students preparing for a career in the medical sciences, to serve as a source of information concerning preprofessional education in the medical sciences, and to serve as a source of recommendations to professional schools in the medical sciences.

A representative of the committee meets with all new premedical students at summer orienta-

tions. Committee members serve as academic advisors and are available to provide guidance and information to help students pursue their professional goals during their undergraduate careers.

The first year program usually includes biology, chemistry, English, and mathematics. After the first year, with the exceptions of organic chemistry and physics, the program is a function of the student's choice of departmental major and the specific requirements of the professional program being pursued. For further information, contact Dr. Rodney P. Anderson, chair, Medical Sciences Advisory Committee.

**Medical Technology** Many students in medical technology study three years on campus and spend a fourth clinical year at an accredited medical technology school. Forty-five quarter hours are transferred from the medical technology school to Ohio Northern University and applied toward a B.S. in Medical Technology degree. Recently, a more popular option for medical technology students has been to spend four years on campus and a fifth year at an accredited medical technology school. This allows students to earn a B.S. in Biology, a B.S. in Medical Technology and a chemistry minor. This additional education has made our students strong candidates for medical technology and laboratory administration positions. Ohio Northern University is affiliated with Riverside Mercy Hospital in Toledo, the Cooperative Medical Technology Program of Akron and St. Vincents's Health Center in Erie, PA. For additional information, see Department of Biological Sciences program descriptions in this catalog. For detailed curriculum information contact Dr. Linda Young, Medical Technology Coordinator, Department of Biological Sciences.

**Prephysical Therapy** The prephysical therapy curriculum most appropriately prepares students for entry into post-baccalaureate Master's Degree programs in physical therapy. In general, required courses include one year of biology, one year of general chemistry, one year of physics and mathematics courses most appropriately at the level of pre-calculus. Courses in psychology are required in addition to various recommended electives considered necessary for application to graduate programs.

**Preoccupational Therapy** The preoccupational therapy program prepares students for entry into post-baccalaureate Master's Programs in occupational therapy that typically require prerequisite coursework concentrating on the following areas: biological sciences (biology, physiology, and human anatomy each with a laboratory component), behavioral sciences, written/verbal communication, physics, chemistry, biostatistics, medical terminol-

ogy, and computer literacy.

Both curricula also include completion of a one quarter internship in a physical therapy/occupational therapy clinical setting. Because admission requirements, prerequisites, and program components differ from school to school, details of either curriculum may vary dependent on the chosen graduate program. For further information, contact Dr. Rema G. Suniga, Prephysical Therapy/ Preoccupational Therapy Coordinator, Department of Biological Sciences.

**Preseminary** A faculty member in the department of philosophy and religion serves as advisor to the preseminary student in planning a preprofessional program. The recommendations of the American Association of Theological Schools are followed in counseling the student. A major in the department of philosophy and religion or in another appropriate department may be selected.

**Prelaw** Students in the prelaw program select a major and complete the necessary requirements as do other students. The program is open to all students enrolled in any academic department of the Colleges of Arts and Sciences, Engineering, Pharmacy, or Business Administration. For additional information, see page 33.

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## General Regulations

1. A student usually may not register for more than 19 hours of academic work unless he/she achieved a grade point average of 3.00 or better in the preceding quarter, in which case the dean may grant permission for extra hours. See page 18 for overload charges beyond 19 credit hours. A normal program consists of 12 to 19 scheduled hours including physical education.
2. All new students in the College of Arts and Sciences are required to take freshman orientation or freshman seminar in the fall quarter.
3. A student indicates a choice of major field by filling out a declaration of major form available in the office of the department chair or dean.
4. No course for which a student has received a "D" is acceptable toward a major, minor, option, or area of concentration.
5. Juniors and seniors are expected to schedule a majority of their courses from the "300" and "400" group.
6. With the permission of the instructor and the department chair, any course prerequisite may be waived.
7. Except where noted, credit hours earned in repeated courses may be counted only one time among the total hours required for graduation.
8. Writing I should be taken by all freshmen during their first quarter on campus. Both courses in writing should be completed by the end of the freshman year.
9. In all degree programs, a given course may not count for both basic and distributional requirements.

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## S/U Grade Option

Students in the College of Arts and Sciences are given the opportunity to register for one course per quarter on a S/U (Satisfactory/Unsatisfactory) options basis, with the following stipulations:

1. The student must have sophomore, junior, senior or postgrad standing.
2. The requested course cannot count toward fulfillment of major, minor, concentration, or option requirements.
3. The requested course cannot be a 100-level general education course.
4. The requested course cannot be a cognate.
5. The grade of "S" is to be equated with A, B, C. The grade of "U" is equated with D or F.
6. Students cannot change their minds about the grading system after the second week of class.

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## Classification of Students

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

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## Academic Standing

A grade point average of 2.00 is required for graduation. If a student's accumulative grade point average falls below 2.00, the student is placed on academic probation. The student can return to good academic standing by raising his/her accumulative grade point average to 2.00 or above.

If the accumulative grade point average of a freshman falls below 1.60, that student cannot participate in competitive activities of individuals, teams, or other groups officially designated as representing the University. A sophomore must maintain at least a 1.80 accumulative grade point average to participate in the aforementioned activities. Juniors and seniors who are on academic probation are not eligible to participate in these activities.

Any student on probation whose quarter grade point average for the following quarter is below a 2.00 will have his/her record reviewed by the Committee on Academic Qualifications of the college and may be recommended to the dean for academic actions which may include suspension or dismissal.

If action is taken to suspend a student, the suspension will be for a definite period of time, after

which the student may apply for readmission. If readmission is granted, the Committee on Academic Qualifications may establish certain conditions of academic performance for the student to remain enrolled in the College of Arts and Sciences. Continued poor performance by a readmitted student will lead to dismissal.

If action is taken to dismiss a student, it is to be regarded as a terminal action and the student is not eligible to apply for readmission to the College of Arts and Sciences at any time thereafter.

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## Graduation

To graduate with a Bachelor of Arts, a Bachelor of Fine Arts or a Bachelor of Science degree, a student is required to complete a minimum of 182 quarter hours which includes the appropriate general education courses, complete an approved major, and have an accumulative point average of at least 2.00.

The minimum residency requirement for all students is the last three quarters and the completion of at least 45 quarter hours with at least 90 quality points elected mostly from 300- and 400-level courses.

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

To graduate with a Bachelor of Music degree in music education, performance, composition, or music with elective studies in business, the student is required to complete a minimum of 182 quarter hours which includes the appropriate general education courses, complete an approved major, and have an accumulative point average of 2.00. The music education major must also complete all course work and observation hours required by the state of Ohio for teacher licensure.

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## COLLEGE OF ARTS AND SCIENCES COURSES

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### ***Subject - General Arts and Sciences (AASG)***

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#### **001 - MEDICAL SCIENCES ORIENTATION**

*1.00 Credit*

Familiarity with general requirements and admissions standards for entry into colleges of medicine, dentistry, veterinary medicine, etc. Open to students interested in preparing for a career in these areas. CREDIT EARNED IN THIS COURSE DOES NOT SATISFY GRADUATION REQUIREMENTS FOR ANY PROGRAM OFFERED AT THE UNIVERSITY. Graded S/U.

#### **002 - PRELAW ORIENTATION**

*1.00 Credit*

Familiarity with general requirements and admissions standards for entry into law school and with opportunities in the legal profession. CREDIT EARNED IN THIS COURSE DOES NOT SATISFY GRADUATION REQUIREMENTS FOR ANY PROGRAM OFFERED AT THE UNIVERSITY. Graded S/U.

#### **003 - GENERAL SCIENCE ORIENTATION**

*1.00 Credit*

Examination of science-based majors and/or programs available at Ohio Northern University. Information to assist in making career choices. CREDIT EARNED IN THIS COURSE DOES NOT SATISFY GRADUATION REQUIREMENTS FOR ANY PROGRAM OFFERED AT THE UNIVERSITY. Graded S/U.

#### **010 - STUDY SKILLS**

*1.00 Credit*

To increase study efficiency by emphasizing improvement in motivation, concentration and memory. Attention is also given to selected study skills including time-management, listening, note taking, reading comprehension and testing. In addition to the weekly class meeting, this course includes one weekly study-skills lab. CREDIT EARNED IN THIS COURSE DOES NOT SATISFY GRADUATION REQUIREMENTS FOR ANY PROGRAM OFFERED AT THE UNIVERSITY. Open to freshmen and sophomores only.

#### **011 - COLLEGE READING SKILLS**

*2.00 Credits*

To increase student reading efficiency of college textbooks by emphasizing improvement in student reading comprehension, reading speed and vocabulary. In addition to the weekly class meeting, this course includes two weekly reading labs. CREDIT EARNED IN THIS COURSE DOES NOT SATISFY GRADUATION REQUIREMENTS FOR ANY PROGRAM OFFERED AT THE UNIVERSITY.

#### **012 - STRESS MANAGEMENT AND EFFECTIVE LIVING**

*1.00 Credit*

To provide students an opportunity to learn and adopt stress management skills that will enable them to lead more productive and satisfying lives. In addition to the weekly class meeting, this course includes one weekly individualized stress-management lab. CREDIT EARNED IN THIS COURSE DOES NOT SATISFY GRADUATION REQUIREMENTS FOR ANY PROGRAM OFFERED AT THE UNIVERSITY.

#### **100 - FRESHMAN SEMINAR**

*1.00 Credit*

To acclimate freshmen to academic, personal, social and cultural opportunities at the university. To encourage positive life-long learning skills for students. To help them cope successfully with the demands of the first year of college through the use of challenges and opportunities in and out of the classroom. Graded S/U.

#### **121 - CAREER EXPLORATION THROUGH PERSONAL ANALYSIS**

*1.00 Credit*

Principles, methods and practice in career development with emphasis on self analysis, career information, exploration of careers and career opportunities. In addition to the weekly class meeting, this course includes one weekly individualized career development lab. This course is designed for freshmen and sophomores who are uncertain about their college major or their career plans.

#### **190 - SPECIAL TOPICS**

*1.00 to 4.00 Credits*

Can be repeated as the topic varies. May be graded S/U as appropriate to the topic.

#### **290 - SPECIAL TOPICS**

*1.00 to 4.00 Credits*

Can be repeated as the topic varies. May be graded S/U as appropriate to the topic.

**297 - INDEPENDENT STUDY**

*1.00 to 4.00 Credits*

Can be repeated as the topic varies.

**300 - JOB AND GRADUATE SCHOOL SEARCH TECHNIQUES**

*1.00 Credit*

An experiential course where students will learn skills that will enable them to develop and implement personalized and successful career search strategies. CREDIT EARNED IN THE COURSE DOES NOT SATISFY GRADUATION REQUIREMENTS FOR ANY PROGRAM OFFERED AT THE UNIVERSITY. Open to juniors/P4's and seniors/P5's only. Course graded S/U. Can be repeated once.

**390 - SPECIAL TOPICS**

*1.00 to 4.00 Credits*

Can be repeated as the topic varies. May be graded S/U as appropriate to the topic.

**490 - SPECIAL TOPICS**

*1.00 to 4.00 Credits*

Can be repeated as the topic varies. May be graded S/U as appropriate to the topic.

**497 - INDEPENDENT STUDY**

*1.00 to 4.00 Credits*

Can be repeated as the topic varies.

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**DEPARTMENT OF AERO-SPACE STUDIES**

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***Subject - Aerospace Studies (AERO)***

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

**111 - AIR FORCE ORGANIZATION 1**

*3.00 Credits*

Organization of the United States Air Force. Focus on missions involving airlift forces, strategic forces, tactical forces as well as overseas forces. The development and employment of weapons systems and logistic support functions are also discussed. Leadership Laboratory activities.

**112 - AIR FORCE ORGANIZATION 2**

*3.00 Credits*

Organization of the United States Air Force. Focus on U.S. Defense Policies, military balance between U.S. and world forces as well as capabilities of Army, Navy and Reserve/ Guard forces. Officership/ Professionalism and Introduction to Flight are discussed. Laboratory Leadership activities.

**211 - AIR FORCE HISTORY 1**

*3.00 Credits*

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

**212 - AIR FORCE HISTORY 2**

*3.00 Credits*

Development of air power since the establishment of the independent Air Force to the present. Various concepts of employment of air power and factors which have prompted research and technological change. Examples of impact of air power on strategic thought. Leadership laboratory activities.

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### **311 - AIR FORCE MANAGEMENT 1**

*5.00 Credits*

Integrated management course emphasizing individual as leader in the Air Force. Human behavior, individual and in groups, historical development of management thought, discussion of classical leadership theory, oral and written communication, military writing, and briefing formats. Leadership laboratory activities. Prerequisite: Departmental approval.

### **312 - AIR FORCE MANAGEMENT 2**

*5.00 Credits*

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

### **390 - SPECIAL TOPICS IN AEROSPACE STUDIES**

*1.00 to 6.00 Credits*

Topics include, but are not limited to the study of The profession of arms, leadership principles and styles, leadership assessment program, and participation in leadership labs and field training exercises. Credit may be granted for Air Force ROTC Summer Field Training and the Professional Development Program. No military obligation. Departmental permission required. Can be repeated as the topic varies.

### **411 - AMERICAN NATIONAL SECURITY 1**

*5.00 Credits*

Role of the President, the Congress and the National Security Council in national security policy making; American defense strategy; alliances; regional security; arms control. Leadership Laboratory activities. Prerequisite: Departmental approval.

### **412 - AMERICAN NATIONAL SECURITY 2**

*5.00 Credits*

Air Force officer as part of national security forces; military law; laws of armed conflict; the military profession; transition to military life; relations with civilian community. Leadership Laboratory activities. Prerequisite: Departmental approval.

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## **DEPARTMENT OF ARMY ROTC**

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### **Subject - Army ROTC (ARMY)**

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

### **101 - LIFETIME LEADERSHIP SKILLS**

*3.00 Credits*

Skills needed to be successful in wide range of environments to include academic, corporate and military. Subjects include but not limited to time management, memory comprehension, effective and efficient reading and effective note taking. Extensive leadership studies of both corporate and military settings focuses on interpersonal skills, professional ethics and officership. No military obligation or prerequisites. Freshmen only.

### **102 - ROTC AND THE NATIONAL DEFENSE ORGANIZATION**

*3.00 Credits*

Background, programs, benefits and objectives of Army ROTC. Organization and functions of national defense establishment with emphasis on the role of the U.S. Army. Extensive discussion of the role and responsibility of the military officer. Presentation of detailed information concerning career opportunities as an Army officer. No military obligation or prerequisites. Freshmen and sophomores only.

### **201 - SURVIVAL**

*3.00 Credits*

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

### **202 - MILITARY TACTICS**

*3.00 Credits*

Topics include the principles of war, terrain analysis, fundamentals of offensive and defensive operations, and Airland Battle Doctrine. No military obligation or prerequisite. Freshmen and sophomores only.

### **301 - PROFESSIONALISM/LEADERSHIP**

*4.00 Credits*

Professionalism and leadership required of the U.S. Army officer; application of leadership principles and styles through case studies and role-playing exercises with emphasis on military situations. Participation in leadership labs, physical training program and field training exercises required. Prerequisite: Department permission and completion of one of the following: ROTC basic course at BGSU; ROTC Basic Camp at Fort Knox, KY; prior Active Duty service; Army Reserve/ANG basic training.

### **302 - SMALL UNIT OPERATIONS**

*5.00 Credits*

Organization and employment of basic military teams. Squad and platoon level tactical operations. Progressive leadership development through application of tactical principles. Participation in leadership labs, physical training program and field training exercises required. Prerequisite: Departmental permission.

### **390 - ARMY ROTC SPECIAL TOPICS IN MILITARY SCIENCE**

*1.00 to 6.00 Credits*

Topics include but are not limited to: Study of selected military subjects; the profession of arms, leadership principles and styles, leadership assessment program, and participation in leadership labs and field training exercises. Credit may be granted for completion of Army ROTC Basic Camp at Ft. Knox, Kentucky. No Military obligation. Departmental permission required. Can be repeated as the topic varies.

### **401 - UNIT MANAGEMENT AND OFFICER DEVELOPMENT**

*4.00 Credits*

Concepts and fundamentals of Army administration, supply and material readiness. Professional officership techniques and military ethics. Management at the small unit level. Organizing, planning and participating in field training exercises. Prerequisite: Departmental permission.

### **402 - UNIT MANAGEMENT, MILITARY WRITING AND CORRESPONDENCE**

*5.00 Credits*

Organization and concepts of the U.S. Army judicial system including court martial, nonjudicial and nonpunitive actions. Development of military writing techniques, preparation of staff papers and staff actions. Discussions of movement of goods, and administrative details pertinent to newly commissioned lieutenants. Development and participation in field training exercises. Prerequisite: Departmental permission.

### **471 - STUDIES IN MILITARY SCIENCE**

*1.00 Credit*

Detailed study of selected military subjects. Offered as independent study. No military obligation. Departmental permission required. (Formerly ARMY 107)

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## DEPARTMENT OF ART

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Professors Chesser (*Chair*), West; Associate Professor Greavu; Instructor Eddings; Visiting Artist in Residence Mancuso

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

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

A student seeking a **Bachelor of Arts degree with a major in art** must complete the following courses: 100, 150, 160, 170, 210, 222, 250, 251, 255, 265, 310, 320, 330, 350, 355, 360, 375, 385 plus 12 art elective hours for a total of 76 hours.

A candidate for the **Bachelor of Fine Arts degree** must complete 96 hours for the major including 100, 150, 160, 170, 210, 222, 250, 251 or 355, 265, 310, 320, 330, 360, 375 and 385. Students concentrating in studio arts (ceramics, painting, printmaking, or sculpture) must complete a minimum of 24 hours in the area of concentration. Students concentrating in graphic design must complete four hours of 222, four hours of 223, 16 hours of 471 and TECH 240 and TECH 341.

A student may obtain a **minor in art** by completing 150, 160, 170, one three-dimensional course, and 12 hours of art electives. Students are urged to confer with a faculty advisor in order to make an appropriate selection of course work.

**Professional education requirements** are listed by the Center for Teacher Education.

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

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

All art majors are required to enter art work in the annual student juried exhibition and majors with junior standing are required to participate in the preparation and installation of the same exhibition.

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### Subject - Art (ART)

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#### 000 - ORIENTATION

##### 1.00 Credits

Familiarization with the department, requirements for majors, planning program of courses, university catalog, and library. Required of all majors in the department. Graded S/U.

#### 100 - ART

##### 4.00 Credits

Analysis of the visual arts through selected works from the past and present. Illustrated lecture.

#### 150 - STUDIO FOUNDATIONS 1

##### 4.00 Credits

Methods and media of drawing, elements and principles of design including color study.

#### 160 - STUDIO FOUNDATIONS 2

##### 4.00 Credits

Drawing 3-dimensional forms in space, color use in drawings, elements and principles of 3-D design in variety of materials. Prerequisite: ART 150.

#### 170 - DRAWING WORKSHOP

##### 4.00 Credits

Complex problems, thematic development, figure drawing, special papers and methods. May repeat to 8 Credits.

#### 190 - SPECIAL TOPICS IN ART

##### 1.00 to 4.00 Credits

#### 210 - FIGURE DRAWING

##### 4.00 Credits

Drawing and anatomical study of the human figure. May repeat for credit to total of 12 hours. Prerequisites: ART 150 and 160 or permission of the instructor.

#### 221 - JEWELRY

##### 4.00 Credits

Use of a variety of materials in the making of jewelry. Emphasis on design and the development of technical skills. May repeat to 8 credits.

## **222 - GRAPHIC DESIGN 1**

### *4.00 Credits*

Designed to develop the student's aesthetic sensitivity, design awareness and production skills as it pertains to graphic communication. Projects emphasize the elements and principles of design as well as conceptual problem-solving in order to develop the student's personal, visual language.

## **223 - GRAPHIC DESIGN 2**

### *4.00 Credits*

An in-depth study of the technical aspect of graphic design, both on and off the computer. Projects emphasize typographic vocabulary, typographic design solutions, mechanical preparation, color separations, grids, and page layout. Prerequisite: ART 222.

## **225 - GRAPHIC DESIGN 3**

### *4.00 Credits*

Continuation of 222 and 223. Development of advanced graphic communication concepts and skills. Assignments/solutions stress professional application and methods required of the graphic designer. Emphasis on visual thinking and analysis within specifications, budget, and time frame. May repeat for credit up to 8 credit hours. Prerequisites: ART 222 and 223.

## **250 - PAINTING 1**

### *4.00 Credits*

Techniques and modes of painting. Emphasis on theory and use of color in oil or acrylic.

## **251 - PAINTING 2**

### *4.00 Credits*

Techniques and modes of painting in oil. May repeat for credit to a total of 12 hours. Prerequisite: ART 250.

## **255 - CERAMICS 1**

### *4.00 Credits*

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

## **265 - SCULPTURE 1**

### *4.00 Credits*

The design and rendering of sculptural form in a variety of media and techniques. Emphasis on organizational problems of form and space.

## **290 - SPECIAL TOPICS IN ART**

### *1.00 to 4.00 Credits*

## **310 - ART HISTORY 1**

### *4.00 Credits*

Prehistoric to 14th century art, European and Near Eastern forms, developments and styles. Non-European styles explored as directed comparative studies. Prerequisite: Sophomore status or permission of instructor.

## **320 - ART HISTORY 2**

### *4.00 Credits*

European painting, sculpture and architecture from the 15th through the first half of the 19th century. Illustrated lectures. Prerequisite: Sophomore status or permission of instructor.

## **330 - ART HISTORY 3**

### *4.00 Credits*

The formation and development of major artistic movements in Europe and the United States from 1860 to the present. Prerequisite: Sophomore status or permission of instructor.

## **350 - CERAMICS 2**

### *4.00 Credits*

Methods and techniques of forming, decorating, glazing and firing clay bodies. Emphasis on wheel throwing. May repeat for a total of 8 hours credit. Prerequisite: ART 255.

## **355 - WATERCOLOR**

### *4.00 Credits*

Techniques and modes of painting in aqueous media. May repeat for credit to a total of 8 hours. Prerequisites: ART 150 and 160 or permission of the department.

## **360 - SCULPTURE 2**

### *4.00 Credits*

The design and construction of more complex sculptures in a variety of media and techniques. May repeat to total of 8 hours. Prerequisite: ART 265.

## **365 - SCULPTURE 3**

### *4.00 Credits*

Use of metals, oxyacetylene welding of steel, lost wax casting of bronze. May repeat for a total of 12 hours. Prerequisites: ART 265 and 360 or permission of instructor.

## **375 - PRINTMAKING 1**

### *4.00 Credits*

Methods and techniques of relief and intaglio processes. Includes woodcut, linocut, etching, drypoint, aquatint, hard and soft grounds. Prerequisites: ART 150, 160, 170 or permission of instructor.

## 385 - PRINTMAKING 2

### 4.00 Credits

Serigraphy and Lithography introduced as planographic processes in a short, intensive, workshop environment. Demonstration of a working understanding of these processes through a body of produced work. Prerequisites: ART 150, 160, 170 or permission of the instructor.

## 390 - SPECIAL TOPICS IN ART

### 1.00 to 4.00 Credits

## 410 - ADVANCED CERAMICS

### 4.00 Credits

Directed study. May repeat to total credit of 12 hours. Prerequisite: 8 hours of ART 350.

## 415 - ADVANCED PRINTMAKING

### 4.00 Credits

Directed study. May repeat to total credit of 12 hours. Prerequisite: 8 hours of ART 375 and/or 385.

## 420 - ADVANCED PAINTING

### 4.00 Credits

Directed study. May repeat to total credit of 12 hours. Prerequisite: 8 hours of ART 250 and 251.

## 471 - INTERNSHIP

### 8.00 to 16.00 Credits

Supervised field experience in an approved commercial art studio, agency, design department, museum, gallery or arts organization. Application must be made through the advisor to the department chairman not later than one full quarter in advance of enrollment. Prerequisites: Junior or senior rank; ART 150,160, and 222; and permission of the department.

## 489 - SENIOR THESIS

### 1.00 Credit

Required of all art majors. Preparation for and evaluation of the comprehensive examination and exhibit. Arrangements must be made one quarter in advance with the advisor and the department chairman.

## 490 - SPECIAL TOPICS IN ART

### 1.00 to 4.00 Credits

## 494 - SEMINAR IN ART

### 1.00 to 4.00 Credits

## 497 - INDEPENDENT STUDY IN ART

### 1.00 to 4.00 Credits

Designed to develop the student's aesthetic sensitivity, design awareness and production skills as it pertains to graphic communication. Projects emphasize the elements and principles of design as well as conceptual problem-solving in order to develop the student's personal, visual language.

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# DEPARTMENT OF BIOLOGICAL SCIENCES

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Professors Hoagstrom, Keiser (Chair), Moore, Nelson, Young; Associate Professors Anderson, Suniga, Warwick; Assistant Professors Aulthouse, Swanson, Woodley; Instructor Haines; Assistant Instructor Magaw; Adjunct Faculty Ahmed, Bathalon, Crawford, Johnson, Jurgens, Lange, Meyer, Mukerjee, Novak, Shriber, Sreenan

Students majoring in the department will be exposed to a wide range of academic disciplines within biology and environmental studies, including current instrumentation and research techniques and written and oral scientific communication methods. Biology 121 is a principles course with a major emphasis on the study of the cell, genetics, evolution, and ecology. It provides generalizations by which advanced courses in biology can be related to one another and is therefore a prerequisite to all other courses in the curriculum. Students desiring further knowledge of general biology may take Biology 122 which surveys the animal kingdom, and Biology 123 which explores general botany and the fungi. These courses also provide a firm foundation for advanced work in biology and the related applied sciences.

The **Bachelor of Arts** and **Bachelor of Science** degrees are available to biology majors with the opportunity to specialize in premedical sciences (including pre dentistry, premedicine, preoccupational therapy, prephysical therapy and preveterinary medicine), health technology, environmental testing, field biology, and life science licensure. In addition, many students find it desirable and a career advantage to have a second major during their undergraduate program.

### Special Requirements

1. Successful completion of AASG 300 Job and Graduate School Search Techniques.
2. Minimum 2.00 cumulative gpa in **all** biology courses.

## Major in Biology

### Core Requirements:

BIOL 121	General Biology
BIOL 122	General Zoology
BIOL 123	General Botany
BIOL 195	Orientation

### "Capstone Experience"

Choose one course or sequence:

BIOL 494	Biology Senior Seminar
BIOL 295, 395, 495	Research Sequence

### *Molecular/Cellular Course*

Choose one course:

BIOL 210	Introductory Genetics
BIOL 217	Intro. to Molecular Biology
BIOL 351	Cell Biology

### *Physiology/Anatomy Course*

Choose one course:

BIOL 231	Anatomy and Physiology
BIOL 301	Developmental Anatomy
BIOL 302	Human Anatomy
BIOL 308	Plant Anatomy
BIOL 310	Plant Physiology
BIOL 331	Physiology 1

(All must include a laboratory component)

### *Field Biology/Ecology Course*

Choose one course:

BIOL 213	Natural History
BIOL 251	Principles of Ecology
BIOL 271	Intro. to Marine Biology

### *Systematics/Evolution Course*

Choose one course:

BIOL 204	Systematic Plant Survey
BIOL 223	Invertebrate Zoology

OR

Choose two courses:

BIOL 363	Ornithology
BIOL 364	Herpetology
BIOL 368	Ichthyology
BIOL 490	Mammalogy

A minimum of 16 biology elective hours is chosen from among the following courses excluding those which have been taken as required core courses above:

BIOL 201	Environment and Man
BIOL 204	Systematic Plant Survey
BIOL 210	Introductory Genetics
BIOL 213	Natural History
BIOL 217	Intro. to Molecular Biology
BIOL 223	Invertebrate Zoology
BIOL 231-32	Anatomy and Physiology 1,2
BIOL 233	Exercise Physiology
BIOL 251	Principles of Ecology
BIOL 263	Biogeography
BIOL 271	Intro. to Marine Biology
BIOL 290	Special Topics in Biology
BIOL 301	Developmental Anatomy
BIOL 302	Human Anatomy
BIOL 303	Histology
BIOL 305	Environmental Toxicology
BIOL 308	Vascular Plant Anatomy
BIOL 310	Plant Physiology
BIOL 311	Microbiology
BIOL 321	Intro. to Immunology
BIOL 331-32-33	Physiology 1, 2, 3
BIOL 343	Microtechnique
BIOL 351	Cell Biology
BIOL 360	North American Mammals
BIOL 361	Entomology
BIOL 362	Parasitology

BIOL 363	Ornithology
BIOL 364	Herpetology
BIOL 366	Radiation Biology
BIOL 368	Ichthyology
BIOL 371	Advanced Marine Biology
BIOL 372	Topics in Marine Biology
BIOL 383	Animal Behavior (Ethology)
BIOL 423	Topics in Ecology and Biogeography
BIOL 451	Advanced Topics in Cell Biology
BIOL 481*	Internship Program
BIOL 490	Special Topics in Biological Sciences
BIOL 497*	Independent Study in Biology

\*Individually or collectively may count for only 7 hours of the 16 biology elective hours.

Credit cannot be granted for both 231 and 331 or 232 and 332.

A minimum of 47 biology hours is required for both the B.S. and B.A. degree.

Departmental advisors will assist students in selecting relevant electives.

### **B.S. Degree - Required Cognates (25 hrs.)**

Three courses in chemistry

Three courses in mathematics

One course in computer science

**PLUS** two additional science courses (courses in physics strongly recommended)

Specific science courses taught in the College of Engineering are acceptable cognates.

Kinesiology (HPES 223) offered by the department of health, physical education and sport studies may count with permission of the biological sciences faculty.

### **B.S. Degree - Additional Requirements**

Any additional courses in Biology (grade must be C or better), Chemistry, Mathematics, Physics, or GEOL 280 (20 hours)\*\*

\*\*These hours may also be satisfied by taking courses in the College of Engineering and Pharmacy but all are subject to approval of the biological sciences faculty.

### **B.A. Degree - Required Cognates (25 hrs.)**

Three courses in chemistry

Two courses in mathematics

One course in computer science, physics, or an additional mathematics course.

## Major in Environmental Studies

(Minimum 56 qtr. hrs. of Biology)

The department of biological sciences also offers a major in environmental studies. Students studying in this area are pursuing careers with industrial firms, consulting firms and governmental agencies.

### Core Requirements:

BIOL 121	General Biology
BIOL 122	General Zoology
BIOL 123	General Botany
BIOL 195	Orientation
BIOL 201	Environment and Man
BIOL 213	Natural History
BIOL 223	Invertebrate Zoology
BIOL 240	OSHA-40-Hour Safety Training
BIOL 251	Principles of Ecology
BIOL 305	Environmental Toxicology
BIOL 311	Microbiology
BIOL 482	Internship

**PLUS** Any two of the following:

BIOL 361	Entomology
BIOL 363	Herpetology
BIOL 366	Radiation Biology
BIOL 368	Ichthyology
BIOL 490	Mammalogy
BIOL 490	Plant Taxonomy

Additional biology electives (above the 56 quarter hours required) may also be added (see list of electives under Major in Biology).

### Required Cognates:

GEOL 280	Geology
PLSC 306	Environmental Law
PHIL 310	Environmental Ethics
CE 203	Surveying
CE 321	Environmental Science
CE 323	Solid and Hazardous Waste Management
CE 371	Urban Planning
MGMT 333	Management and Organizational Behavior

One year of chemistry including

CHEM 115	Environmental Chemistry
PHYS 100	Physics

**OR**

PHYS 211	General Physics: Mechanics of Solids and Fluids
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**PLUS** Three courses in math and one course in computer science

**PLUS** Six courses in the social sciences, business or public relations (must be advisor approved)

Additional courses in chemistry are also recommended for those wishing to pursue graduate studies. The department will make every effort to tailor the program to meet individual goals and needs of the student.

## Major in Molecular Biology

A major in Molecular Biology provides the necessary training for students to pursue careers in the biotechnology industry and research in cell and molecular biology and provides excellent preparation for graduate and medical school.

### Core Requirements:

BIOL 121	General Biology
BIOL 122	General Zoology
BIOL 123	General Botany
BIOL 195	Orientation
BIOL 210	Introductory Genetics
BIOL 217	Intro. to Molecular Biology
BIOL 311	Microbiology
BIOL 351	Cell Biology
BIOL 451	Adv. Topics in Cell Biology
CHEM 251-52-53	Organic Chemistry 1, 2, 3
CHEM 311	Chem. Of Biological Molecules
CHEM 312	Chemistry of Metabolism
CHEM 414-15-16	Biochemistry Laboratory 1, 2, 3

**PLUS** one of the Research Sequences below:

BIOL 295, 395, 495
CHEM 481, 482, 483

### Required Cognates:

CHEM 171-72-73	Introductory Chemistry 1, 2, 3
Three courses in mathematics (preferable sequence)	
MATH 163-64-65	Calculus 1, 2, 3

**PLUS** One course in computer science

### PLUS

PHYS 211	General Physics: Mechanics of Solids and Fluids
PHYS 212	General Physics: Sound, Heat, and Light
PHYS 213	General Physics: Electricity and Magnetism

(all with labs)

**OR**

PHYS 231	Physics: Mechanics of Solids and Fluids
PHYS 232	Physics: Heat, Sound, and Light
PHYS 233	Physics: Electricity and Magnetism

(all with labs)

## Life Science Licensure with a Major in Biology

The life science licensure program in biology is nationally accredited by the National Council for Accreditation of Teacher Education (NCATE).

### Biology Requirements: (Minimum 48 qtr. hrs.)

BIOL 121	General Biology
BIOL 122	General Zoology
BIOL 123	General Botany
BIOL 204	Systematic Plant Survey
BIOL 210	Introductory Genetics
BIOL 223	Invertebrate Zoology
BIOL 251	Principles of Ecology
BIOL 311	Microbiology
BIOL 351	Cell Biology

One of the following:

BIOL 231	Anatomy and Physiology 1
BIOL 301	Developmental Anatomy
BIOL 302	Human Anatomy
BIOL 331 + 334	Physiology 1 and Physiology Lab 1

**PLUS** the Biology Research Sequence

BIOL 295, 395, 495

And a minimum of 5 quarter hours of biology electives not included above. (See list of electives under Major in Biology.)

**Science Cognates:** (Minimum 24 qtr. hrs.)

CHEM 171-72-73 Introductory Chemistry 1, 2, 3

One of the following:

PHYS 100	Physics
PHYS 211 (with lab)	General Physics: Mechanics of Solids and Fluids
PHYS 231 (with lab)	Physics: Mechanics of Solids and Fluids

**PLUS** one of the following:

PHYS 252	Earth Science and Planetary Astronomy
GEOL 280	Geology

Additional electives in biology, chemistry, physics and/or earth science must be selected to complete a total of 75 quarter hours of science.

**Math Cognates:**

Three courses in mathematics which must include:

MATH 120	College Algebra
MATH 122	College Trigonometry

**OR**

one of the following:

MATH 154 Calculus for Life Sciences 1

MATH 160

Pre-Calculus Mathematics

MATH 163

Calculus 1

**PLUS** one course in computer science

The life science licensure student must also complete the education component of the program, including required field experiences and student teaching.

## Biological Sciences Minors

The department offers minors in **biology, environmental studies, biomedical sciences** and **field biology**.

Students who are **Biology Majors** may add an Environmental Studies, a Biomedical Sciences or a Field Biology Minor by taking all required courses for their major and chosen minor plus twelve additional quarter hours in biology applicable to either the major or minor.

**Environmental Studies Majors** may add a Biology or Biomedical Sciences Minor by taking all the requirements of their major and of the chosen minor. Environmental Studies Majors may also add a Field Biology Minor by taking all the requirements of their major and minor plus twelve additional quarter hours in biology applicable to either the major or minor.

**Molecular Biology Majors** may add an Environmental Studies, a Biomedical Sciences or a Field Biology Minor by taking all required courses for their major and chosen minor plus twelve additional quarter hours in biology applicable to either the major or minor.

Students pursuing a degree in **Medical Technology (BSMT)** may add a Biology, Environmental Studies or Field Biology Minor by taking all the requirements in their program and the chosen minor.

**Non-majors** may take two minors by taking all required courses for each of the minors plus twelve additional quarter hours of biology.

**Minor in Biology** (Minimum 30 qtr. hrs. of Biology)

**Core Requirements** (28 qtr. hrs.)

BIOL 121	General Biology
BIOL 122	General Zoology
BIOL 123	General Botany

*Molecular/Cellular Course*

Choose one course:

BIOL 210	Introductory Genetics
BIOL 217	Intro. to Molecular Biology
BIOL 351	Cell Biology

*Physiology/Anatomy Course*

Choose one course:

BIOL 231	Anatomy and Physiology
BIOL 301	Developmental Anatomy

BIOL 302	Human Anatomy
BIOL 308	Vascular Plant Anatomy
BIOL 310	Plant Physiology
BIOL 331	Physiology 1

(All must include a laboratory component)

#### *Field Biology/Ecology Course*

Choose one course:

BIOL 213	Natural History
BIOL 251	Principles of Ecology
BIOL 271	Intro. to Marine Biology

#### *Systematics/Evolution Course*

Choose one course:

BIOL 204	Systematic Plant Survey
BIOL 223	Invertebrate Zoology

#### **OR**

Choose two courses:

BIOL 363	Ornithology
BIOL 364	Herpetology
BIOL 368	Ichthyology
BIOL 490	Mammalogy

Additional Biology hours (at least 2 hours) can be selected from biology electives not selected from the above. (See list of electives under Major in Biology.)

#### **Required Cognates** (12 qtr. hrs.)

Any combination of mathematics, chemistry, physics, or GEOL 280.

### **Minor in Biomedical Sciences**

(Minimum of 30 qtr. hrs. of Biology)

#### **Core Requirements** (28 qtr. hrs.)

BIOL 121	General Biology
BIOL 122	General Zoology
BIOL 124	Intro. to Human Anatomy and Histology

#### **PLUS**

BIOL 231-32-33	Anatomy and Physiology 1, 2, and Exercise Physiology
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#### **OR**

BIOL 331-32-33	Physiology 1, 2, 3, (all with labs)
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#### **PLUS**

BIOL 301	Developmental Anatomy
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#### **OR**

BIOL 302	Human Anatomy
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Additional Biology hours (at least 2 hours) must be selected from the following electives not selected from the above:

BIOL 210	Introductory Genetics
BIOL 301	Developmental Anatomy
BIOL 302	Human Anatomy
BIOL 303	Histology
BIOL 311	Microbiology

BIOL 321	Intro. to Immunology
BIOL 351	Cell Biology
BIOL 362	Parasitology

#### **Required Cognates** (12 qtr. hrs.)

Any combination of mathematics, chemistry, or physics.

### **Minor in Environmental Studies**

(Minimum 30 qtr. hrs. of Biology)

#### **Core Requirements** (30 qtr. hrs.)

BIOL 121	General Biology
BIOL 122	General Zoology
BIOL 123	General Botany
BIOL 201	Environment and Man
BIOL 251	Principles of Ecology
BIOL 305	Environmental Toxicology
BIOL 311	Microbiology
PLSC 306	Environmental Law

#### **Required Cognates** (12 qtr. hrs.)

Any combination of mathematics, chemistry, physics, or GEOL 280

### **Minor in Field Biology** (Minimum 30 qtr. hrs. of Biology)

#### **Core Requirements** (24 qtr. hrs.)

BIOL 121	General Biology
BIOL 122	General Zoology
BIOL 123	General Botany

#### **PLUS**

BIOL 213	Natural History
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#### **OR**

BIOL 251	Principles of Ecology
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**PLUS** any two of the following (not included above):

BIOL 213	Natural History
BIOL 251	Principles of Ecology
BIOL 271	Intro. to Marine Biology
BIOL 363	Ornithology
BIOL 490	Mammalogy
BIOL 490	Plant Taxonomy

Additional Biology hours (at least 6 hours) must be selected from the following electives not selected from the above:

BIOL 204	Systematic Plant Survey
BIOL 213	Natural History
BIOL 223	Invertebrate Zoology
BIOL 251	Principles of Ecology
BIOL 263	Biogeography
BIOL 271	Intro. to Marine Biology
BIOL 360	North American Mammals
BIOL 361	Entomology
BIOL 363	Ornithology
BIOL 364	Herpetology
BIOL 368	Ichthyology
BIOL 383	Animal Behavior (Ethology)
BIOL 490	Mammalogy
BIOL 490	Plant Taxonomy

**Required Cognates** (12 qtr. hrs.)

Any combination of mathematics, chemistry, physics, or GEOL 280.

The **Ohio Northern University Nature Center**, a 70-acre property in Tuscarawas County, Ohio, serves as a biology field station. The facility is located near Ragersville, and includes a century-old house with eight rooms and a laboratory area. The hills, valleys, woods, fields, stream, and pond provide an excellent opportunity for teaching, study, and research.

The department of biological sciences has an **internship program** in which it has formed working relationships with a number of organizations and institutions. The one quarter senior year internship provides an off-campus practical experience in an area of biological sciences. Examples of possible internships include toxic waste management, environmental consulting, zoo animal care and management, wildlife and fisheries management, laboratory research, cardiology, cardio-pulmonary technology, biomedical computer, hospital and technical health programs. Before embarking on an internship, students must complete at least three years of courses in biology and related areas. The internship must be approved by the faculty of the department prior to registration.

## Bachelor of Science in Medical Technology (BSMT)

The department of biological sciences offers a medical technology program leading to a Bachelor of Science in Medical Technology. Both 3 + 1 and 4 + 1 programs are available. Affiliate hospitals are Riverside Hospital in Toledo, Ohio, the Cooperative Medical Technology Program of Akron, Ohio and St. Vincent's Health Center in Erie, Pennsylvania.

**General Education Requirements** for the 3 + 1 program: (Minimum 52 qtr. hrs.)

Two courses in mathematics  
 One course in computer science  
 One religion course  
 One fine arts course  
 One non-western course (see selection under College of Arts and Sciences)  
 ENGL 110-111 Writing 1, 2  
 ENGL 204 Great Works  
 HIST 110 Western Civilization 1  
 PSYC 100 Psychology  
 COMM 211 Public Speaking  
 HPES 110 Scientific Basis of Health & Fitness

and two additional Physical Education courses; one in the Fitness Area and one in the Lifetime Activities Area (see listing of Physical Education Service Courses in Department of Health, Physical Education, and Sport Studies)

**Biology Requirements:** (Minimum 52 qtr. hrs.)

BIOL 121	General Biology
BIOL 122	General Zoology
BIOL 124	Intro. to Human Anatomy And Histology
BIOL 195	Orientation
BIOL 210	Introductory Genetics
BIOL 217	Intro. to Molecular Biology
BIOL 223	Invertebrate Zoology
BIOL 301	Developmental Anatomy
BIOL 303	Histology
BIOL 311	Microbiology
BIOL 321	Intro. to Immunology
BIOL 331	Physiology 1 (with lab)
BIOL 343	Microtechnique
BIOL 362	Parasitology

**PLUS** the biology research sequence

BIOL 295, 395, 495

**OR**

BIOL 494 Biology Senior Seminar

Additional Biology electives must be selected from the following:

BIOL 302	Human Anatomy
BIOL 332	Physiology 2 (with lab)
BIOL 333	Physiology 3 (with lab)
BIOL 351	Cell Biology
BIOL 366	Radiation Biology
BIOL 397	Hematology
BIOL 397	Medical Terminology
BIOL 451	Adv. Topics in Cell Biology

**Chemistry Requirements:** (Minimum 31 qtr. hrs.)

CHEM 171-72-73	Introductory Chem. 1, 2, 3
CHEM 261-62-63	Organic Chem. - Majors 1, 2, 3
PHBS 341	Biochemistry 1

The B.S. in Medical Technology degree is awarded after the successful completion of the clinical year from an accredited school of medical technology. The medical technology student may choose to graduate with a major in biology, and then after graduation complete the clinical year. The student interested in this option should consult the medical technology advisor. The courses taken during the clinical year are listed below and numbered from 460 to 477.

**Business Option**

A business option with a management emphasis is available for any student majoring in biology or environmental studies or for students in the medical technology program. See Business Options under Arts and Sciences description.

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## **Subject - Biological Sciences (BIOL)**

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### **103 - LIFE AND EARTH SCIENCE FOR EARLY & MIDDLE CHILDHOOD MAJORS**

#### *4.00 Credits*

Consideration of the life sciences, including the following topics: cell biology, genetics, animal anatomy and physiology (primarily human), plant anatomy and physiology, evolution and ecology. Aspects of earth science as they affect and have affected life on earth including: weather, climate, glaciers, extraterrestrial impacts and continental drift. The roles of energy, material and information are emphasized. Some science teaching methods are included. For early childhood and middle childhood majors only. Prerequisite: CHEM 102.

### **121- GENERAL BIOLOGY**

#### *4.00 Credits*

Biological principles of plant and animal life with emphasis on cell biology, genetics and major concepts in evolution and ecology. Laboratory material is made available and discussed when appropriate. (Formerly BIOL 100).

### **122 - INTRODUCTION TO ZOOLOGY**

#### *4.00 Credits*

The classification of major animal groups, and structure of animals from a comparative systems viewpoint. (Formerly BIOL 112). Prerequisite: BIOL 121.

### **123 - GENERAL BOTANY**

#### *4.00 Credits*

Microbes, fungi and plants emphasizing classification and evolutionary relationships. The life histories, anatomy and physiology of fungi and plants. (Formerly BIOL 113). Prerequisite: BIOL 121.

### **124 - INTRODUCTION TO HUMAN ANATOMY AND HISTOLOGY**

#### *4.00 Credits*

The gross anatomy and histology of the human body system. Laboratory includes skeletal material, histology, radiographs, and cat dissection. Prerequisite: BIOL 122. Corequisite: BIOL 126.

### **195 - ORIENTATION (1+0)**

#### *1.00 Credit*

Presentations and discussions relating to adjustment and requirements of academic life within the University, College and the Department of Biological Sciences. Graded S/U.

### **201 - ENVIRONMENT AND MAN**

#### *4.00 Credits*

The interaction of man and his surroundings with an emphasis on the problems arising from increasing human population, pollution, and resource use. (Formerly BIOL 125).

### **204 - SYSTEMATIC PLANT SURVEY (2+4)**

#### *4.00 Credits*

Plant and algal relationships concentrating on phylogeny and classification. The morphology, development and life cycles of selected taxa will be examined. Prerequisite: BIOL 123.

### **210 - INTRODUCTORY GENETICS**

#### *4.00 Credits*

Mendelian, molecular and population genetics. Bacteriophages, bacteria, *Drosophila*, corn and humans will be studied for their historical and technological significance. Molecular information transfer and the regulation of gene expression will be analyzed in some depth. The laboratory focuses on an experimental analysis of fundamental genetic principles. Prerequisites: BIOL 121, 122 and 123; one year of chemistry.

### **213 - NATURAL HISTORY (1+6)**

#### *4.00 Credits*

The recognition, identification, and understanding of local biotic communities and their inhabitants. Field study is emphasized. Prerequisite: BIOL 122 or permission of the instructor.

### **217 - INTRODUCTION TO MOLECULAR BIOLOGY (3+3)**

#### *4.00 Credits*

The basic molecular processes of DNA, RNA, and protein synthesis. The regulation mechanisms used by viruses will be analyzed. The laboratory will emphasize gel electrophoresis techniques. Previous experience in organic chemistry is recommended. Prerequisite: one year of biology.

### **223 - INVERTEBRATE ZOOLOGY (3+3)**

#### *4.00 Credits*

Invertebrate relationships including morphology, physiology, life cycles and taxonomy. Prerequisite: BIOL 122.

### **231 - ANATOMY AND PHYSIOLOGY 1 (3+3)**

#### *4.00 Credits*

Basic principles of human structure and function. Cell physiology, metabolism, histology, skin, bone, neural, muscular and renal physiology and anatomy. Prerequisite: BIOL 122; BIOL 124 recommended.

**232 - ANATOMY AND PHYSIOLOGY 2 (3+3)***4.00 Credits*

Continuation of 231. The blood, digestive, endocrine, reproductive, cardiovascular, and respiratory systems. Prerequisite: BIOL 231.

**233 - EXERCISE PHYSIOLOGY (3+3)***4.00 Credits*

The physiological basis of exercise and training. Metabolism, muscle physiology, cardiovascular physiology and special topics in exercise physiology. Laboratory covers techniques for evaluating physical conditioning as related to lecture topics. Prerequisites: BIOL 232 or 333.

**240 - OSHA 40-HOUR SAFETY TRAINING***3.00 Credits*

Practical knowledge concerning response operations for the remediation incidents involving hazardous materials. Uncontrolled (remediation) site functions, methods of operation and safety in cleaning-up hazardous substances dumped, spilled or investigations at abandoned hazardous waste sites are emphasized. Provided by arrangement with the University of Findlay at Findlay. Does not count as a biology course.

**241 - BASIC EMERGENCY RESPONSE***2.00 Credits*

The basic defensive and offensive mitigation techniques available to responders. Application of skills to mock emergency responses. Basic site safety; recognition, identification and notification procedures; use of survey instrumentation; risk assessment and mitigation of chemical hazards in emergency response scenarios. Prerequisite: BIOL 240. Graded S/U.

**242 - GENERAL INDUSTRY SAFETY AND HEALTH COMPLIANCE***2.00 Credits*

Methods of finding, interpreting and implementing governmental regulations pertaining to employee safety. Prerequisite: HSPS 306. Graded S/U.

**242 - HAZARDOUS WASTE GENERATOR TRAINING***2.00 Credits*

Hazardous waste management procedures and the implementation of contingency plans in dealing with hazardous materials. Prerequisite: BIOL 240. Graded S/U.

**245 - OSHA SAFETY TRAINING REFRESHER***1.00 Credit*

This eight hour workshop is designed to comply with requirements regarding annual follow-up training for hazardous waste site workers who have previously completed BIOL 240 (OSHA Safety Training). Scheduled only in consultation with the Environmental Studies advisor in the

department. Taught at the University of Findlay. May be repeated 3 times for credit. Prerequisite: BIOL 240. Does not count as a biology course. Graded S/U.

**246 - HAZARDOUS MATERIALS TRANSPORTATION***2.00 Credits*

Basic hazardous materials transportation regulations and their applications in daily operations involving the four major transportation models (air, water, rail, highways). Hazardous materials package selection, marketing, labeling, etc. for shipment of materials. Graded S/U.

**251 - PRINCIPLES OF ECOLOGY***4.00 Credits*

Consideration of the interaction of organisms with their environment at the levels of the individual, population, community and ecosystem. The laboratory consists of collection of data in the field, and analysis and interpretation of that data. Prerequisites: BIOL 122, 123 or permission of the instructor.

**263 - BIOGEOGRAPHY***5.00 Credits*

The current and historic distribution of plants and animals. Consideration of continental drift, glaciation, meteorology, climatology, ecology and evolutionary history and their effect on the current distribution of living things. Prerequisites: BIOL 122, 123 or permission of the instructor. Offered alternate years.

**271 - INTRODUCTION TO MARINE BIOLOGY***4.00 Credits*

An overview of the various marine organisms and their habitats. Particular emphasis is placed on southeastern and Gulf coastal and offshore environments. A two-week field trip to a selected marine environment is required. Permission of instructor required. Prerequisite: BIOL 122.

**290 - SPECIAL TOPICS IN BIOLOGICAL SCIENCES***1.00 to 4.00 Credits*

Grading system at the discretion of the instructor. May be repeated for credit as the topic varies.

**295 - BIOLOGICAL LITERATURE RESEARCH***1.00 Credit*

Selection of a research project for the senior thesis, planning the approach to the project and submission of a formal research proposal for Department approval. The research proposal will require reading and critical analysis of portions of classical and current journal articles. Attendance of all departmental and thesis seminars required. Prerequisites: BIOL 121, 122 and 123.

### **301 - DEVELOPMENTAL ANATOMY (2+4)**

#### *4.00 Credits*

Human embryonic and fetal development supplemented by laboratory studies of fish, chick, pig, and mouse embryonic development. Prerequisite: BIOL 122 or its equivalent.

### **302 - HUMAN ANATOMY (2+4)**

#### *4.00 Credits*

The gross anatomy of the human body and body systems. Laboratories include x-rays, MRI's, skeletal material, and cadaver dissection. Prerequisite: BIOL 122 or its equivalent. Offered alternate years.

### **303 - HISTOLOGY (3+3)**

#### *4.00 Credits*

Microscopic analysis of cells, tissues, and the organ systems of the human body. Prerequisite: BIOL 122 or its equivalent. Offered alternate years.

### **305 - ENVIRONMENTAL TOXICOLOGY**

#### *3.00 Credits*

Consideration of effects of both man-made and natural toxic agents on living systems. Material will emphasize aspects of physiologic toxicity in both plant and animal systems. An understanding of basic chemical, physical and biologic principles will be required. Prerequisites: BIOL 121 and two courses in Chemistry.

### **308 - VASCULAR PLANT ANATOMY (3+3)**

#### *4.00 Credits*

General vascular plant anatomy, morphology and cellular ultrastructure. Structures from all major plant organs will be examined in an evolutionary, ecological, and physiological context. Prerequisite: BIOL 123. Offered alternate years.

### **310 - PLANT PHYSIOLOGY (3+3)**

#### *4.00 Credits*

Various plant functions, including water relations, photosynthesis, metabolism and hormonal regulation of growth, development and stimulus response with emphasis on cellular structure/function relationships. Prerequisite: BIOL 123. Offered alternate years.

### **311 - MICROBIOLOGY**

#### *4.00 Credits*

Classical microorganisms with the emphasis of the course on the various groups of bacteria and viruses. Fungi, algae and protozoa will receive only brief mention. Significance of the taxa will be discussed in reference to medical, environmental and basic research importance. Laboratory techniques for culturing, identifying and manipulating microbes will be practiced. Prerequisites: BIOL 121, 122 and 123.

### **312 - MICROBIOLOGY LABORATORY**

#### *1.00 Credit*

The practice of microbiological techniques for culturing, identifying and manipulating microbes. Experimental design and data analysis will be emphasized. Corequisite: BIOL 313. Prerequisites: BIOL 121, 122, 123 or 124.

### **313 - INTRODUCTION TO MEDICAL MICROBIOLOGY**

#### *4.00 Credits*

The fundamentals of microbiological principles using medically important organisms. Core themes include the impact of microbes on the biosphere, microbial cell biology, microbial genetics, interactions of microorganisms with humans and other organisms, microbial diversity and humans and other organisms, microbial diversity and microbial evolution. Students cannot have credit for both BIOL 311 and BIOL 313. Prerequisites: BIOL 121, 122, 123, or 124, and one year of chemistry.

### **321 - INTRODUCTION TO IMMUNOLOGY**

#### *4.00 Credits*

Basic anatomical, physiological, and genetic principles of immunology with considerable reference to clinical and research applications. Laboratories involve performance and demonstration of various immunoassays currently used in most areas of biological inquiry. Prerequisites: BIOL 121 and 122. BIOL 124 recommended.

### **322 - BIOSCIENCE LABORATORY 1**

#### *1.00 Credit*

Laboratory exercises involving various subject matter in the biological sciences including physiology, human anatomy, histology, and pathology. Prerequisite: BIOL 331.

### **323 - BIOSCIENCE LABORATORY 2**

#### *1.00 Credit*

Laboratory exercises involving various subject matter in the biological sciences including microbiology, molecular biology, and cell biology. Experimental data analysis will be emphasized. Corequisite: BIOL 333. Prerequisites: BIOL 311 or 313 and 322; PHBS 341 and 342.

### **331 - PHYSIOLOGY 1 (3+0)**

#### *3.00 Credits*

An advanced structural and functional approach to understanding the human body. Emphasis is placed on the integration of parameters from all levels of tissue and organ system function. Prerequisites: BIOL 124 and one year of chemistry or permission of the instructor.

**332 - PHYSIOLOGY 2 (3+0)**

3.00 Credits

Continuation of 331. Prerequisite: BIOL 331.

**333 - PHYSIOLOGY 3 (3+0)**

3.00 Credits

Continuation of 332. Prerequisite: BIOL 332.

**334 - PHYSIOLOGY LAB 1 (0+3)**

1.00 Credit

Corequisite: BIOL 331.

**335 - PHYSIOLOGY LAB 2 (0+3)**

1.00 Credit

Corequisite: BIOL 332.

**336 - PHYSIOLOGY LAB 3 (0+3)**

1.00 Credit

Corequisite: BIOL 333.

**343 - MICROTECHNIQUE (2+3)**

3.00 Credits

Principles and procedures used in the preparation of biological specimens for microscopic study. Offered alternate years. Prerequisite: BIOL 124 or 303.

**351 - CELL BIOLOGY (3+3)**

4.00 Credits

The function, structure and growth of cells will be analyzed with an emphasis on experimental techniques. Cellular organelles studied include: endomembrane systems, ribosomes, mitochondria and cytoskeletal elements. Prerequisites: BIOL 121, 122, 123 and CHEM 173.

**360 - NORTH AMERICAN MAMMALS**

4.00 Credits

The natural history, behavior, ecology and systematics of North American mammals. Representatives of all North American orders and most North American families are considered. Aspects which demonstrate general biological principles are emphasized. A weekend field trip is required. Offered alternating years, spring quarter. Prerequisite: BIOL 122.

**361 - ENTOMOLOGY**

4.00 Credits

The principles of entomology including the morphology, ecology, evolution and taxonomy of insects. A collection of a minimum 100 insects identified to family is required. The collection requirement may be met with a collection of fifty photographs of insects identified to family. Prerequisite: BIOL 122. BIOL 223 strongly recommended.

**362 - PARASITOLOGY**

4.00 Credits

The principles of parasitology, including the ecology, evolution and taxonomy, immunology and pathology of the protozoan and metazoan parasites. Major human and veterinary parasites, including their distribution, pathology and control. Offered alternate years. Prerequisite: BIOL 122. BIOL 223 strongly recommended.

**363 - ORNITHOLOGY**

4.00 Credits

The learning and identification of about 200 Ohio avian species. Lectures cover the biology of birds and the reading of library material. The laboratory includes field work, techniques for studying birds, journal writing, and preparation of a museum study skin. Prerequisite: BIOL 122.

**364 - HERPETOLOGY**

3.00 Credits

The biology of amphibians and reptiles with particular emphasis on the major taxonomic groupings. Morphology, behavior, systematics and the significance to man are examined. Field exercises at a major natural history museum and zoological park are required. Offered alternate years. Prerequisite: BIOL 213.

**366 - RADIATION BIOLOGY**

4.00 Credits

Interaction of radioactive decay particles with matter, the principles of radiological health and safety, and the biological effects of radiation. Offered alternate years.

**368 - ICHTHYOLOGY**

4.00 Credits

Fish biology with particular emphasis on the freshwater teleosts inhabiting Ohio waters. Considerable emphasis placed on field exercises, techniques and systematics. Prerequisite: BIOL 122.

**371 - ADVANCED MARINE BIOLOGY**

4.00 Credits

The unifying concepts of marine biology including biological, physical and chemical aspects. Emphasis will be on various organisms and their interactions with their environments. A two-week field trip to a selected marine environment is required. Prerequisites: BIOL 271 and permission of the instructor.

**372 - TOPICS IN MARINE BIOLOGY**

4.00 Credits

Selected areas of marine biology may be selected for in-depth study. Specific study areas include marine ichthyofauna, marine plankton, marine arthropods, marine molluscs, marine phycology, marine mammology, marine physiology and others. A field experience will be required. Prerequisites: BIOL 371 and permission of the instructor. May be repeated once for credit.

### **383 - ANIMAL BEHAVIOR (ETHOLOGY) (3+2)**

*4.00 Credits*

Basic principles of the behavior and ethology of invertebrates and vertebrates, stressing observational and descriptive techniques.

Offered alternate years. Prerequisites: BIOL 121, 122 and 223.

### **395 - BIOLOGICAL RESEARCH REPORT**

*1.00 Credit*

Working with a research advisor, investigation of the project proposed in BIOL 295, and preparation and submission of a written report in approved scientific format. Report must detail the progress of the senior thesis research including a literature review and work completed to date. Attendance at all departmental and thesis seminars required. Prerequisite: BIOL 295.

### **397 - SELF-DIRECTED STUDIES IN THE BIOLOGICAL SCIENCES**

*1.00 to 2.00 Credits*

An opportunity for students to investigate specialty fields within the biological sciences by utilizing interactive and/or multi-media programs. Various self-directed topics will be offered, e.g. Hematology. A maximum of 3 hours may be counted towards the major. This course cannot be used as a general education class. Prerequisites: BIOL 121, 122, 123 or 124. Graded S/U.

### **423 - TOPICS IN ECOLOGY AND BIOGEOGRAPHY**

*3.00 Credits*

Current literature on selected topics in Ecology and Biogeography. Prerequisite: BIOL 251 or permission of instructor. Offered alternate years. Can be repeated for credit.

### **451 - ADVANCED TOPICS IN CELL BIOLOGY**

*3.00 Credits*

Current literature on selected topics in cell biology. Prerequisite: BIOL 351 or PHBS 342. May be repeated for credit as the topic varies.

### **481 - INTERNSHIP PROGRAM**

*16.00 Credits*

Practical experience in areas such as wildlife/fisheries biology, zookeeping, environmental monitoring, cardio-pulmonary technology, pro-health programs and other specializations. Internships for which credit hours are also offered by another department are acceptable as long as the credit hours total 16 quarter hours. All departments involved must agree with the internship arrangement. Prerequisites: normally restricted to seniors, must be approved by biological sciences faculty, and a minimum of 3 years work in the fundamentals of biology and related areas. Graded S/U.

### **482 - INTERNSHIP IN ENVIRONMENTAL STUDIES**

*16.00 Credits*

Required experience in areas of environmental studies such as monitoring, compliance, and consulting. Prerequisite: Senior standing.

### **490 - SPECIAL TOPICS IN BIOLOGICAL SCIENCES**

*1.00 to 4.00 Credits*

Disciplines such as mammalogy and plant taxonomy. May be repeated for credit as topic varies.

### **494 - BIOLOGY SENIOR SEMINAR**

*1.00 Credit*

The presentation of a library research topic in both written and oral formats. Additionally a biology comprehensive examination must be passed with a grade of 70% or better. Previous or concurrent enrollment in AASG 300. Attendance at all departmental and thesis seminars required. Prerequisite: junior or senior status.

### **495 - SENIOR THESIS SEMINAR**

*1.00 Credit*

Written and oral presentation of the senior research project. The completed research project will be written in a format acceptable for submission to a scientific journal and presented during a formal seminar. Attendance at all departmental and thesis seminars required. Prerequisite: BIOL 395.

### **497 - INDEPENDENT STUDY IN BIOLOGY**

*1.00 to 3.00 Credits*

Graded S/U.

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## **Subject - Geology (GEOL)**

### **280 - GEOLOGY**

*4.00 Credits*

Physical geology and paleogeology, including chemical properties of minerals and rocks, geologic processes, and earth materials, and how these relate to the formation and preservation of plant and animal fossils. Fossils from the major geologic eras will be surveyed and reviewed in an evolutionary and ecological context. Prerequisites: BIOL 121, 122 or 123, or permission of instructor. Does not count as a biology course, but will count as a physical science requirement in both the BA and BS programs.

**290 - SPECIAL TOPICS IN GEOLOGY**

1.00 to 4.00 Credits

May be repeated for credit up to a total of 8 hours as the topic varies.

**297 - INDEPENDENT STUDY IN GEOLOGY**

1.00 to 3.00 Credits

Independent study in geology. Prerequisite: GEOL 280 or permission of instructor. Graded S/U.

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**Subject - Medical Technology  
(MDTC)**

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**460 - ORIENTATION/SAFETY**

.00 Credit

Basic laboratory instruments, methods, procedures, terminology, ethics and safety. Graded S/U.

**461 - CLINICAL BACTERIOLOGY-LECTURE**

4.00 Credits

Study of micro-organisms found in human infection, principles of isolation and identification.

**462 - CLINICAL MYCOLOGY-LECTURE**

2.00 Credits

Study of fungi found in human infection, principles of isolation and identification.

**463 - CLINICAL PARASITOLOGY-LECTURE**

2.00 Credits

Study of parasites found in human infection, principles of isolation and identification.

**464 - MICROBIOLOGY LABORATORY**

8.00 Credits

Laboratory methods, procedures, and instrumentation to correlate with Bacteriology, Mycology, and Parasitology lectures.

**465 - IMMUNOHEMATOLOGY LECTURE**

3.00 Credits

Theory of human blood groups, compatibility testing, detection, and identification of antibodies.

**466 - IMMUNOHEMATOLOGY LABORATORY**

3.00 Credits

Laboratory methods and instrumentation to correlate with lectures.

**467 - CLINICAL IMMUNOLOGY LECTURE**

2.00 Credits

Theory of information and detection of antigens and antibodies in disease states, both in vivo and in vitro.

**468 - CLINICAL IMMUNOLOGY LABORATORY**

2.00 Credits

Laboratory methods and instrumentation to correlate with lectures.

**469 - CLINICAL HEMATOLOGY/COAGULATION LECTURE**

4.00 Credits

Theory of hematopoiesis, cell morphology, blood dyscrasias, coagulation mechanism and abnormalities. Correlation of findings with human physiology and disease.

**470 - CLINICAL HEMATOLOGY/COAGULATION LABORATORY**

4.00 Credits

Laboratory instrumentation and procedures to correlate with the lectures.

**471 - CLINICAL CHEMISTRY LECTURE**

8.00 Credits

Theory of chemical constituents of body fluids in normal and disease states. Includes General Chemistry, Toxicology and DIA, Instrumentation, Statistics and Quality Control.

**472 - CLINICAL CHEMISTRY LABORATORY**

8.00 Credits

Laboratory instrumentation and procedures to correlate with the lectures.

**473 - URINALYSIS LECTURE**

1.00 Credit

Physiology of urinary system, related diseases and correlation to disease states.

**474 - URINALYSIS LABORATORY**

1.00 Credit

Laboratory methods and instrumentation to correlate with lectures.

**475 - LABORATORY MANAGEMENT**

.00 Credit

Theory and discussion of supervision and management. Graded S/U.

**490 - SPECIAL TOPICS IN MEDICAL TECHNOLOGY**

1.00 to 4.00 Credits

Clinical students are provided with opportunities to explore additional areas of laboratory science including such fields as: phlebotomy, serology, clinical research, clinical computer applications and advanced clinical analyses. This course may be repeated as the topic varies. Prerequisite: MDTC 460.

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## DEPARTMENT OF CHEMISTRY

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Professors Canagaratna, Hawbecker, Kurtz (*Chair*), Lamb, Peterson, Sadurski; Associate Professors Gray, C. Smith; Assistant Professors S. Bates, Broekemeier; Director of Laboratories Kelsey

The department of chemistry prepares students for research and careers in physical and medical sciences. Students master methods in mathematics and physical sciences while developing competence to identify, analyze, and solve scientific problems. The department also meets the need of non-technical students for an understanding of scientific methods and insights as they apply to the world of the mind and to decision making in a free society.

The department of chemistry is on the list of departments approved by the American Chemical Society for the professional education of Chemists and Biochemists, and offers both the Bachelor of Science and Bachelor of Arts degrees.

**Departmental Majors** Five programs are available in the department of chemistry. They are the American Chemical Society Approved Chemistry Major, the Chemistry Major basic program, the Chemistry Major modified program, the American Chemical Society Approved Biochemistry Major, and the Medicinal Chemistry Major.

### **The Chemistry Major American Chemical Society Approved Program**

Students desiring ACS Certification in Chemistry complete a program designed to prepare for graduate studies in chemistry or environmental science or direct entry into the chemical industry. Students may select either a B.A. or a B.S. degree.

The following core chemistry courses are required for the chemistry major: Chemistry 000, 181-182-183, 261-262-263, 271, 300, 304, 324, 341-342-343, 351 and 494. To this core must be added a "professional" component which includes Chemistry 311, 451, 462, and 5 credit hours from among Chemistry 473, 474, 481, 482, 483, and 300 level or above mathematics or physics courses approved by the chemistry department. The following cognates are required: Mathematics 163-164-165; a chemistry department approved computer science course; and Physics 231-232-233 with related laboratories.

**The Basic Program** Premedical students and students seeking a less technical path into graduate and professional schools or chemical industry may select the basic program with a B.S. or B.A. degree. This program includes the core and cognate courses listed above, but does not require the "professional" chemistry component.

**The Modified Major** A modified program is available for those who seek careers in chemically related areas such as chemical sales, patent law, science writing, or scientific information retrieval. It is designed individually in order to permit additional courses to be taken in the area which supports the entrant's chemistry related career goal. Entrance into the modified major must be approved by the department, and students selecting this program are expected to complete a second major or teacher licensure. High school physical science licensure at ONU is approved by the National Science Teachers Association and the State of Ohio. All modified programs include Chemistry 000, 181-182-183, 261-262-263 and 494, plus three courses from among 304, 311, 324, 337, 341-342-343. In addition the entrant must select a minimum of twelve credit hours of 300-400 level courses in the division of mathematics and natural sciences or other 300-400 level courses acceptable to the chemistry department. PHBS Biochemistry 341 and 342 may be substituted for Chemistry 311. Two of the following cognates must also be taken: Physics 211-212-213 or 231-232-233 with related laboratories; Biology 121-122-123; three mathematics courses at the level of 120 or above.

### **The American Chemical Society Approved Biochemistry Major**

This program is designed to prepare students for professional employment as biochemists and for graduate or professional studies in biochemistry, toxicology, molecular genetics, and related fields. The following core courses are required: Chemistry 000, 181-182-183, 261-262-263, 271, 300, 304, 311, 321, 341-342-343, 351 and 494. To this core must be added Chemistry 312, Chemistry 414-415-416 and a minimum of two courses from among Biology 210, 311, 321, 351, and 451. Required cognates are Biology 121-122-123; Mathematics 163-164-165; a chemistry department approved computer science course; and Physics 231-232-233 with related laboratories.

### **The Medicinal Chemistry Major**

The Bachelor of Science in medicinal chemistry is an interdisciplinary major designed for students preparing for research careers in pharmacology, medicinal chemistry, pharmaceutical sciences, or for direct employment in pharmaceutical chemistry. Required core chemistry courses are Chemistry 000, 181-182-183, 261-262-263, 271, 300, 304, 311-312, 341-342-343, 351, 481-482-483 or PHBS 565 and Chemistry 494. Required cognates are Biology 121-122-123; Mathematics 163-164-165; a chemistry department approved computer science course; and Physics 231-232-233 with related laboratories. The following Pharmacy College courses complete the major; PHBS 381, 562 (or BIOL 351), PHBS 443 and 444.

**Minor in Chemistry** Students wishing to obtain a minor in chemistry should complete these courses:

Chemistry 181-182-183 (or 171-172-173) and 261-262-263 plus two additional courses from among Chemistry 304, 312, 321, 337, 341, 342, 343, 351, or 363.

**Minor in Biochemistry** Students wishing to obtain a minor in biochemistry should complete these courses: Chemistry 181-182-183 (or 171-172-173) and 261-262-263, 311 (or PHBS 341), 312 (or PHBS 342) and Chemistry 414 and 415.

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## **Subject - Chemistry (CHEM)**

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### **000 - ORIENTATION (1+0)**

#### *1.00 Credit*

Familiarization with the department, requirements for majors, planning a program of courses, university catalog, career planning and library. Required of department majors. Course graded S/U.

### **100 - CHEMISTRY (3+1)**

#### *4.00 Credits*

The behavior of matter at the macroscopic level and explanations of this behavior using molecular-level models. Applications in everyday life. Chemistry 171 recommended for science majors. Credit may be received for either CHEM 100 or CHEM 171 but not for both.

### **102 - PHYSICAL AND EARTH SCIENCES- EARLY & MIDDLE CHILDHOOD MAJORS**

#### *4.00 Credits*

Expressions of the nature of matter and energy in the earth (geology), atmosphere (meteorology), and space (astronomy). Includes major conceptual models in these disciplines. For early childhood and middle childhood education majors only. Prerequisite: PHYS 101.

### **108 - BASICS OF CHEMISTRY (4+0)**

#### *4.00 Credits*

Basic skills and concepts needed to understand the nature of chemical processes. Recommended for students with little or no previous background in chemistry prior to entry into CHEM 171. CHEM 108 DOES NOT SATISFY A GENERAL EDUCATION REQUIREMENT AND IT CANNOT BE USED TO SATISFY SPECIFIC DEPARTMENTAL OR PROGRAM REQUIREMENTS.

### **114 - CHEMISTRY OF LIFE (4+0)**

#### *4.00 Credits*

Chemical nature of the major groups of biological molecules and their activities in living systems. Credit may not be received for both CHEM 114 and CHEM 311 or PHBS 341. Offered alternate years. Prerequisite: CHEM 100 or 162 or 171.

### **115 - ENVIRONMENTAL CHEMISTRY (4+0)**

#### *4.00 Credits*

Chemical aspects of the natural and polluted environment. Particular emphasis on air and water pollution. Prerequisite: CHEM 100 or 162 or 171.

### **162 - CHEMISTRY-CONCEPTS AND APPLICATIONS 1 (4+0)**

#### *4.00 Credits*

Chemistry for engineering students. Basic chemical theories applied to practical situations. Prerequisites: High school chemistry; MATH 164; PHYS 231, 232, 233, 234, 235, 236 or equivalent of the above or approval of the department chairman.

### **163 - CHEMISTRY-CONCEPTS AND APPLICATIONS 2 (3+3)**

#### *4.00 Credits*

Continuation of CHEM 162. Laboratory reinforces the lecture program. Prerequisite: CHEM 162.

### **171 - INTRODUCTORY CHEMISTRY 1 (4+3)**

#### *5.00 Credits*

Macroscopic concepts of the elements, compounds and reactions. Stoichiometry, thermochemistry and properties of ideal gases as applied to reactive systems. Emphasis on acid-base, redox, and descriptive chemistry. Laboratory relates physical observations to principles presented in lecture. Credit may be received for either CHEM 100 or 171 but not for both. Prerequisite: High school chemistry or equivalent, or CHEM 108.

### **172 - INTRODUCTORY CHEMISTRY 2 (4+3)**

#### *5.00 Credits*

Atomic theory and its application to bonding, molecular structure, condensed phases, chemical reactions and mechanisms. Laboratory supports principles presented in lecture, including spectroscopy. Prerequisite: CHEM 171.

### **173 - INTRODUCTORY CHEMISTRY 3 (4+3)**

#### *5.00 Credits*

Physical principles controlling chemical reactions including kinetics, thermodynamics, electrochemistry, and acid-base equilibrium conditions. Laboratory supports principles presented in lecture, including kinetics and equilibrium. Prerequisite: CHEM 172.

### **181 - INTRODUCTORY CHEMISTRY FOR MAJORS 1 (4+3)**

#### *5.00 Credits*

Same lecture and laboratory as CHEM 171.

**182 - INTRODUCTORY CHEMISTRY FOR MAJORS 2 (4+3)**

*5.00 Credits*

Same lecture and laboratory as CHEM 172.

Prerequisite: CHEM 181.

**183 - INTRODUCTORY CHEMISTRY FOR MAJORS 3 (4+3)**

*5.00 Credits*

Same lecture and laboratory as CHEM 173.

Prerequisite: CHEM 182.

**251 - ORGANIC CHEMISTRY 1 (3+3)**

*4.00 Credits*

Bonding, energetics, synthesis and mechanisms emphasized throughout the course. Electronic structure, acid-base and redox relationships among functional groups, conformational and configurational isomers, IUPAC nomenclature, Sn, E, Ad2 and Sr reactivity, and the synthesis of alkenes and alkynes. Laboratory introduces chromatographic and classical separation techniques. Elimination and substitution reactions are investigated. Credit may be received for CHEM 251 or 261, but not both. Prerequisite: CHEM 173 or 183.

**252 - ORGANIC CHEMISTRY 2 (3+3)**

*4.00 Credits*

Mass, ir, uv, and nmr spectroscopy in structure determination, alcohol synthesis, organometallics, nucleophilic additions to carbonyls, polyenes, aromaticity, SeAR and SnAR processes. Laboratory includes applications of spectroscopy, synthetic, and stereochemical principles, carbonyl and alkene additions, terpene identification, and aromatic substitutions. Credit may be received for CHEM 252 or 262, but not both. Prerequisite: CHEM 251.

**253 - ORGANIC CHEMISTRY 3 (3+3)**

*4.00 Credits*

Organic nitrogen chemistry, carbohydrates, enolate condensations, alkylation, and conjugate addition, heterocyclic chemistry, polymerization, amino acids and proteins. Laboratory emphasizes short syntheses of biological and pharmaceutical relevance. Credit may be received for CHEM 253 or 263, but not both. Prerequisite: CHEM 252.

**261 - ORGANIC CHEMISTRY 1 - MAJORS (3+3)**

4.00 Credits

Same as Chemistry 251 lecture with Chemistry 254 Lab. Credit may be received for CHEM 251 or CHEM 261 but not for both. Prerequisite: CHEM 173 or CHEM 183.

**262 - ORGANIC CHEMISTRY 2 - MAJORS (3+3)**

4.00 Credits

Same as Chemistry 252 lecture with Chemistry 255 lab. Credit may be received for CHEM 252 or CHEM 262 but not for both. Prerequisites: CHEM 251 or CHEM 261.

**263 - ORGANIC CHEMISTRY 3 - MAJORS (3+6)**

5.00 Credits

Same as Chemistry 253 lecture with two credit laboratory in organic structure elucidation. Laboratory comprises traditional wet tests as well as instrumental experience with ir, uv, mass and nmr spectrometry. Inferential and critical reasoning emphasized. Credit may be received for CHEM 253 or CHEM 263 but not for both. Prerequisites: CHEM 252 or CHEM 262.

**271 - CHEMICAL APPLICATIONS OF MATHEMATICS (4+0)**

4.00 Credits

Selected areas of mathematical techniques used in modern chemistry as a preparation for the higher level quantitative chemistry courses (junior year Physical Chemistry, Quantitative Analysis, Chemical Instrumentation and Advanced Physical Chemistry). Examples illustrate the application of mathematical techniques to problems in Chemistry. Prerequisites: CHEM 181, 182, 183 or equivalent; and MATH 165.

**290 - SPECIAL TOPICS IN CHEMISTRY**

1.00 to 4.00 Credits

Can be repeated as the topic varies.

**297 - INDEPENDENT STUDY IN CHEMISTRY**

1.00 to 4.00 Credits

Can be repeated for a maximum of 6 credit hours. Prerequisite: Approval of the department chairman.

**300 - INTRODUCTION TO CHEMICAL RESEARCH (1+0)**

.00 Credit

Methods and objectives of chemical research. Undergraduate research opportunities in the Chemistry department. Required of all students in the Basic, ACS or Biochemistry programs prior to enrollment in CHEM 497 or 481, 482 and 483. Course graded S/U. Prerequisite: Junior standing or approval of department chairman.

**304 - ORGANIC SYNTHESIS (2+6)**

4.00 Credits

Major carbon skeletal alteration techniques and selective functional group transformations. Laboratory consists of planning and executing multistep syntheses of graded complexity. Use of synthetic chemical literature introduced. Prerequisite: CHEM 253 or 263.

**311 - CHEMISTRY OF BIOLOGICAL MOLECULES (4+0)**

4.00 Credits

Structures and properties of the major classes of biological molecules with emphasis on the physical properties of macromolecules. Includes thermodynamics, enzyme kinetics and mechanisms, coenzymes, isolation and characterization techniques and an introduction to the design and regulation of metabolic pathways. Prerequisites: CHEM 253 or 263 and MATH 165.

**312 - CHEMISTRY OF METABOLISM (4+0)**

4.00 Credits

Intermediary metabolism with emphasis on the chemical reactions of glycolysis, the citric acid cycle, lipid and amino acid synthesis and degradation, and nucleic acid metabolism. Prerequisite: CHEM 311.

**321 - INTERMEDIATE INORGANIC CHEMISTRY-BIOCHEMISTRY MAJORS (3+3)**

4.00 Credits

Same lecture as CHEM 324 with a different laboratory. Bonding, structures, preparation, properties, compounds, and reactions of main group and transition metal elements. Laboratory involves basic methods of synthesis and characterization with selected experiments for the biochemistry major. Prerequisite: CHEM 263 or approval of the department chairman.

**324 - INTERMEDIATE INORGANIC CHEMISTRY-CHEMISTRY MAJORS (3+3)**

4.00 Credits

Same lecture as CHEM 321 with a different laboratory. Bonding, structures, preparation, properties, compounds, and reactions of main group and transition metal elements. Laboratory involves basic methods of synthesis and characterization. Prerequisite: CHEM 263 or approval of the department chairman.

**337 - ELEMENTS OF PHYSICAL CHEMISTRY (4+0)***4.00 Credits*

Principles and applications of selected areas of physical chemistry including thermodynamics, kinetics, and spectroscopy. Intended for students in the modified chemistry major or chemistry minor who wish to enhance their chemistry background. Credit may be received for CHEM 337 or CHEM 341 but not for both. Prerequisites: CHEM 163 or 252 or 262, and three courses from the Department of Mathematics and Computer Science. Offered alternate years.

**339 - CHEMICAL INTERACTIONS IN ENVIRONMENTAL SYSTEMS (4+0)***4.00 Credits*

Chemical interactions in the natural environment, including the effects of man's activities on the dynamics, thermodynamics and kinetics of atmospheric, hydrospheric and lithospheric chemical systems. Taught in alternate years. Prerequisites: CHEM 163, 253 or 263.

**341 - PHYSICAL CHEMISTRY 1 (3+3)***4.00 Credits*

Classical thermodynamics. Laboratory illustrates principles and applications. Knowledge of computer programming recommended. Prerequisites: CHEM 253 or 263; MATH 165 and 272; PHYS 231, 232 and 233 with related laboratories.

**342 - PHYSICAL CHEMISTRY 2 (3+3)***4.00 Credits*

Quantum mechanics. Laboratory illustrates applications in spectroscopy. Knowledge of elementary differential equations recommended. Prerequisite: CHEM 341.

**343 - PHYSICAL CHEMISTRY 3 (3+3)***4.00 Credits*

Statistical thermodynamics, kinetic molecular theory and chemical kinetics. Laboratory illustrates principles and applications. Prerequisite: CHEM 342.

**351 - INTERMEDIATE QUANTITATIVE ANALYSIS (2+6)***4.00 Credits*

Practice and principles of modern chemical methods of analysis. Introduction to instrumental methods of analysis. Prerequisite: CHEM 173 or 183.

**363 - APPLICATIONS OF CHEMICAL INSTRUMENTATION (1+5)***3.00 Credits*

Principles and methods of instrumental measurements for the analysis of real samples. Lecture and laboratory integrated to deal with the collection, preparation and analysis of environmental, geological, biological and industrial samples. Automatic sequencing and process analysis. Prerequisite: CHEM 163 or 253 or 263. Offered alternate years.

**390 - SPECIAL TOPICS IN CHEMISTRY***1.00 to 4.00 Credits*

Can be repeated as the topic varies.

**411 - ADVANCED TOPICS IN BIOCHEMISTRY (3+0)***3.00 Credits*

Behavior and characterization of biological macromolecules. Biochemical basis for hormone action, gene expression and photosynthesis. Prerequisites: CHEM 312 or PHBS 342 and CHEM 343 or approval of the department chairman.

**414 - BIOCHEMISTRY LABORATORY 1 (0+6)***2.00 Credits*

Chemical and physical properties of biological molecules and an introduction to enzyme kinetics. Prerequisite: CHEM 312 or PHBS 342.

**415 - BIOCHEMISTRY LABORATORY 2 (0+6)***2.00 Credits*

Protein, nucleic acid, lipid and carbohydrate isolation and characterization. Prerequisite: CHEM 414.

**416 - BIOCHEMISTRY LABORATORY 3 (0+6)***2.00 Credits*

Modern methods of nucleic acid analysis with an emphasis on recombinant DNA techniques. Prerequisite: CHEM 415.

**451 - ADVANCED INORGANIC CHEMISTRY (3+3)***4.00 Credits*

Theory, bonding, spectroscopy, reaction mechanisms and organometallic compounds. Laboratory involves advanced methods of synthesis and characterization. Prerequisites: CHEM 321 or 324 and 343 or approval of the department chairman.

**462 - ADVANCED ANALYTICAL CHEMISTRY (3+3)***4.00 Credits*

Theoretical and experimental study of modern methods of instrumental analysis. Principles, design and use of chemical instrumentation. Laboratory stresses independent, investigative experimentation. Prerequisites: CHEM 343 and 351 or approval of the department chairman.

**473 - ADVANCED TOPICS IN PHYSICAL CHEMISTRY (4+0)**

*4.00 Credits*

Selected topics from group theory, advanced quantum mechanics, spectroscopy and chemical dynamics. Knowledge of computer programming recommended. Prerequisite: CHEM 343.

**474 - THEORETICAL ORGANIC CHEMISTRY (4+0)**

*4.00 Credits*

Application of molecular orbital theory and various thermodynamic relationships to the study of organic reaction mechanisms. Structure-reactivity relationships are emphasized. Prerequisites: CHEM 304 and 343 or approval of the department chairman.

**481 - SENIOR RESEARCH 1**

*2.00 Credits*

Prerequisites: CHEM 300 and approval of the department chairman.

**482 - SENIOR RESEARCH 2**

*2.00 Credits*

Prerequisites: CHEM 481 and approval of the department chairman.

**483 - SENIOR RESEARCH 3**

*2.00 Credits*

Prerequisites: CHEM 482 and approval of the department chairman.

**490 - SPECIAL TOPICS IN CHEMISTRY**

*1.00 to 4.00 Credits*

Can be repeated as the topic varies.

**494 - SEMINAR IN CHEMISTRY (1+0)**

*1.00 Credit*

Oral presentation and a formal paper on a chemical topic related to a selected seminar theme. Required of all senior chemistry and biochemistry majors.

**497 - INDEPENDENT STUDY IN CHEMISTRY**

*1.00 to 4.00 Credits*

Can be repeated for a maximum of 6 credit hours. Prerequisite: CHEM 300 and approval of the department chairman.

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## DEPARTMENT OF COMMUNICATION ARTS

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Professors Johnson, Riess (*Chair*), Roberts; Associate Professors Bayliss, Gaine, Iseman, Vivian; Assistant Professors Bell (Resident Artist), Dobson

### Departmental Objectives

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

### Departmental Curriculum

The departmental course offerings promote understanding of the theory, practice, and aesthetics of human communication. Students majoring in communication arts pursue a concentration particular to their professional education goals.

Concentrations leading to the **Bachelor of Arts** degree are offered in the following areas:

- Professional and Organizational Communication
- Theatre
- Public Relations
- Telecommunications

**Professional and Organizational Communication** provides knowledge and skills emphasizing the close relationship between effective communication and the successful operation of all organizations. The concentration prepares students for graduate study and for careers in fields such as human resources, law, business, education, personnel, and politics.

**Theatre** provides artistic expression of human actions. As a liberal art it is a foundation for many careers where critical thinking, analytic ability, and creative expression are important. Graduates have been successful in theatre, law, medicine, banking, public service, and graduate school. The program has an extensive production and directing focus.

**Public Relations** prepares students for jobs with agencies, nonprofit organizations, and corporations doing both internal and external communica-

tion tasks. Public relations majors learn how to conduct research, plan programs, produce communication materials, and carry out program evaluation.

**Telecommunications** provides a review of the past and a preview of the future in radio, television, cable, and telecommunications. The concentration affords opportunities to develop hands-on skills for careers in broadcast production and performance, corporate audio/video, multimedia production, as well as graduate study.

A concentration leading to the **Bachelor of Fine Arts** degree is offered in:

- Musical Theatre

**Musical Theatre** provides professional training within a liberal arts environment and blends dance, music, and theatre. Students audition for acceptance into the Musical Theatre concentration at the end of their first year of course work. Graduates typically pursue professional careers in the performing arts. Double majors are permitted.

Department majors as well as dual majors whose primary major is from another department/college may elect to pursue more than one concentration.

Departmental majors who are unable to fulfill specified curricular requirements in existing departmental concentrations may obtain a major in Communication Arts (without concentration) upon approval by the department Chair.

**Internships** are an integral part of some concentrations. Related courses outside the department are also required of some concentrations.

**Minors** are offered in the following areas:

- Professional and Organizational Communication
- Theatre
- Public Relations
- Telecommunications
- Dance

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

**Business Option** A business option is available for any student majoring in communication arts. The courses for the option are in addition to concentration course work. The option is designed to provide a business focus for students

within their communication career goals. See page 51 of this catalog for the Business Option courses.

### Departmental Activities

Beyond the traditional classroom experience, students are encouraged to become involved in a variety of departmental activities. WONB-FM, the campus radio station, allows students to gain experience in broadcasting and management. ONU Cable TV provides students experience in campus telecommunication activities. The Public Relations Student Society of America gives students professional learning experiences through networking, workshops, campaign exposure, and service. Ohio Northern University Theatre offers opportunities for students to act in and engage in technical work for musicals, new works, readers theatre, and traditional plays. In all these activities, the department encourages student involvement. Credit toward graduation may be received from participation in some activities.

**Grading** Any grade below "C" that is received in a departmental course will not count toward major or minor requirements.

## Communication Arts with Professional and Organizational Communication Concentration (66 hours)

### *I. Concentration Requirements: (54 hours)*

COMM 211	Public Speaking
COMM 212	Business and Prof. Speaking
COMM 221	Interviewing
COMM 225	Interpersonal Communication
COMM 311	Persuasive Speaking
COMM 321	Group Communication
COMM 345	Organizational Communication
COMM 440	Comm. and Conflict Mgmt.
COMM 445	Issues in Professional Comm.
IBEC 100	Economics
ABUS 201	PC Applications
MGMT 333	Management and Org. Beh.
MRKT 351	Principles of Marketing
ENGL 241	News Writing <b>or</b>
ENGL 243	Magazine Writing <b>or</b>
ENGL 343	Persuasive Writing <b>or</b>
ENGL 347	Advanced Writing
	Senior Capstone Experience

### *II. Concentration Electives (12 hrs)*

#### *Choose two courses:*

COMM 121	Argumentation
COMM 130	Intro. to Public Relations
COMM 150	Intro. to Telecommunications

COMM 230	Communication Theory
COMM 240	Parliamentary Procedure
COMM 330	Publ., Media and Campaigns
COMM 340	Voice and Diction
COMM 348	Health Communication
COMM 421	Political Communication

*Choose one course:*

ABUS 312	Business Law 1
MGMT 363	Human Resource Mgmt.
MRKT 452	Consumer Behavior

**Professional and Organizational Communication Minor (34 hours)**

*I. Minor Requirements (26 hours)*

COMM 211	Public Speaking
COMM 212	Business and Prof. Speaking
COMM 225	Interpersonal Communication
COMM 311	Persuasive Speaking
COMM 345	Organizational Communication
COMM 440	Comm. and Conflict Mgmt.
COMM 445	Issues in Prof. Communication

*II. Minor Electives (8 hours)*

*Choose two courses:*

COMM 121	Argumentation
COMM 130	Intro. to Public Relations
COMM 150	Intro. to Telecommunications
COMM 221	Interviewing
COMM 240	Parliamentary Procedure
COMM 321	Group Communication
COMM 330	Publ., Media and Campaigns
COMM 348	Health Communication

**Communication Arts with Theatre Concentration (74 hours)**

*I. Concentration Requirements: (54 hours)*

COMM 106	Introduction to Theatre
COMM 241	Oral Interpretation of Literature
COMM 260	Acting
COMM 275	Theatre Technology
COMM 285	Stage Management
COMM 291	World Theatre History
COMM 300	Theatre Symposium
COMM 340	Voice and Diction
COMM 370	Dance History
COMM 375	Topics in Theatre Design
COMM 380	Arts Administration
or 486	Playwriting
COMM 385	Production Analysis
COMM 386	Directing
COMM 391	American Theatre History
COMM 499	Independent Study (Sr. Capstone)

*II. Concentration Electives*—Choose 8 hours from the following courses:

COMM 261	Performance Practicum
COMM 276	Production Practicum
COMM 277	Shop Practicum

COMM 283	Stage Management Practicum
COMM 378	Design Practicum
COMM 387	Directing Practicum

*III. Concentration Cognates: (12 hours)*

ENGL 208	Modern World Drama
ENGL 260	Introduction to Shakespeare
or 412	Shakespeare Studies
PHIL 341	Aesthetics

**Theatre Minor (28 hours)**

COMM 106	Intro. to Theatre
COMM 260	Acting
COMM 275	Theatre Tech.
COMM 285	Production Analysis
COMM 291	World Theatre History
COMM 386	Directing
Plus 4 hrs. of theatre electives other than practicum.	

**Communication Arts with Public Relations Concentration (62 hrs.)**

*I. Concentration Requirements (38 hrs.)*

COMM 130	Introduction to Public Relations
COMM 203	Public Relations Practicum*
COMM 236	Public Relations Writing
TECH 240	Introduction to Communication Technology
COMM 330	Publicity, Media & Campaigns
COMM 335	Internship**
COMM 336	Advanced Public Relations Writing
COMM 342	Public Relations Research
COMM 430	Public Relations Case Studies
	Senior Capstone Experience

*II. Concentration Electives (24 hours)*

*Choose four courses:*

COMM 211	Public Speaking***
or	
COMM 225	Interpersonal Communication***
ART 222	Graphic Design
ENGL 241	News Writing
ENGL 243	Magazine Writing
COMM 256	Telecommunications Writing
COMM 321	Group Communication
COMM 355	Broadcast Journalism
	Special Topics in Public Relations****

*Choose two courses:*

COMM 150	Intro. to Telecommunications
COMM 212	Business and Prof. Speaking
COMM 221	Interviewing
MGMT 333	Management and Org. Beh.
MRKT 351	Principles of Marketing
MGMT 363	Human Resource Management
MGMT 410	Business and Society

\*\*Four hours minimum-sixteen hour maximum;  
Minimum 2.5 GPA required overall and in concentration requirements

\*Six hours minimum-twelve hours maximum

\*\*\*Whichever was not taken to meet general education requirements

\*\*\*\*May be repeated with different topics

### **Public Relations Minor (28 hours)**

COMM 130	Intro. to Public Relations
COMM 236	Public Relations Writing
TECH 240	Intro. to Comm. Technology
COMM 330	Publ., Media and Campaigns
COMM 336	Adv. Public Relations Writing
COMM 342	Public Relations Research
COMM 430	Public Relations Case Studies

### **Communication Arts with Telecommunications Concentration (48 hours)**

#### *I. Concentration Requirements (28 hours)*

COMM 150	Intro. to Telecommunications
COMM 256	Telecommunications Writing
COMM 258	Telecommunications Practicum: Audio (4 hrs.)
COMM 259	Telecommunications Practicum: Video (4 hrs.)
COMM 335	Internship (4 hrs.)
COMM 351	Audio/Video Production
COMM 453	Mass Media & Society Senior Capstone Experience

#### *II. Concentration Electives (20 hours)*

*Choose three courses:*

COMM 355	Broadcast Journalism
COMM 452	Broadcast Sales and Promo.
COMM 454	Corporate Audio and Video Production

COMM 455	Broadcast Management
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*Choose two courses:*

COMM 130	Introduction to Public Relations
COMM 212	Business and Prof. Speaking
COMM 221	Interviewing
COMM 260	Acting
COMM 340	Voice and Diction
MGMT 333	Management and Org. Beh.
MRKT 351	Principles of Marketing

### **Telecommunications Minor (28 hours)**

COMM 150	Intro. to Telecommunications
COMM 256	Telecommunications Writing
COMM 258	Telecommunications Practicum: Audio (2 hrs.)
COMM 259	Telecommunications Practicum: Video (2 hrs.)
COMM 355	Broadcast Journalism
COMM 452	Broadcast Sales and Promo.
COMM 453	Mass Media & Society
COMM 455	Broadcast Management

### **Communication Arts with Musical Theatre Concentration (87 hours)**

*I. Concentration Core Requirements (8 hrs.)*  
(Core courses to be completed prior to auditioning for the musical theatre concentration)

AMUS 010	Musical Theatre Voice
COMM 116	Jazz 1
COMM 265	Musical Theatre Perf. Studies

#### *II. Concentration Requirements: Theatre (46 hours)*

COMM 106	Introduction to Theatre
COMM 260	Acting
COMM 261	Performance Practicum
or 204	Dance Practicum
COMM 275	Theatre Technology
COMM 278	Makeup
COMM 291	World Theatre History
COMM 300	Theatre Symposium
COMM 360	Topics in Acting
COMM 370	Dance History
or 470	Dance Composition
COMM 460	Styles of Acting
COMM 465	Advanced Musical Theatre Performance
COMM 499	Independent Study (Sr. Capstone)

#### *Music (19 hours)*

MUSC 100	Music Appreciation
MUSC 121	Theory of Music
MUSC 131	Ear Training
AMUS 015	Individual Voice
AMUS 020	Piano Class
or 025	Individual Piano
AMUS 089	Opera Workshop

#### *Dance (12 hours)*

At least one course in each dance area chosen from the following:

COMM 115	Tap 1
COMM 215	Tap 2
COMM 216	Jazz 2
COMM 117	Ballet 1
COMM 217	Ballet 2
COMM 118	Modern 1
COMM 218	Modern 2

*III. Concentration Cognate Requirements (2 hours)*

COMM 050	Social Dance
COMM 080	Square and Folk Dancing

### **Communication Arts/Dance Minor (29 hrs.)**

The dance minor, which is available to majors and non-majors throughout the university, has a strong technical component. Students pursuing a dance minor must choose a technical area of emphasis in either ballet or modern dance.

### *Ballet Emphasis*

COMM 117	Ballet 1
COMM 118	Modern Dance 1
COMM 204	Dance Practicum
COMM 217	Ballet 2**
COMM 380	Dance History**
COMM 470	Dance Composition**

### *Modern Dance Emphasis*

COMM 117	Ballet 1
COMM 118	Modern Dance 1
COMM 204	Dance Practicum
COMM 218	Modern Dance 2
COMM 380	Dance History**
COMM 470	Dance Composition**

\*\*To be offered on alternate years.

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## **Subject - Communication Arts (COMM)**

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### **000 - ORIENTATION**

#### *1.00 Credit*

Familiarization with the departmental requirements for majors, planning a program of courses, university catalog and library. Required of departmental majors. Graded S/U.

### **105 - THEATRE APPRECIATION**

#### *4.00 Credits*

An introduction to theatre through the study of its origin and development, and its contemporary theory and practice. For the non-major. Two hours of lecture per week, along with play attendance and production experience. A terminal course which will not answer any Communication Arts major sequence. May not be taken after a successful enrollment in COMM 106. (Discipline: Theatre)

### **106 - INTRODUCTION TO THEATRE**

#### *4.00 Credits*

Introduction to dramatic structures and genres, production styles, and the roles of artists within the theatre. Overview of the history of theatre's place in society through the examination of selected dramatic texts. Enrollment limited to students in the theatre and musical theatre concentrations. (Discipline: Theatre)

### **110 - PUBLICATION ACTIVITIES PRACTICUM**

#### *1.00 Credit*

Participation in design, photography, writing, and producing the Ohio Northern yearbook. May be repeated, but only 12 hours will count toward graduation. Graded S/U.

### **115 - TAP DANCING 1**

#### *2.00 Credits*

Tap dancing, taught in a studio format. The course is designed for the student with little or no experience in tap dancing. May be repeated, but only 8 credit hours will count toward graduation. (Discipline: Theatre)

### **116 - JAZZ DANCE 1**

#### *2.00 Credits*

Jazz dancing for the musical theatre taught in a studio format. The course is designed for the student with little or no experience in jazz dancing. May be repeated, but only 8 credit hours will count toward graduation. (Discipline: Theatre)

### **117 - BALLET 1**

#### *2.00 Credits*

Ballet dancing taught in a studio format. The course is designed for the student with little or no experience in ballet dancing. May be repeated, but only 8 credit hours will count toward graduation. (Discipline: Theatre)

### **118 - MODERN DANCE 1**

#### *2.00 Credits*

Modern dance taught in the studio format. The course is designed for the student with little or no experience in modern dance. May be repeated, but only 8 credit hours graduation. (Discipline: Theatre)

### **121 - ARGUMENTATION**

#### *4.00 Credits*

Basic skills in critical thinking by applying elementary debate theory through oral and written activities. (Discipline: Prof. & Org. Comm.)

### **130 - INTRODUCTION TO PUBLIC RELATIONS**

#### *4.00 Credits*

The role, function, and responsibilities of the public relations practitioner within organizations. (Discipline: Public Relations)

### **150 - INTRODUCTION TO TELECOMMUNICATIONS**

#### *4.00 Credits*

A survey course that examines various aspects of broadcasting, cable, and the emerging electronic media. (Discipline: Telecommunications)

### **190 - SPECIAL TOPICS IN COMMUNICATION ARTS**

#### *1.00 to 4.00 Credits*

Course may be repeated as topics vary, but only 12 hours will count toward graduation.

### **203 - PUBLIC RELATIONS PRACTICUM**

*1.00 to 4.00 Credits*

Course provides students the opportunity to experience public relations firsthand through professional involvement with service and non-profit projects. A repeatable course. For non-majors, only 12 hours apply toward graduation. (Discipline: Public Relations)

### **204 - DANCE PRACTICUM**

*1.00 to 4.00 Credits*

Participation in a collaborative laboratory experience. Open only to students who have auditioned and been awarded roles in Ohio Northern University Dance Company or dance productions. A repeatable course. For non-majors, only 6 hours apply toward graduation. Prerequisite: Permission of the instructor. (Discipline: Theatre)

### **211 - PUBLIC SPEAKING**

(Formerly Speech Communication 100)

*4.00 Credits*

Basic principles of preparation and delivery of original informative and persuasive speeches. (Discipline: Prof. & Org. Comm.)

### **212 - BUSINESS AND PROFESSIONAL SPEAKING**

*4.00 Credits*

A course to assist the student in acquiring the knowledge and skills especially pertinent to meeting the speech communication tasks of a business or professional person. Prerequisite: COMM 211. (Discipline: Prof. & Org. Comm.)

### **215 - TAP DANCE 2**

*2.00 Credits*

A studio tap dance class for the intermediate and advanced student. Course may be repeated, but only 8 credit hours will count toward graduation. Permission of the instructor is required for admission. (Discipline: Theatre)

### **216 - JAZZ DANCE 2**

*2.00 Credit*

A studio jazz dance class for the intermediate and advanced student. Course may be repeated, but only 8 credit hours will count toward graduation. Permission of the instructor is required for admission. (Discipline: Theatre)

### **217 - BALLET 2**

*2.00 Credits* A studio ballet class for the intermediate and advanced student. At the discretion of the instructor, the class may include pointe work and partnering work for students with strong technique. Course may be repeated, but only 8 credit hours will count toward graduation. Permission of the instructor is required for admission. (Discipline: Theatre)

### **218 - MODERN DANCE 2**

*2.00 Credits*

A modern dance studio class for the intermediate and advanced student. Course may be repeated, but only 8 credit hours will count toward graduation. Permission of the instructor is required for admission. (Discipline: Theatre)

### **221 - INTERVIEWING**

*4.00 Credits*

The basic principles and structures of interviewing are examined and applied to interview situations such as employment, performance/appraisal, journalism, etc. (Discipline: Prof. & Org. Comm.)

### **225 - INTERPERSONAL COMMUNICATION**

*4.00 Credits*

Course explores a range of theories and issues which will help students improve their ability to communicate effectively in a variety of interpersonal relationships. (Discipline: Prof. & Org. Comm.)

### **230 - COMMUNICATION THEORY**

*4.00 Credits*

The course is designed to provide a framework of knowledge about the theories, nature, and dynamics of human communication/interaction. Prerequisite: COMM 211 or 225. (Discipline: Prof. & Org. Comm.)

### **236 - PUBLIC RELATIONS WRITING**

*4.00 Credits*

Study of basic concepts for public relations writing projects and production of written public relations materials. Use of the computers for word-processing and page layout programs are also included. The course consists of lectures, discussions, and supervised writing labs. Prerequisite: COMM 130. (Discipline: Public Relations)

### **240 - PARLIAMENTARY PROCEDURE**

*4.00 Credits*

Methods of conducting formal meetings by parliamentary rules. (Discipline: Prof. & Org. Comm.)

### **241 - ORAL INTERPRETATION OF LITERATURE**

*4.00 Credits*

Analyzing prose, poetry, and dramatic literature for individual and group presentations in class. (Discipline: Prof. & Org. Comm. and Theatre)

### **256 - TELECOMMUNICATIONS WRITING**

*4.00 Credits*

A study of the principles and techniques of copywriting for radio and television, corporate audio/video productions and the electronic media. (Discipline: Telecommunications)

**257 - TELECOMMUNICATIONS PRACTICUM: A/V**

*1.00 to 4.00 Credits*

Production practicum utilizing the facilities of WONB Radio or ONU Cable. Primarily for non-majors with an interest in working with the campus radio station or campus cable system. Majors with limited skills in production are welcome to take the course as well. A repeatable course. For non-majors, only 12 hours apply toward graduation. Prerequisite: Permission of instructor. (Formerly COMM 252) (Discipline: Telecommunications)

**258 - TELECOMMUNICATIONS PRACTICUM: AUDIO**

*1.00 to 4.00 Credits*

Production practicum utilizing the facilities of WONB Radio. Majors are required to complete four hours of the course for graduation. Final grade in course is production driven. Highly skilled non-majors are welcome to take the course, but only 12 hours apply toward graduation. Prerequisite: Permission of instructor. (Discipline: Telecommunications)

**259 - TELECOMMUNICATIONS PRACTICUM: VIDEO**

*1.00 to 4.00 Credits*

Production practicum utilizing the facilities of ONU Cable. Majors are required to complete four hours of the course for graduation. Final grade in this course is production driven. A repeatable course. For non-majors, only 12 hours apply toward graduation. Prerequisite: Permission of instructor. (Discipline: Telecommunications)

**260 - ACTING**

*4.00 Credits*

A studio class designed to introduce and develop fundamental acting skills through readings, discussions, exercises, monologues, and scenes. Course may be repeated, but only 8 credit hours will count toward graduation. (Discipline: Theatre)

**261 - PERFORMANCE PRACTICUM**

*1.00 to 4.00 Credits*

Participation in a collaborative laboratory experience. Open only to students who have auditioned for and have been awarded roles in University mainstage or studio theatre productions. A repeatable course. For non-majors, only 6 hours apply toward graduation. Prerequisite: Permission of the instructor. (Discipline: Theatre)

**265 - MUSICAL THEATRE PERFORMANCE STUDIES**

*4.00 Credits*

Performance techniques for musical theatre. Students will also prepare and present scenes and songs from musicals. Course may be repeated, but only 8 credit hours will count toward graduation. (Discipline: Theatre)

**275 - THEATRE TECHNOLOGY**

*4.00 Credits*

Theoretical and practical work in the fundamentals of technical theatre production. Content includes scenic construction, property construction, theatrical sound, basic drafting, and basic design theory. Required lab work. (Discipline: Theatre)

**276 - PRODUCTION PRACTICUM**

*1.00 to 4.00 Credits*

Participation in a collaborative laboratory experience which involves serving on a crew for a University mainstage or studio production. A repeatable course. For non-majors, only 6 hours apply toward graduation. Prerequisite: Permission of the instructor. (Discipline: Theatre)

**277 - SHOP PRACTICUM**

*1.00 to 4.00 Credits*

Participation in a collaborative laboratory experience working in the scene or costume shop for University productions. A repeatable course. For non-majors, only 6 hours apply toward graduation. Prerequisite: Permission of the instructor. (Discipline: Theatre)

**278 - MAKEUP**

*2.00 Credits*

Methods and practice in the creation and application of stage makeup. Students may comprise makeup crews for University Theatre and Studio Theatre productions. (Discipline: Theatre)

**283 - STAGE MANAGEMENT PRACTICUM**

*1.00 to 4.00 Credits*

Participation in a collaborative laboratory experience as a stage manager or assistant stage manager for a University mainstage or studio production. A repeatable course. For non-majors, only 6 hours apply toward graduation. Prerequisite: Permission of the instructor. (Discipline: Theatre)

**285 - STAGE MANAGEMENT**

*2.00 Credits*

Principles and practices of stage management and logistical organization of commercial and noncommercial theatre. Content includes scheduling, pre-production planning, auditions, rehearsals, performance procedures, budgeting, and company organization and structure. (Discipline: Theatre)

### **290 - SPECIAL TOPICS IN COMMUNICATION ARTS**

*1.00 to 4.00 Credits*

Course may be repeated as topics vary, but only 12 hours will count toward graduation.

### **291 - WORLD THEATRE HISTORY**

*4.00 Credits*

A survey of the history and social impact of the theatre in Western and non-Western cultures from ancient times to the present. (Discipline: Theatre)

### **300 - THEATRE SYMPOSIUM**

*1.00 Credits*

Workshop with visiting theatre professionals which may include stage directors, designers, choreographers, and professional performers. Course may be repeated as topics vary but only 4 hours apply toward graduation. Graded S/U. Prerequisite: Permission of the instructor. (Discipline: Theatre)

### **311 - PERSUASIVE SPEAKING**

(Formerly Advanced Public Address)

*4.00 Credits*

An advanced public speaking course with an emphasis on persuasive theory and techniques. Prerequisite: COMM 211. (Discipline: Prof. & Org. Comm.)

### **321 - GROUP COMMUNICATION**

*4.00 Credits*

Group theory and problem solving methods are examined; course focuses on the process of analyzing problems to implementing solutions. Prerequisite: COMM 211. (Discipline: Prof. & Org. Comm.)

### **330 - PUBLICITY, MEDIA, AND CAMPAIGNS**

*4.00 Credits*

A course analyzing techniques for motivating target audiences along with practical analysis and preparation of communication materials to elicit reactions or support from specialized groups. Prerequisite: COMM 130. (Discipline: Public Relations)

### **335 - INTERNSHIP**

*1.00 to 16.00 Credits*

A skills course designed to blend classroom theory with practical experience through working in an outside organization. Approval of department required prior to registration for course. Course may be repeated, but only 16 credit hours will count toward graduation. (Discipline: Public Relations and Telecommunications)

### **336 - ADVANCED PUBLIC RELATIONS WRITING**

*4.00 Credits*

This course presents opportunities for researching, identifying and writing public affairs columns, editorials, features, and position papers for use in the public relations arena. Prerequisites: COMM 130 and 236. (Discipline: Public Relations)

### **340 - VOICE AND DICTION**

*4.00 Credits*

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. (Disciplines: Prof. & Org. Comm. and Theatre)

### **342-PUBLIC RELATIONS RESEARCH FOR PLANNING & EVALUATION**

*4.00 Credits*

The planning and evaluation process of public relations. The difference between public relations research and social science research methods. Prerequisite: COMM 130. (Discipline: Public Relations)

### **345 - ORGANIZATIONAL COMMUNICATION**

*4.00 Credits*

Major organization and communication theories and their practical applications for effective communication within organizations and the professions. Examines communication processes, various roles and relationships in organizations, leadership communication, ethics, and problematic communication situations. Offered alternate years. (Discipline: Prof. & Org. Comm.)

### **348 - HEALTH COMMUNICATION**

*4.00 Credits*

Theory and practice of health communication. Examines communication between practitioner/client, in community/consumer health education, in health teams and groups, in health care delivery systems, in support systems for the elderly, disabled, terminally ill, in intercultural settings. Offered alternate years. (Discipline: Prof. & Org. Comm.)

### **351 - AUDIO/VIDEO PRODUCTION**

*4.00 Credits*

Principles and techniques of audio and video production. Course will include lab times utilizing the facilities of WONB Radio and ONU Cable Television. Prerequisite: COMM 256. (Discipline: Telecommunications)

### **355 - BROADCAST JOURNALISM**

#### *4.00 Credits*

Principles of news gathering and reporting primarily for television and radio. Subjective and objective analysis of news, its presentation, and its effects. Practical assignments emphasized. Prerequisite: COMM 150. (Discipline: Telecommunications)

### **360 - TOPICS IN ACTING**

#### *4.00 Credits*

A course which focuses on a specific topic each time it is offered. Topics may include improvisation, stage combat, stage dialects and acting for the camera. Course may be repeated as topics vary but only 12 hours apply toward graduation. (Discipline: Theatre)

### **370 - DANCE HISTORY**

#### *4.00 Credits*

Evolution of dance through the ages. Ethnic dance styles and dance as a performance art will be studied. Some reconstruction of cultural and historical dance will be included in the coursework. (Discipline: Theatre)

### **375 - TOPICS IN THEATRE DESIGN**

#### *4.00 Credits*

The basic design elements of theatre including, but not limited to: Scenic, Lighting, Costume, Sound, Props and Advanced Technology. Only one design area is offered each year. May be repeated, but only 16 credit hours will count toward graduation. Prerequisite: COMM 275. (Discipline: Theatre)

### **378 - DESIGN PRACTICUM**

#### *1.00 to 4.00 Credits*

Participation in a collaborative laboratory experience which focuses on the design, supervision, and execution of lights, sets, costumes, sound or props for a University mainstage or studio production. The student is assigned a departmental advisor for the project. A repeatable course. For non-majors, only 6 hours apply toward graduation. Prerequisite: COMM 375 and permission of the instructor. (Discipline: Theatre)

### **380 - ARTS ADMINISTRATION**

(Formerly Arts Management)

#### *4.00 Credits*

Examines the management of non-profit arts organizations. Content includes study in planning, programming, marketing and fundraising. Prerequisite: COMM 106 or COMM 130 or ART 100. (Discipline: Theatre)

### **385 - PRODUCTION ANALYSIS**

#### *4.00 Credits*

The techniques for the interpreting and staging of dramatic literature by the producer, director, and designers. Content includes the basic concepts of interpretation, theme, style, play analysis, and staging. (Discipline: Theatre)

### **386 - DIRECTING**

#### *4.00 Credits*

Methods, theories, exercises, and practices in directing and presenting dramatic scenes. Prerequisite: 4 hours of acting and permission of the instructor. (Discipline: Theatre)

### **387 - DIRECTING PRACTICUM**

#### *1.00 to 4.00 Credits*

Participation in a collaborative laboratory experience which focuses on directing a University mainstage or studio production. The student is assigned a department advisor for the project. A repeatable course. For non-majors, only 6 hours apply toward graduation. Prerequisite: COMM 386 and permission of the instructor. (Discipline: Theatre)

### **390 - SPECIAL TOPICS IN COMMUNICATION ARTS**

#### *1.00 to 4.00 Credits*

May be repeated as topics vary, but only 12 hours will count toward graduation.

### **391 - AMERICAN THEATRE HISTORY**

#### *4.00 Credits*

An historical survey of American theatre and popular entertainment forms from the colonial period through the rise of realism and contemporary theatre. (Discipline: Theatre)

### **421 - POLITICAL COMMUNICATION**

#### *4.00 Credits*

Political communication and the means to assess political activities through rhetorical methods of analysis. Methods may include those presented by classical and contemporary theorists, such as Aristotle, Lloyd Bitzer, and Kenneth Burke. (Discipline: Prof. & Org. Comm.)

### **430 - PUBLIC RELATIONS CASE STUDIES**

#### *4.00 Credits*

Public relations case studies concerning problems in industry, business, education, government, social welfare, and trade associations. Prerequisite: COMM 130. (Discipline: Public Relations)

#### **440 - COMMUNICATION AND CONFLICT MANAGEMENT**

##### *4.00 Credits*

The central role of communication in the creation and management of conflict, as well as communication skills and strategies for managing conflict effectively, with an emphasis on collaborative problem solving. Offered alternate years. Prerequisite: Sophomore standing. (Discipline: Prof. & Org. Comm.)

#### **445 - ISSUES IN PROFESSIONAL COMMUNICATION**

##### *4.00 Credits*

Issues in communication relative to entry into the professional and organizational sector. The role of communication in such issues as affirmative action, harassment, gender equity, sexual orientation, workplace environment, labor relations, multiculturalism, and use of new communication technologies. Offered alternate years. Prerequisite: COMM 345. (Discipline: Prof. & Org. Comm.)

#### **452 BROADCAST SALES AND PROMOTIONS**

##### *4.00 Credits*

Skills involved in selling broadcast time and station promotion. (Discipline: Telecommunications)

#### **453 - MASS MEDIA AND SOCIETY**

##### *4.00 Credits*

The legal, ethical, and social responsibilities of journalists and other mass communicators. Prerequisite: COMM 150. (Discipline: Telecommunications)

#### **454 - CORPORATE VIDEO PRODUCTION**

##### *4.00 Credits*

Video production course reviewing the needs of the corporate, non-broadcast, industry. Will cover planning, scripting and production of short and long form corporate videos. (Discipline: Telecommunications)

#### **455 - BROADCAST MANAGEMENT**

##### *4.00 Credits*

Sales, programming, marketing, and management techniques unique to the broadcast medium. Prerequisite: COMM 150. (Discipline: Telecommunications)

#### **460 - STYLES OF ACTING**

##### *4.00 Credits*

Improvement of acting techniques and preparation for creating characterizations from the classical theatre repertoire including Shakespearean Tragedy and Comedy, Moliere's Comedy, Restoration Comedy of Manners, and Farce. Course may be repeated but only 8 credit hours will count toward graduation. Prerequisite: COMM 260. (Discipline: Theatre)

#### **465 - ADVANCED MUSICAL THEATRE PERFORMANCE**

##### *4.00 Credits*

Choosing audition material and performing scenes and songs from the traditional and contemporary styles of musical theatre. Enrollment limited to students accepted into the musical theatre concentration. Prerequisite: COMM 265. (Discipline: Theatre)

#### **470 - DANCE COMPOSITION**

##### *4.00 Credits*

Principles general to all choreographic compositional styles and application of these principles through weekly choreographic compositional projects. There will also be inclass performances. (Discipline: Theatre)

#### **480 - ARTS IN THE COMMUNITY**

##### *4.00 Credits*

Theory and practice of education programs in the non-profit arts organization. Examines the application of multi-disciplinary teaching methods in outreach programs; long-range planning; and design and evaluation of lesson plans, activities and materials for events or exhibits. Prerequisite: COMM 380. (Discipline: Theatre)

#### **486 - PLAYWRITING**

##### *2.00 Credits*

The principles of writing plays by examining the process for selecting and arranging dramatic material for an artistic purpose. (Discipline: Theatre)

#### **490 - SPECIAL TOPICS IN COMMUNICATION ARTS**

##### *1.00 to 4.00 Credits*

May be repeated as topics vary, but only 12 hours will count toward graduation.

#### **499 - INDEPENDENT STUDY IN COMMUNICATION ARTS**

##### *1.00 to 4.00 Credits*

Prerequisite: Permission of department.

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## DEPARTMENT OF COMPUTER SCIENCE

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Professors Hovis, Lhamon; Associate Professors Hudak (Chair), Retterer; Assistant Professor Bitterman

### Mission Statement

The mission of the department of Computer Science at Ohio Northern University is to prepare students for professional and productive lives as members of the computing community. Toward that end, we set the following goals:

1. To provide students with the formal education that serves as the foundation on which practical knowledge and skills are built.
2. To develop the design skills of students through problem solving and laboratory activities.
3. To participate in the rapid growth of Computer Science through the deployment of current computing technology and integration of research and emerging technologies in our curriculum.
4. To view the practice of Computer Science within technical, societal, political, ergonomic and ethical perspectives.

### Department Overview

The department offers a major in computer science as well as a minor in computer science. Courses are offered in computer science to complement many disciplines in the university. Students with a primary major in the department may choose a general education program leading to either the bachelor of arts degree or the bachelor of science degree. The department maintains a student chapter of the Association for Computing Machinery, a national organization for computing professionals and a chapter of the Upsilon Pi Epsilon, the national Computer Science honorary.

The **Mary Reichelderfer Chair in Mathematics and Computer Science** was established in 1983 from funds of the estate of Mary K. Werkman. The chair is jointly shared between the Departments of Computer Science and Mathematics. The 1998-99 recipient of this chair is Danhong Song, associate professor of mathematics.

Students who want an introduction to computing should take either CS 130, Introduction to Information Systems, or CS 141, Introduction to the World Wide Web. Students desiring an introduction to programming should take CS 164, Programming 1. For a greater exposure to programming, the sequence 164-165-166 should be taken.

All courses in computer science that are to be counted toward a major or minor in computer science must be completed with a grade of "C" or better.

### Co-op Program

Computer science majors seeking a Co-op must enroll in CS 350 (1 hour). At least sophomore status is required for application for admission into a

co-op program. Participation requires junior or senior status. Participants must agree to:

- Register for at least 12 hours of course work each term on campus.
- Register for CS 350 for each term at the co-op site.
- Maintain an overall grade point average of at least 2.5.
- Submit a co-op practicum report to the departmental co-op director during the ninth week of each work term.
- Allow release of academic record to co-op employer and prospective employers and to allow the co-op employer to release their employment record to Ohio Northern University.
- Arrange to meet all deadlines for completion of paperwork normally associated with attendance at Ohio Northern University (e.g., advance registration, grants and loans, etc.).

Certification of completion of the program will appear as a concentration on the transcript. No other courses can be taken while on a co-op experience. Participation in intercollegiate athletic teams is prohibited while on a co-op experience. A minimum of three quarters of work is required for completion of the co-op experience—a maximum of six quarters of work is allowed. Most co-ops will be expected to do six quarters of work. Acceptance into the program is not guaranteed. Once the experience is begun, it can be terminated by the participant, the department, the university, or the employer for any reason. Co-op employers must meet the requirements of the department and the university. Complete details of the co-op program are available in the department office.

### Major and Minor Requirements

For the computer science major, the student must complete the following courses:

CS 164	Programming 1
CS 165	Programming 2
CS 166	Programming 3
CS 228	Programming Environments
CS 264	Assembly Language and Computer Organization
CS 268	Data Structures
CS 330	Organization of Programming Languages
CS 365	Computer Architecture
CS 429	Senior Project Definition
CS 440	Senior Project
CS 448	Foundations of Computing
CS 464	Software Engineering
CS 466	Operating Systems
CS 468	Compilers

In addition, the computer science major is required to complete three courses (each 4 credit hours or more) in computer science electives with at least two at the 300/400 level. CS 470 (Internship) can not count as any more than one four hour elective. The computer science major must also complete these cognates: MATH 163, 164, 272, 336, and 380; ECE 361.

For the computer science minor, the student must complete CS 164, 165, and 166 followed by at least four additional courses (four credit hours or more) in computer science with at least two at the 300/400 level.

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## **Subject -Computer Science (CS) —**

### **000 - ORIENTATION**

#### *1.00 Credit*

Familiarization with the department, requirements for majors, planning programs of study, University catalog and library. Graded S/U.

### **130 - INTRODUCTION TO INFORMATION SYSTEMS**

#### *4.00 Credits*

The language, technology, techniques, applications, and management of information systems. The course includes a laboratory component dealing with such issues as operating systems, word processing, spreadsheet and databases.

### **141 - INTRODUCTION TO THE WORLD WIDE WEB**

#### *4.00 Credits*

The languages, technologies, techniques and applications of the World Wide Web. A hands-on laboratory component including both web navigation and content design.

### **164 - PROGRAMMING 1**

#### *4.00 Credits*

Basic programming techniques; simple data types, expressions, functions, conditionals, iteration, recursion, structures, data types, etc. The use of high-level programming languages with a focus on simple algorithm development. (Formerly CS 134) (Also listed as ECE 164)

### **165 - PROGRAMMING 2**

#### *4.00 Credits*

Advanced programming topics: memory management, object-oriented programming, algorithm analysis, etc. Principles of software engineering with illustrations based on examples from central areas of computing science. Prerequisite: CS 164. (Formerly CS 135) (Also listed as ECE 165)

### **166 - PROGRAMMING 3**

#### *4.00 Credits*

Continuation of topics from Programming 2 (CS 165). System Life Cycle, library construction, recursion, abstract data types (stacks, queues, trees), searching and sorting. Prerequisite: CS 165. (Formerly CS 136) (Also listed as ECE 166)

### **191 - SPECIAL TOPICS IN COMPUTER SCIENCE**

#### *1.00 TO 3.00 Credits*

### **228 - PROGRAMMING ENVIRONMENTS**

#### *4.00 Credits*

Study and use of software development environments with integrated compiler, linker, debugger, editor, browser and project management. Development of an application with a graphical user interface (GUI). Additional study of object-oriented programming, inheritance and polymorphism. Prerequisite: CS 166. (Formerly CS 138)

### **231 - INTRODUCTION TO COBOL**

#### *4.00 Credits*

An introduction to programming in COBOL with business applications. Offered alternate years.

### **241 - WEB-ENABLED PROGRAMMING**

#### *4.00 Credits*

The World Wide Web as a programming platform. Issues, tools and applications related to distributed computing will be covered. Prerequisite: CS 166. Offered alternate years.

### **264 - ASSEMBLY LANGUAGE AND COMPUTER ORGANIZATION**

#### *4.00 Credits*

Computer structure and machine language, assembly language programming, macros, program segmentation and linkage. Prerequisite: CS 166. (Formerly CS 234) (Also listed as ECE 264)

### **268 - DATA STRUCTURES**

#### *4.00 Credits*

Emphasis on data abstraction as a primary tool in software construction. Use of modern programming language abstraction features to implement classical data structures: linear structures (lists, stacks, queues), tree structures (BTrees, AVLTrees, Splay Trees), hash tables and graphs. Introduction to space and time complexity analysis. Prerequisites: CS 166 and MATH 336. (Formerly CS 338 and 248) (Also listed as ECE 268)

### **291 - SPECIAL TOPICS IN COMPUTER SCIENCE**

#### *1.00 TO 4.00 Credits*

### **330 - ORGANIZATION OF PROGRAMMING LANGUAGES**

#### *4.00 Credits*

Theoretical investigation of programming language constructs; illustration of construct implementation in popular programming languages. Offered alternate years. Prerequisite: CS 264.

### **332 - OPERATIONS RESEARCH**

#### *4.00 Credits*

Optimal decision making in deterministic systems; linear programming model, simplex method and algorithms, primal and dual problem, sensitivity analysis, transportation and transshipment, assignment, shortest route, minimal spanning tree, maximal flow, PERT, game theory, and nonlinear programming. Prerequisite: MATH 272. (Also listed as MATH 332.)

### **341 - ARTIFICIAL INTELLIGENCE**

#### *4.00 Credits*

Artificial intelligence problems and techniques for their solution. Includes use of LISP, search algorithms, knowledge representation, expert systems, parsing language and language comprehension, learning. Offered alternate years. Prerequisite: Knowledge equivalent of 2 quarters of a programming language or consent of instructor. Offered alternate years.

## **348 - DATABASES**

### *4.00 Credits*

Overview, models and applications of database systems, including the relational data model. Prerequisite: CS 164 or 231. Offered alternate years.

## **350 - PROFESSIONAL PRACTICE**

### *1.00 Credit*

Cooperative education at an off-campus site. Involvement in full-time work (40 hours per week or more) requiring knowledge and skills in the major. See description of co-op program in department's catalog narrative for details. Prerequisites: Junior status; 2.5 GPA; and acceptance into the Co-op program. Graded S/U.

## **365 - COMPUTER ARCHITECTURE**

### *4.00 Credits*

Aspects of computer hardware; computer arithmetic, micro-architecture design (both datapath and control unit), instruction sets, storage hierarchies. Introduction to system organization. Current families of micro-processors illustrating design tradeoffs. Prerequisites: CS 264 and ECE 361. (Formerly CS 236 and 336.) (Also listed as ECE 365)

## **366 - NETWORKS AND DATA COMMUNICATION**

### *4.00 Credits*

WAN and LAN design and use. Network software, including the ISO/OSI standard. Network hardware, including the Ethernet and Token Ring network protocols. Prerequisite: CS 365. (Formerly CS 346) (Also listed as ECE 366)

## **391 - SPECIAL TOPICS IN COMPUTER SCIENCE**

### *1.00 to 4.00 Credits*

## **429 - SENIOR PROJECT DEFINITION**

### *1.00 Credit*

An examination of the software life cycle and a discussion of software engineering methodologies. The goal of the course is to produce a problem definition that can be used as the basis for the CS 440 Senior Project course.

## **440 - SENIOR PROJECT IN COMPUTER SCIENCE**

### *4.00 Credits*

An applications project conducted by student teams. Students will be responsible for the definition, design, and implementation of a software project. Students doing an off-campus project will be graded S/U. Prerequisite: CS 464. (Formerly CS 430)

## **442 - HIGH PERFORMANCE COMPUTING**

### *4.00 Credits*

Vector and parallel architecture. System software for high-performance computers; numerical analysis on high-performance computers; parallel algorithms. Prerequisite: CS 365. Offered alternate years.

## **448 - FOUNDATIONS OF COMPUTING**

### *4.00 Credits*

Analysis of algorithms. Computability and complexity theory. The halting problem; P and NP classes of algorithms; NP-completeness. Prerequisite: MATH 336.

## **461 - NUMERICAL ANALYSIS 1**

### *4.00 Credits*

Solution of equations in one variable; interpolation and polynomial approximation; direct methods for solution of linear systems. (Also listed as MATH 461.) Prerequisites: CS 165; MATH 165 and 272. Offered alternate years.

## **462 - NUMERICAL ANALYSIS 2**

### *3.00 Credits*

Numerical differentiation and integration; initial value problems for ordinary differential equations; iterative techniques in matrix algebra. Offered alternate years. Prerequisite: MATH 361. (Also listed as MATH 462)

## **464 - SOFTWARE ENGINEERING**

### *4.00 Credits*

The methodologies used to design, create, evaluate and maintain software systems, including coverage of several modern methodologies with emphasis on one. A project written in a modern software development environment will be developed. Prerequisites: CS 228 or 268. (Formerly CS 434) (Also listed as ECE 464)

## **466 - OPERATING SYSTEMS**

### *4.00 Credits*

Operating system principles; multiprogramming, virtual memory, client-server models for operating systems. Prerequisite: CS 268. (Formerly CS 436) (Also listed as ECE 466)

## **467 - COMPUTER DEVICE LABORATORY**

### *4.00 Credits*

Synchronous and asynchronous bus design. Motherhood implementation issues, clock skew, power dissipation. Device interfacing and device operation. Prerequisite: CS 365.

## **468 - COMPILERS**

### *4.00 Credits*

Scanning; parsing; type checking for strongly typed languages; symbol table generation and maintenance; code generation for simple instruction sets. Prerequisite: CS 268. (Formerly CS 438) (Also listed as ECE 468)

## **470 - COMPUTER SCIENCE INTERNSHIP**

### *3.00 to 12.00 Credits*

Analysis, design, coding, or testing of a software project. Normally achieved off-campus working for an industrial organization or government agency. Open to computer science majors who have completed eight quarters of work and have junior standing. A maximum of 12 hours is allowed.

## **491 - SPECIAL TOPICS IN COMPUTER SCIENCE**

### *1.00 to 4.00 Credits*

## **495 - SEMINAR IN COMPUTER SCIENCE**

### *1.00 to 4.00 Credits*

## **498 - INDEPENDENT STUDY IN COMPUTER SCIENCE**

### *1.00 to 4.00 Credits*

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# CENTER FOR TEACHER EDUCATION

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Professors Griggs, Haynes (Director), Hoagstrom, Meininger, Miller, Peltier, Sadurski, C. Smith; Associate Professors Bayliss, Berg, Campoli, Crosser, D'Arca, Dickson, Freeman, Greavu, Roepke, Romanowski, Rouch, Theisen; Assistant Professors Bates, Witte; Lecturers McCullough, Osborn, Russell

The professional education unit at Ohio Northern University is the Center for Teacher Education, which is nationally accredited by the National Council of Accreditation of Teacher Education. The center is the single, unified faculty and administrative unit within the University that is primarily responsible for the preparation of teachers. The director of teacher education, as head of the unit, is delegated the authority and responsibility for the overall administration and operation of the professional education unit.

The teacher education program is designed to provide the prospective teacher with the general education, subject area concentration, and professional education experiences that will enable the student to enter the profession of teaching with competency.

Teaching licenses are issued by the state of Ohio to students who have successfully completed an approved program of teacher preparation and met all requirements prescribed by the State Board of Education. Approved programs and requirements may be obtained in the Center for Teacher Education.

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

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

## Admission to the Teacher Education Program

Specific requirements may be obtained in the office of the Center for Teacher Education. The student is responsible for following the program in a timely manner.

## Early Childhood Education preK-3rd grade Licensure

The program is only open to freshmen starting fall of 1998 and beyond.

This program can not be taken with the middle childhood program. A student must choose between the two programs.

General education, curriculum area, and professional education requirements may be obtained in the office of the Center for Teacher Education. The courses in general education and curriculum area will meet College of Arts and Sciences and state licensure requirements.

## Professional Education Requirements

(\*student must be admitted to teacher education program)

EDUC 115	Culture and Schooling, 4 hrs.
EDUC 150	Five-Day Field Experience, 0 hrs. (taken twice)
EDUC 210	Exceptional Learner, 4 hrs.
EDUC 320	Educational Technologies, 4 hrs.
•EDUC 342	Reading in the Content Area, 4 hrs.
•EDUC 445	Organization and Administration of American Schools, 2 hrs.
•EDUC 470	Student Teaching, 15 hrs.
•EDUC 475	Student Teaching Seminar, 1 hr.

## Plus:

EDUC 195	Orientation, 1 hr.
EDUC 220	Integrated Fine Arts, 4 hrs.
EDUC 230	Early Childhood Math Methods, 4 hrs.
EDUC 223	Child Development and Psychology, 4 hrs.
EDUC 240	Introduction to Early Childhood Education, 4 hrs.
EDUC 241	Early Childhood Methods and Instruction, 4 hrs.
EDUC 242	Early Childhood Curriculum and Polices, 4 hrs.
•EDUC 310	Integrated Language Arts, 4 hrs.
•EDUC 312	Teaching Phonics, 5 hrs.
•EDUC 314	Foundations of Reading and Assessment, 5 hrs.
•EDUC 340	Diagnosis and Correction of Reading Difficulties, 4 hrs.

## Middle Childhood Education 4-9th grades Licensure

This program is only open to freshmen entering the fall of 1998 and beyond.

This program can not be taken with the early childhood program. A student must choose between the two programs.

General education, curriculum area, and professional education requirements may be obtained in the office of the Center for Teacher Education. The courses in general education and curriculum area will meet the College of Arts and Sciences and state approved licensure requirements.

### Professional Education Requirements

- EDUC 115 Culture and Schooling, 4 hrs.  
EDUC 150 Five- Day Field Experience, 0 hrs.  
(taken twice)  
EDUC 210 Exceptional Learner, 4 hrs.  
EDUC 320 Educational Technologies, 4 hrs.  
•EDUC 342 Reading in the Content Area,  
4 hrs.  
•EDUC 445 Organization and Administration of  
American Schools, 2 hrs.  
•EDUC 470 Student Teaching, 15 hrs.  
•EDUC 475 Student Teaching Seminar, 1 hr.

### Plus:

- EDUC 195 Orientation, 1 hr.  
EDUC 224 Young and Late Adolescent  
Psychology, 4 hrs.  
EDUC 260 Introduction to Middle Childhood  
Education, 4 hrs.  
EDUC 261 Middle Childhood Methods and  
Instruction, 4 hrs.  
EDUC 262 Middle Childhood Curriculum and  
Polices, 4 hrs.  
•EDUC 312 Teaching Phonics, 5 hrs.  
•EDUC 314 Foundations of Reading and  
Assessment, 5 hrs.  
•EDUC 340 Diagnosis and Correction of  
Reading Difficulties, 4 hrs.

In addition the student must choose two of four content areas to use for concentration areas;

Students may choose between math, reading-language arts, science, or social studies.

They will take the education method for that particular middle level and at least 36 hours in the disciplines.

### Choices:

- EDUC 308 Middle School Math Methods  
EDUC 309 Middle School Science Methods  
EDUC 310 Integrated Language Arts  
EDUC 311 Middle School Social Studies

List of discipline courses in the concentration areas are available in the Center of Teacher Education office.

### Elementary Education (1-8) Certification

(Only for students who were admitted prior to September, 1998).

General education, curriculum area, and professional education requirements may be obtained in the office of the Center for Teacher Education. The courses in general education and curriculum area will meet College of Arts and Sciences and state-approved program requirements.

### Professional Education Requirements

- (•student must be admitted to the teacher education program)  
EDUC 115 Culture and Schooling, 4 hrs.  
EDUC 150 Five-Day Field Experience, 0 hrs.  
(taken twice)  
EDUC 225 Child and Adolescent Psychology, 4 hrs.  
EDUC 263 Educational Psychology, 4 hrs.  
EDUC 320 Educational Technologies, 4 hrs.  
•EDUC 445 Organization and Administration  
of American Schools, 2 hrs.  
•EDUC 470 Student Teaching, 15 hrs.  
•EDUC 475 Student Teaching Seminar, 1 hr.

### Plus:

- ELED 195 Orientation, 1 hr.  
ELED 230 Teaching Math in the Elementary  
School, 4 hrs.  
•ELED 310 Integrated Language Arts, 4 hrs.  
•ELED 311 Teaching Social Studies in the  
Elementary School, 4 hrs.  
•ELED 312 Whole Language Reading I, 4 hrs.  
•ELED 314 Whole Language Reading II, 4 hrs.

### Elementary Education with Reading (K-12)

**Endorsement:** completion of the elementary education program, plus:

- EDUC 340 Diagnosis and Correction of  
Reading Difficulties, 3 hrs.  
EDUC 341 Advanced Reading Methods and  
Materials: Clinical Practice in  
Remedial Reading, 3 hrs.  
EDUC 342 Reading in the Content Area, 4 hrs.

### Elementary Education with Driver Education

**Endorsement:** completion of the elementary education program, plus:

- HPES 219 Psychological Factors in Driving,  
3 hrs.  
HPES 433 Driver Education, 3 hrs.  
HPES 434 Organization and Administration  
of Drivers-Traffic Safety, 3 hrs.

### Adolescent Licensure 7-12

Requirements for licensure in the various adolescent teaching fields may be obtained in the office of the Center for Teacher Education. Additionally, all students must complete a minimum four-hour computer science and minimum four-hour mathematics course.

### Adolescent Licensure Programs are offered in the following areas:

- Integrated Science  
Integrated Language Arts  
Integrated Mathematics  
Integrated Social Studies  
Life Science  
Physical Science

**Professional Education Course Requirements:**

(•Students must be admitted to the teacher education program)

EDUC 115	Culture and Schooling, 4 hrs.
EDUC 150	Five- Day Field Experience, 0 hrs. (taken twice)
EDUC 210	Exceptional Learner, 4 hrs.
EDUC 224	Young and Late Adolescent Psychology, 4 hrs.
EDUC 285	Curriculum, 4 hrs.
EDUC 320	Educational Technologies, 4 hrs.
•EDUC 342	Reading in the Content Area, 4 hrs.
•EDUC 440	Classroom Strategies, 4 hrs.
•EDUC 445	Organization and Administration of American Schools, 2 hrs.

**Specific Methods Courses:**

(•Students must be admitted to the teacher education program in order to take these courses)

EDUC 451	Integrated Science Methods, 4 hrs.
EDUC 452	Integrated Language Arts Methods, 4 hrs.
EDUC 453	Integrated Social Studies Methods, 4 hrs.
EDUC 454	Integrated Mathematics Methods, 4 hrs.
EDUC 475	Student Teaching Seminar, 1 hr.
EDUC 480	Student Teaching, 15 hrs.

**Multiage Licensure PreK-12**

Requirements for licensure in the various multiage licensure areas may be obtained in the office of the Center for Teacher Education. Additionally,

all students must complete a minimum four-hour computer science course and a minimum four-hour mathematics course.

**Multiage Licensure Programs are offered in the following areas:**

Art  
Health  
Physical Education  
Foreign Language  
Music

**Professional Education Course Requirements:**  
(•students must be admitted to the teacher education program)

EDUC 115	Culture and Schooling, 4 hrs.
EDUC 150	Five-Day Field Experience, 0 hrs. (taken twice)
EDUC 210	Exceptional Learner, 4 hrs.
EDUC 223	Child Development Psychology, 4 hrs.
EDUC 224	Young and Late Adolescent Psychology, 4 hrs.
EDUC 285	Curriculum, 4 hrs.
EDUC 320	Educational Technologies, 4 hrs.
•EDUC 342	Reading in the Content Area, 4 hrs.
•EDUC 440	Classroom Strategies, 4 hrs.
•EDUC 445	Organization and Administration of American Schools, 2 hrs.

**Specific Methods Courses:**

(students must be admitted to the teacher education program in order to take these courses)

EDUC 456	Foreign Language Methods, 4 hrs.
EDUC 457	Art Methods, 4 hrs.

EDUC 459	Music Methods, 4 hrs.
EDUC 460	Health Methods, 4 hrs.
EDUC 461	Physical Education Methods, 4 hrs.
EDUC 470	Student Teaching, 7 hrs.
EDUC 475	Student Teaching Seminar 1 hr.
EDUC 480	Student Teaching, 8 hrs.

### Vocational Licensure 4-12

Requirements for vocational licensure 4-12 may be obtained in the office of the Center for Teacher Education.

### Vocational Licensure Programs are offered in the following area:

Technology Education

### Professional Education Course Requirements: (•Students must be admitted to the teacher education program)

EDUC 115	Culture and Schooling 4 hrs.
EDUC 150	Five- Day Field Experience, 0 hrs. (taken twice)
EDUC 210	Exceptional Learner, 4 hrs.
EDUC 224	Young and Late Adolescent Psychology, 4 hrs.
EDUC 285	Curriculum, 4 hrs.
•EDUC 342	Reading in the Content Area, 4 hrs.
•EDUC 445	Organization and Administration of American Schools, 2 hrs.

### Specific Methods Courses:

(students must be admitted to the teacher education program in order to take these courses)

EDUC 304	Strategies for Technology Education, 4 hrs.
EDUC 458	Organization and Methods of Teaching Technology Education, 4 hrs.
EDUC 470	Student Teaching, 7 or 15 hrs.
EDUC 475	Student Teaching Seminar, 1 hr.
EDUC 480	Student Teaching, 8 or 15 hrs.

### Secondary Education (7-12) Certification

(only for students who were admitted prior to September, 1998)

Requirements for certification in the various secondary teaching fields may be obtained in the office of the Center for Teacher Education. Additionally, all students must complete a minimum four-hour computer science and a minimum four-hour mathematics course.

### Secondary Education Certification programs are offered in the following areas:

Biological Science  
 Bookkeeping/Basic Business  
 Chemistry  
 Comprehensive Communications  
 Computer Science  
 Drama/Theatre  
 Economics  
 English  
 General Science  
 History  
 Mathematics  
 Physical Education  
 Physics  
 Political Science  
 Psychology/Sociology  
 Sales  
 Science Comprehensive  
 Social Studies Comprehensive  
 Speech/Communication

### Professional Educational Course Requirements

EDUC 115	Culture and Schooling, 4 hrs.
EDUC 150	Five-Day Field Experience, 0 hrs. (taken twice)
EDUC 225	Child and Adolescent Psychology, 4 hrs.
EDUC 263	Education Psychology, 4 hrs.
EDUC 285	Curriculum, 4 hrs.
EDUC 320	Educational Technologies, 4 hrs.
•EDUC 342	Reading in the Content Area, 4 hrs.
•EDUC 440	Classroom Strategies, 4 hrs.
•EDUC 445	Organization and Administration of American Schools, 2 hrs.

### •Specific Methods Courses:

•EDUC 451	Secondary Science Methods, 5 hrs.
•EDUC 452	Secondary English Methods, 4 hrs.
•EDUC 453	Social Studies Methods, 4 hrs.
•EDUC 454	Methods in Teaching Secondary Schools Mathematics, 4 hrs.
•EDUC 458	Organization and Methods of Teaching Technology Education, 4 hrs.
•EDUC 461	Physical Education Methods, 4 hrs.
•EDUC 475	Student Teaching Seminar, 1 hr.
•EDUC 480	Student Teaching, 15 hrs.

### Secondary Education Certification with

**Reading (K-12) Endorsement:** completion of requirements in a specific teaching field, plus:

ELED 312	Whole Language Reading I, 4 hrs.
ELED 314	Whole Language Reading II, 4 hrs.
ELED 340	Diagnosis and Correction of Reading Difficulties, 3 hrs.
ELED 341	Advanced Reading Methods and Materials: Clinical Practice in Remedial Reading, 3 hrs.

**Secondary Education Certification with Driver Education Endorsement:** completion of requirements in specific teaching field, plus:

- HPES 219 Psychological Factors in Driving, 3 hrs.
- HPES 433 Driver Education, 3 hrs.
- HPES 434 Organization and Administration of Drivers Traffic Safety, 3 hrs.

**All-Grades (K-12) Certification**

(only for students who were admitted prior to September, 1998)

Requirements for certification in the various All-Grades (K-12) areas may be obtained in the office of the Center for Teacher Education.

Additionally, all students seeking Secondary and All-Grades certification must complete a minimum four-hour computer science course and a minimum four-hour mathematics course.

**All-Grades (K-12) Education Certification programs are offered in the following areas:**

- Art, Visual
- Health Education
- Languages:
  - French
  - Spanish
  - French/Spanish Dual
- Music
- Physical Education
- Technology

**Professional Education course requirements:**

- EDUC 115 Culture and Schooling 4 hrs.
- EDUC 150 Five-Day Field Experience, 0 hrs. (taken twice)
- EDUC 225 Child and Adolescent Psychology, 4 hrs.
- EDUC 285 Curriculum, 4 hrs.
- EDUC 320 Educational Technologies, 4 hrs.
- EDUC 342 Reading in the Content Area, 4 hrs.
- EDUC 440 Classroom Strategies, 4 hrs.
- EDUC 445 Organization and Administration of American Schools, 2 hrs.

**Specific Methods Courses:**

- EDUC 304 Strategies for Technology Education, 4 hrs.
- EDUC 456 Foreign Language Methods, 4 hrs.
- EDUC 457 Art Methods, 4 hrs.
- EDUC 458 Organization and Methods of Technology Education, 4 hrs.
- EDUC 459 Music Methods, 4 hrs.
- EDUC 460 Health Methods, 4 hrs.
- EDUC 461 Physical Education Methods, 4 hrs.
- EDUC 470 Student Teaching, 7 hrs.
- EDUC 475 Student Teaching Seminar, 1 hr.
- EDUC 480 Student Teaching, 8 hrs.

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## DEPARTMENT OF EDUCATION

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Professors Griggs (*Chair*), Haynes (*Director*, CTE), Miller; Associate Professors Berg, Crosser, Freeman, Romanowski; Lecturers McCullough, Osborn, Russell

Elementary education is a major in the Getty College of Arts and Sciences until 2002. Only students who were admitted for the first time before September 1998 can continue in this program. The department of education serves a reporting function to the college, acts as a conduit, and functions as a source of curriculum. The chair of the department of education reports to the director of teacher education.

Hence, the elementary education program is located in and *administered* by the Center for Teacher Education, a distinct administrative unit within the University.

**Requirements for Elementary Education Majors**  
**General Education**

- English 110, 4 hrs.
- English 111, 4 hrs.
- English 204, 4 hrs.
- English Literature elective, 4 hrs.
- Foreign Language (3 courses), 12 hrs.
- Western Civilization 110, 4 hrs.
- Western Civilization 111, 4 hrs.
- Interpersonal Communication 225, 4 hrs.
- Religion, 4 hrs.
- Philosophy, 4 hrs.
- Psychology 100, 4 hrs.
- Math 172 (computer course), 5 hrs.
- Math 173, 4 hrs.
- World Regional Geography/Non-Western, 4 hrs.
- Physical Education activity courses, 1 hr. (take 3)
- Integrated Elementary Science courses: Physics 101, Chemistry 102, Biology 103, (science methods incorporated)

**Curriculum**

- Integrated Fine Arts 220, 4 hrs.
- Art 100, 4 hrs.
- Music 100, 4 hrs.
- Social Science elective, 4 hrs.
- Psychology electives, 12 hrs.
- Education 210, 4 hrs.
- Education 315, 4 hrs.

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### Subject - Education (EDUC)

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**115 - CULTURE AND SCHOOLING**

*4.00 Credits*

The philosophical, historical, and sociological aspects of education used to investigate the cultural factors that impact students and curriculum including diverse world views, values, norms, and history of multicultural American groups. Characteristics, legislation, programs, and strategies for identifying and working with exceptional students in the

classroom are stressed. Clinical hours are awarded and a 5-day field experience is required. Required of all Early Childhood Education, Middle Childhood Education, Adolescent Level and Multiage Level majors.

### **150 - FIVE-DAY FIELD EXPERIENCE**

*.00 Credit*

Observation and participation with students and teachers in a school setting for five consecutive school days and a minimum of 35 hours. Must be repeated one time. One experience must be in a culturally, racially and socioeconomically diverse setting. Required during freshman or sophomore year of all students seeking teacher licensure. Approval of education advisor is required prior to this experience. Graded S/U. Prerequisite: EDUC 115.

### **190 - SPECIAL TOPICS IN EDUCATION**

*1.00 to 4.00 Credits*

Can be repeated as the topic varies.

### **195 - ORIENTATION**

*1.00 Credit*

Familiarization with the department, requirements for majors, planning program of courses and field-based experiences, University catalog, and library. Required of early childhood education and middle childhood education majors. Graded S/U.

### **210 - EXCEPTIONAL LEARNER**

*4.00 Credits* A course for education majors. To familiarize students with the varying characteristics and needs of exceptional individuals, their rights under the law and programming alternatives developed to meet their needs. Includes a minimum of 30 hours of field experience. Prerequisite: EDUC 115.

### **220 - INTEGRATED FINE ARTS**

*4.00 Credits*

Translation of knowledge of and experiences in the visual and performing arts into appropriate integrated experiences. Styles and modes of visual and performing arts across cultures and from various periods of history. (Formerly ELED 220)

### **223 - CHILD DEVELOPMENT AND PSYCHOLOGY**

*4.00 Credits*

Characteristics of the child at different levels of maturity; physical, mental, social and emotional growth; growth and organization of meanings and concepts; controls and factors in social behavior; personality developments. Includes a minimum of 30 hours of field experience. A criminal record check is required. Prerequisite: EDUC 115.

### **224 - YOUNG AND LATE ADOLESCENT PSYCHOLOGY**

*4.00 Credits*

The physical, social, emotional, and intellectual development of early and late adolescents, and the corresponding implications for curriculum and instruction. Includes a minimum of 30 hours of field experience. Prerequisite: EDUC 115.

### **230 - EARLY CHILDHOOD MATHEMATICS**

*4.00 Credits*

Content, strategies, materials, and evaluation that reflect the current emphasis in mathematics. Includes 30 hours of field experience. Prerequisites: MATH 172 and 173.

### **240 - INTRODUCTION TO EARLY CHILDHOOD EDUCATION**

*4.00 Credits*

History, philosophy and current developments in the field of early childhood education. Prerequisites: EDUC 115 and 223. (Formerly ELED 240)

### **241 - EARLY CHILDHOOD METHODS AND INSTRUCTION**

*4.00 Credits*

Teaching processes and development of materials for early childhood settings. Planning methodology and strategies. Includes 30 hours of field experience. Prerequisite: EDUC 240. (Formerly ELED 241)

### **242 - EARLY CHILDHOOD CURRICULUM AND POLICIES**

*4.00 Credits*

The comprehensive examination of the curriculum of early childhood programs and the policies of the early childhood movement. Curriculum planning and organization. Prerequisites: EDUC 240 and 241.

### **260 - INTRODUCTION TO MIDDLE CHILDHOOD EDUCATION**

*4.00 Credits*

The history, philosophy, and organization of middle school education. Evaluation of multimedia materials, creative exploration, and enrichment activities to build an effective middle school. Prerequisites: EDUC 115 and 224.

### **261 - MIDDLE CHILDHOOD METHODS AND INSTRUCTION**

*4.00 Credits*

Integrated teaching at the middle school level. Planning, instruction, strategies, and evaluation of an interdisciplinary nature. Includes 30 hours of field experience. Prerequisites: EDUC 115, 224, and 260.

## **262 - MIDDLE CHILDHOOD CURRICULUM AND POLICIES**

*4.00 Credits*

The development of theory, organization, and decision making in middle school curriculum from integrated, interdisciplinary focus. Clinical field experience is included. Prerequisites: EDUC 115, 225, 260 and 261.

## **285 - CURRICULUM**

*4.00 Credits*

School curriculum practices, instructional materials, curriculum development changes and trends. Discussion of mainstreaming and gifted education. Designed for adolescent and multiage education majors. Includes 30 hours of clinical experience. Prerequisite: EDUC 115.

## **290 - SPECIAL TOPICS IN EDUCATION**

*1.00 to 4.00 Credits*

Can be repeated as the topic varies.

## **304 - STRATEGIES FOR TECHNOLOGY EDUCATION**

*4.00 Credits*

Technology and technical activity at the middle school level to assist the children in learning. The use of materials, tools and processes to enhance learning and to assist in developing interests and talents. The rationale, materials, creative and manipulative activities. Typical problems and the planning and organizing of the learning environment. Includes 30 hours of field experience. Prerequisite: Admission to the Teacher Education Program.

## **308 - MIDDLE SCHOOL MATH METHODS**

*4.00 Credits*

Methods and current issues in middle school mathematics teaching, including problem solving, technology, strategies, and teaching aids. Includes 30 hours of field experience. Prerequisite: Admission to Teacher Education.

## **309 - MIDDLE SCHOOL SCIENCE METHODS**

*5.00 Credits*

Science in middle school education, the preparation of materials, and organization of learning activities for problem solving. Includes 30 hours of field experience. Prerequisite: Admission to Teacher Education.

## **310 - INTEGRATED LANGUAGE ARTS**

*4.00 Credits*

An integrated or whole language approach is taken in this course and is based on cognitive, developmental, and psycholinguistic theories about how students learn. Knowledge and appreciation of children's books, teaching of creative writing. Encompasses strategies showing how to integrate all of the language arts with an emphasis on children's literature. Includes 30 hours of field experience. Prerequisite: Admission to Teacher Education Program.

## **311 - MIDDLE SCHOOL SOCIAL STUDIES METHODS**

*4.00 Credits*

Objectives, trends, issues, and evaluation of the teaching of social studies in the middle school. Includes the preparation of units and organization of learning activities for problem solving. Requires 30 hours of field experience (10 hours of clinical experience). Prerequisite: Admission to Teacher Education.

## **312 - TEACHING PHONICS**

*5.00 Credits*

Emphasis on how to teach phonics, word recognition skills and communication skills including listening and speaking. Includes 30 hours of field experience (including 10 clinical hours). Prerequisites: Admission to Teacher Education.

## **314 - FOUNDATIONS OF READING AND ASSESSMENTS**

*5.00 Credits*

Principles and methods of teaching reading including whole language, phonics, creative writing, diagnostic skills, and preparation and evaluation of reading materials. Includes 30 hours of field experience (including 10 hours clinical). Prerequisites: Admission to Teacher Education, Program, EDUC 310 and 312.

## **315 - EDUCATION OF CHILDREN WITH LEARNING DISABILITIES**

*4.00 Credits*

The meaning and concepts associated with the field of learning disabilities and the history, definitions, theories, issues, instructional strategies delivery systems and trends in the field. Includes 30 hours of field experience. Prerequisites: EDUC 115 and 210.

### **320 - INSTRUCTIONAL MEDIA AND EDUCATIONAL TECHNOLOGIES**

*4.00 Credits*

The role that technologies play in our schools of today as well as in American society. Emphasis on instruction, planning, selection, utilization, operation, production, and evaluation of media equipment and materials including motion, media, projected visuals, audio media, computers, and multimedia systems. Ten hours of clinical experience will be required. Prerequisite: EDUC 115 and junior or seniors seeking teacher licensure.

### **340 - DIAGNOSIS AND CORRECTION OF READING DIFFICULTIES**

*4.00 Credits*

Reading difficulties and related causal factors. Investigation and utilization of diagnostic procedures and techniques, including experience in administration and interpretation. Appropriate teaching procedures for reading. Prerequisites: EDUC 312 and 314, and admission to Teacher Education.

### **341 - ADVANCED READING METHODS AND MATERIALS-CLINICAL**

*4.00 Credits*

Intensive study and discussion of specific areas of interest in reading and practical application of diagnostic techniques and procedures in a clinical field experience situation. Prerequisites: EDUC 312, 314 and 340, and admission to Teacher Education.

### **342 - READING IN THE CONTENT AREA**

*4.00 Credits*

Strategies for facilitating student/text interaction in a variety of curricular areas. Emphasis on following aspects of reading: assessment of student and text; prereading, vocabulary, and comprehension strategies; study skills. Includes 30 hours of field experience. Prerequisite: Admission to Teacher Educ.

### **350 - DEPARTMENTAL FIELD EXPERIENCE**

*.00 Credits*

Individually planned field experience based on an area of certification purposes and objectives and/or student teaching objectives. Specific objectives and experience proposed by student and must be approved by major department and education advisors. Required for adolescent or multiage licensure if 300 hours of field experience is not complete in other professional education courses. Graded S/U. May be repeated once.

### **390 - SPECIAL TOPICS IN EDUCATION**

*1.00 to 4.00*

Credits Can be repeated as the topic varies.

### **420 - SPECIFIC LEARNING DISABLED: EDUC/PSYCH DEVELOP HANDICAPPED**

*3.00 Credits*

Provided by arrangement with the University of Findlay, Fall Semester, at Findlay. Students register at ONU Fall Quarter of their junior year. Introduction to the understanding and teaching of developmentally handicapped children: etiology, diagnosis, theory and education procedure.

### **421 - SPECIFIC LEARNING DISABLED: DIAGNOSTIC ASSESSMENT/TEACHING TECHNIQUES**

*6.00 Credits*

Provided by arrangement with the University of Findlay, Fall Semester, at Findlay. Students will register Fall Quarter at ONU of their senior year. The instruments and procedures the special education teacher uses in diagnostic process, and the development of prescriptions from diagnostic information for specific learning disability and developmentally handicapped children.

### **422 - SPECIFIC LEARNING DISABLED: READING/LANGUAGE ARTS METHODS**

*6.00 Credits*

Provided by arrangement with the University of Findlay, Spring Semester, at Findlay. Students will register Winter Quarter of their junior year. Emphasis on the functional use of oral and written communication skills in conjunction with language arts and skills and on practical applications to everyday living experiences.

### **423 - COUNSELING PARENTS OF HANDICAPPED/STUDENT TEACHING**

*3.00 Credits*

Provided by arrangement with the University of Findlay, Spring Semester at Findlay. Students will register for Winter Quarter at ONU of their senior year. Exposes the prospective teacher of handicapped students to the purpose, principles and conditions of parent counseling. Both counseling theory and application are used as a basis of the course.

**424 - STUDENT TEACHING LD***9.00 Credits*

Planning and teaching under supervision in a specific learning discipline grade. Prerequisites: An overall accumulative point average of 2.5 with no grade less than "C" in education or major courses required for certification; a minimum of 300 hours of supervised clinical/field experiences; recommendation of the major department advisor and chairperson, professional education advisor, and the Director of Teacher Education.

**440 - CLASSROOM STRATEGIES***4.00 Credits*

Teaching behavior, techniques, methods, and strategies that are required for effective instruction in adolescent and multiage classrooms. Focuses on other aspects of effective teaching such as positive teacher beliefs, evaluation, and classroom management. Includes 30 hours of field experience. Note: EDUC 440 does not fulfill the specific methodology requirement for adolescent and multiage education majors. Prerequisite: Admission to Teacher Education.

**445 - ORGANIZATION AND ADMINISTRATION OF SCHOOLS IN AMERICAN SOCIETY***2.00 Credits*

Professional issues and orientation to school administrative structure, job search strategies, educational law, educational finance and the politics of education. Prerequisite: Admission to Teacher Education and senior status.

**451 - INTEGRATED SCIENCE METHODS***5.00 Credits*

Methods, strategies and safety considerations for classroom and laboratory instruction in science. Topics include laboratory planning, laboratory management, laboratory safety, science-technology-society, computer-assisted instruction, materials procurement and materials storage. Thirty hours of field experience is required. Prerequisite: Admission to Teacher Education.

**452 - INTEGRATED ENGLISH/LANGUAGE ARTS METHODS***4.00 Credits*

Effective methods in teaching grammar, writing, and literature. Includes 30 hours of field experience. Prerequisite: Admission to the Teacher Education Program.

### **453 - INTEGRATED SOCIAL STUDIES METHODS**

#### *4.00 Credits*

Effective methods in teaching History, Political Science, Psychology, Sociology, Geography, Economics and Anthropology. Includes 30 hours of field experience. Prerequisite: Admission to the Teacher Education Program.

### **454 - INTEGRATED MATHEMATICS METHODS**

#### *4.00 Credits*

Methods and current issues in high school mathematics teaching including guided discovery, problem solving, diagnosis and remediation, technology, strategies, and teaching aids. This course will not count toward a major in mathematics. Includes 30 hours of field experience. Prerequisite: Admission to Teacher Education.

### **456 - INTEGRATED MODERN LANGUAGE METHODS**

#### *4.00 Credits*

Theory and practice of current methods for teaching modern languages; evaluation of textbooks; use of audio-visual media; methods of evaluating student progress. Includes 30 hours of field experience. Prerequisites: minimum of 18 hours in foreign languages; Admission to the Teacher Education Program.

### **457 - INTEGRATED ART METHODS**

#### *4.00 Credits*

Effective strategies dealing with materials, techniques and methods of instruction in art. Includes 30 hours of field experience. Prerequisite: Admission to the Teacher Education Program.

### **458 - ORGANIZATION AND METHODS OF TECHNOLOGY EDUCATION**

#### *4.00 Credits*

Philosophical constructs, organizing courses, program and course objectives, preparing lesson plans and industrial materials, laboratory procedures, and administrative practices. Includes 30 hours of field experience. Prerequisite: Admission to the Teacher Education Program.

### **459 - INTEGRATED MUSIC METHODS**

#### *4.00 Credits*

Philosophy, techniques, materials, curriculum planning for the music teacher. Includes 30 hours of field experience. Prerequisite: Admission to the Teacher Education Program.

### **460 - INTEGRATED HEALTH METHODS**

#### *4.00 Credits*

Innovative strategies for the teaching of health education are applied. Attention is given to conceptualizing instruction, specifying instructional objectives, planning units and lessons, utilizing various instructional methods, selecting and using instructional materials, and evaluating teaching effectiveness. Includes 30 hours of field experience; Admission to the Teacher Education Program.

### **461 - INTEGRATED PHYSICAL EDUCATION METHODS**

#### *4.00 Credits*

Methods, devices and techniques which are most effective in teaching of the discipline in the public schools. Includes 30 hours of field experience. Prerequisite: One year of physical education for majors; Junior status; and Admission to Teacher Education Program.

### **470 - STUDENT TEACHING-EARLY CHILDHOOD-MIDDLE CHILDHOOD**

#### *7.00 or 15.00 Credits*

Planning and teaching under supervision in the early or middle level grades; weekly seminar on campus. Prerequisites: An overall accumulative point average of 2.5 with no grade less than "C" in education and major courses required for licensure; a minimum of 300 hours of supervised field/clinical experiences; recommendation of the major department advisor and chairperson, professional education advisor, and the Director of Teacher Education. Students seeking multiage licensure enroll for 7 hours. Students seeking early childhood or middle childhood licensure enroll for 15 hours. The student teaching experience is for eleven weeks. Corequisite: EDUC 475. Graded S/U.

### **475 - STUDENT TEACHING SEMINAR**

#### *1.00 Credit*

Weekly seminar to be taken concurrently with student teaching. Includes such discussion topics as classroom management, legal aspects, communication with parents, licensure and interviewing techniques, etc. Graded S/U, based upon attendance. Corequisite: EDUC 470 and 480.

**480 - STUDENT TEACHING-ADOLESCENT**

*8.00 or 15.00 Credits*

Planning and teaching under supervision in the adolescent level, full time, five days per week for 11 weeks, in the major teaching field of the student; weekly seminar on campus. Prerequisite: An overall accumulative point average of 2.5 with no grade less than "C" in education or major courses required for licensure; a minimum of 300 hours of supervised clinical/field experiences; recommendation of the major department advisor and chairperson, professional education advisor, and Director of Teacher Education. Students seeking multiage licensure enroll for 8 hours. Students seeking 7-12 licensure enroll for 15 hours. Corequisite: EDUC 475. Graded S/U.

**490 - SPECIAL TOPICS IN EDUCATION**

*1.00 to 4.00 Credits*

Can be repeated as the topic varies.

**497 - INDEPENDENT STUDY IN EDUCATION**

*1.00 to 4.00 Credits*

In areas of student interest with permission of Director of Teacher Education

**312 - WHOLE LANGUAGE READING 1**

*4.00 Credits*

Introduction to reading. Emphasis will be placed on how to teach phonics, whole language, emerging literacy, word recognition skills, cooperative learning and communication skills including listening and speaking. Includes 30 hours of field experience (including 10 clinical hours.) Prerequisite: Admission to Teacher Education Program. (1999-2000 last year offered.)

**314 - WHOLE LANGUAGE READING 2**

*4.00 Credits*

Principles and methods of teaching reading including whole language, phonics, creative writing, diagnostic skills and preparation and evaluation of reading materials. Includes 30 hours of field experience (including 10 hours clinical). Prerequisite: Admission to Teacher Education Program, ELED 310 and ELED 312. (2000-2001 last year offered.) NOTE: ELEMENTARY METHODS COURSES ARE TO BE TAKEN CONSECUTIVELY OVER THREE QUARTERS IN THE SEQUENCE: 310 AND 311, 312, 314. STARTING FALL OR WINTER QUARTER OF THE JUNIOR YEAR.

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**Subject - Elementary Education  
(ELED)**

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**310 - INTEGRATED LANGUAGE ARTS**

*4.00 Credits*

An integrated or whole language approach is taken in this course and is based on cognitive, developmental, and psycholinguistic theories about how children learn. Knowledge and appreciation of children's books, teaching of creative writing. Encompasses strategies showing how to integrate all of the language arts with an emphasis on children's literature. Includes 30 hours of field experience. Prerequisite: Admission to Teacher Education Program. ELED 310 must be taken concurrently with ELED 311. (1999-2000 last year offered.)

**311 - TEACHING SOCIAL STUDIES IN  
ELEMENTARY SCHOOL**

*4.00 Credits*

Objectives, trends, issues, and evaluation of the teaching of social studies in elementary school. Includes the preparation of units and organization of learning activities for problem solving. Requires 30 hours of field experience (10 hours of clinical experience). Prerequisite: Admission to Teacher Education. ELED 311 must be taken concurrently with ELED 310. (1999-2000 last year offered.)

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## DEPARTMENT OF ENGLISH

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Professors Banks (*Chair*), Green, Smith;  
Associate Professors Cullen, Lietz, Marino, E.  
McManus; Scott; Assistant Professor Willhardt;  
Visiting Assistant Professor L. McManus; Instructor  
O'Connell

English is, on the one hand, a humanities discipline based on the study of Western and non-Western literary texts as works of art, as sources of personal pleasure and enlightenment, and as means to understanding people and culture. It is, on the other hand, a rhetorical discipline that teaches analytical and creative processes and methods of interpretation through reading and writing.

The English faculty designs its courses for the general education of the university student and for the training of its majors, making use of lecture, discussion, workshop, collaborative teaching strategies, and independent research and reading. As a humane and practical study that develops analytical and communication skills, and individual and cultural awareness, English prepares students for life after college, for professional and business careers, for law school, and for graduate study in English and other disciplines.

The department offers majors in English/Literature, English/Creative Writing, English/Professional Writing, English/Language Arts (for the secondary-school teaching licensure in integrated language arts), and Journalism. It offers minors in Literature, Creative Writing, Professional Writing, and Journalism. The majors include a five-hour senior essay sequence during which the student works with a faculty advisor on a personal research project.

The department encourages complementary majors, minors, or options in other disciplines, including specifically a recommended option or minor in business. It provides opportunities for practical experience, including internships, journalism activities on department and student publications, and activities within the Sigma Tau Delta honor society.

Majors are urged to consider study abroad as part of their English degree. One option is to participate in the university's cooperative exchange agreement with the University of Wales, Lampeter, in Lampeter, Wales.

**General Education:** The B.A. requirement in humanities beyond ENGL 204 may be fulfilled by designated literature courses or by ENGL 341 or 342. Students with an ACT score in English of 27 or above may be waived from ENGL 110.

**Major and Minor Programs:** 100-level English courses and ENGL 204 do not count toward any major or minor in the department, nor does any English course with a grade below "C." Required cognates for the Major in English/Literature are two courses in Philosophy above the 100 level or one intermediate course in a Foreign Language (214, 224, 244, 250, or 264). For Literature, Creative Writing, and Language Arts majors, 7 courses (not including the senior essay) must be above the 200 level. For the other majors, the 300/400-level requirements are indicated separately below. Most majors and minors must take a specified number of literature courses from the following **core distribution**:

British Literature: Medieval/Renaissance/Jacobean  
(ENGL 213, 310, 319)

British Literature: Restoration/Eighteenth-Century/  
Romantic  
(ENGL 213, 214, 322, 323)

British Literature: Victorian/Twentieth-Century  
(ENGL 214, 324, 326)

American Literature: Pre-Twentieth-Century  
(ENGL 211, 334)

American Literature: Twentieth-Century  
(ENGL 212, 335)

World Literature: Ancient to Modern  
(ENGL 208, 209, 219, 220,  
262, 432, 451)

*Other courses, whose content changes significantly with each offering, may also satisfy these literature requirements: ENGL 207, 261, 263, 290, 364, 365, 390, 430, 431, 490.*

### Major in English/Literature (53 hours)

#### Required Courses (29 hours)

ENGL 210 English Studies

ENGL 213, 214 British Literature 1 and 2

or

ENGL 211, 212 American Literature 1 and 2

ENGL 351 English Language

ENGL 410 Chaucer

ENGL 412 Shakespeare Studies

ENGL 384, The Senior Essay

483-85

#### Electives (24 hours)

Five courses in five core areas in British,

American, and world literature

One free elective (literature, criticism, or writing)

### Major in English/Creative Writing (56 hours)

#### Creative Writing Core (28 hours)

ENGL 341 Poetry Writing

ENGL 342 Fiction Writing

ENGL 443 Nonfiction Writing

ENGL 451 Literary Criticism

COMM 486 Playwriting

ENGL 384 Directed Reading

ENGL 483-5 Senior Essay

ENGL 251 Magazine Practicum

Language and Literature Core (28 hours)

ENGL 210 English Studies

ENGL 351 English Language

Five courses in five core areas in British, American, and world literature

**Major in English/Professional Writing (56 hours + Secondary Study)**

Professional Writing Core (32 hours)

ART 222 Graphic Design 1

COMM 236 Public Relations Writing

ENGL 243 Magazine Writing

ENGL 347 Advanced Writing

ENGL 443 Nonfiction Writing

ENGL 470 Editing

ENGL 384 Directed Reading

ENGL 483-5 Senior Essay

ENGL 251 Magazine Practicum

ENGL 481 Internship

Core Elective (4 hours)

ART 223 Graphic Design 2

ENGL 241 News Writing

COMM 256 Telecommunications Writing

ENGL 342 Fiction Writing

ENGL 343 Persuasive Writing

ENGL 346 Prelaw Writing

ENGL 377 Professional Writing Workshop

ENGL 451 Literary Criticism

Special topics courses (290, 390, 490) when the topic is writing

Language and Literature Core (20 hours)

ENGL 210 English Studies

ENGL 351 English Language

Three literature courses in three core areas, two at the 300/400 level:

World Literature (ENGL 208, 209, 219, 220, 262, 432, 451)

British Literature (ENGL 213, 214, 260, 310-326, 364, 410, 412)

American Literature (ENGL 211, 212, 261, 334, 335, 365, 431)

*Other courses, whose content changes significantly with each offering, may also satisfy these literature requirements: ENGL 207, 263, 290, 390, 430, 490.*

Secondary Study

An Option, Minor, or Second Major in a discipline other than English

**Major in English/Language Arts (66 hours)  
Integrated Language Arts Teaching Licensure Literature (38 hours)**

ENGL 210 English Studies

ENGL 211 American Literature 1

ENGL 212 American Literature 2

ENGL 225 Children's and Young Adult Literature

ENGL 410 Chaucer

ENGL 412 Shakespeare Studies

ENGL 384 Directed Reading

ENGL 483 Reading for the Senior Essay

Three literature courses in three core areas: British literature (Restoration to Romantic; Victorian/Twentieth Century) and World literature  
Writing (16 hours)

ENGL 343 Persuasive Writing

or

ENGL 347 Advanced Writing

ENGL 241 News Writing

or

ENGL 243 Magazine Writing

or

ENGL 443 Nonfiction Writing

ENGL 250 Newspaper Practicum

or

ENGL 251 Magazine Practicum

ENGL 341 Poetry Writing

or

ENGL 342 Fiction Writing

ENGL 484 Senior Essay 1

ENGL 485 Senior Essay 2

Linguistics, Grammar, History of the Language (4 hours)

ENGL 351 English Language

Oral Communication (8 hours)

COMM 225 Interpersonal Communication

COMM 241 Oral Interpretation of Literature

Attendance at two professional conferences/workshops

**Major in Journalism (62 hours + Secondary Study)**

Journalism Core Requirements (38 hours)

ART 222 Graphic Design 1

COMM 236 Public Relations Writing

ENGL 241 News Writing

ENGL 243 Magazine Writing

ENGL 371 Journalism

ENGL 470 Editing

ENGL 384 Directed Reading (Journalism related)

ENGL 483-5 Senior Essay (Journalism related)

ENGL 250 Newspaper Practicum

ENGL 481 Internship

Core Elective (4 hours)

COMM 150 Introduction to Telecommunications

COMM 221 Interviewing

COMM 230 Communication Theory

COMM 256 Telecommunications Writing

ENGL 343 Persuasive Writing

ENGL 346 Prelaw Writing

ENGL 347 Advanced Writing

COMM 355 Broadcast Journalism

ENGL 443 Nonfiction Writing

ENGL 376 Journalism Workshop

Special topics courses (290, 390, 490) when the topic is journalism

Language and Literature Core (20 hours)

ENGL 210 English Studies

ENGL 351 English Language

Three literature courses in three core areas, two at the 300/400 level:  
 World Literature (ENGL 208, 209, 219, 220, 262, 432, 451)  
 British Literature (ENGL 213, 214, 260, 310-326, 364, 410, 412)  
 American Literature (ENGL 211, 212, 261, 334, 335, 365, 431)

*Other courses, whose content changes significantly with each offering, may also satisfy these literature requirements: ENGL 207, 263, 290, 390, 430, 490.*

#### Secondary Study

An Option, Minor, or Second Major in a discipline other than English

#### **Minor in English/Literature (32 hours)**

ENGL 210 English Studies  
 ENGL 412 Shakespeare Studies  
 Five courses in five core areas in British, American, and world literature  
 One elective in literature, criticism, or writing

#### **Minor in English/Creative Writing (30 hours)**

##### Required Courses (18 hours)

ENGL 210 English Studies  
 ENGL 341 Poetry Writing  
 ENGL 342 Fiction Writing  
 ENGL 443 Nonfiction Writing *or*  
 COMM 486 Playwriting  
 ENGL 251 Magazine Practicum

##### Writing or Criticism Elective (4 hours)

ENGL 443 Nonfiction Writing  
 ENGL 451 Literary Criticism  
 COMM 486 Playwriting  
 ENGL 375 Creative Writing Workshop

##### Literature Electives (8 hours)

Two courses from two core areas

#### **Minor in English/Professional Writing (30 hours)**

##### Required courses (26 hours)

ART 222 Graphic Design 1  
 COMM 236 Public Relations Writing  
 ENGL 243 Magazine Writing  
 ENGL 347 Advanced Writing  
 ENGL 443 Nonfiction Writing  
 ENGL 470 Editing  
 ENGL 251 Magazine Practicum

##### Elective (4 hours)

ART 223 Graphic Design 2  
 ENGL 241 News Writing  
 COMM 256 Telecommunications Writing  
 ENGL 342 Fiction Writing  
 ENGL 343 Persuasive Writing  
 ENGL 346 Prelaw Writing  
 ENGL 377 Professional Writing Workshop  
 ENGL 451 Literary Criticism  
 Special topics courses (290, 390, 490) when the topic is writing

#### **Minor in Journalism (30 hours)**

##### Required courses (26 hours)

ART 222 Graphic Design 1  
 COMM 236 Public Relations Writing  
 ENGL 241 News Writing  
 ENGL 243 Magazine Writing  
 ENGL 371 Journalism  
 ENGL 470 Editing  
 ENGL 250 Newspaper Practicum

##### Elective (4 hours)

COMM 150 Introduction to Telecommunications  
 COMM 221 Interviewing  
 COMM 230 Communication Theory  
 COMM 256 Telecommunications Writing  
 ENGL 343 Persuasive Writing  
 ENGL 346 Prelaw Writing  
 ENGL 347 Advanced Writing  
 COMM 355 Broadcast Journalism  
 ENGL 443 Nonfiction Writing  
 ENGL 376 Journalism Workshop  
 Special topics courses (290, 390, 490) when the topic is journalism

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### **Subject - English (ENGL)**

#### **000 - ENGLISH ORIENTATION**

##### *1.00 Credit*

Familiarization with department faculty, students, programs, and technology. Emphasis on career development within a liberal arts framework. Introduction to general university services and activities. Required of all majors. Graded S/U.

#### **001 - ENRICHMENT**

##### *.00 Credit*

Enrichment of the curriculum for English majors through required attendance at designated cultural and academic extracurricular events. Must be taken twice each academic year by all English majors. Graded S/U.

#### **105 - WRITING WORKSHOP**

##### *4.00 Credits*

Instruction and practice in writing for entering students whose English ACT is below 16. Offered Fall Quarter. CREDIT IN THIS COURSE DOES NOT SATISFY GRADUATION REQUIREMENTS FOR ANY PROGRAM OFFERED AT THE UNIVERSITY.

#### **110 - WRITING 1**

##### *4.00 Credits*

Development of reading and writing skills for effective communication on the college level. Prerequisite for all 200-level courses in English. Students with English ACT of 27 or above may be exempted from this course.

## **111 - WRITING 2**

### *4.00 Credits*

Continuation of ENGL 110. Prerequisite for ENGL 204.

## **151 - COLLEGE COMPOSITION 1**

### *4.00 Credits*

Communication skills for non-native speakers of English with emphasis on reading and writing in an academic setting. ENGL 151 and 152 together may be substituted for ENGL 110.

## **152 - COLLEGE COMPOSITION 2**

### *4.00 Credits*

Continuation of ENGL 151. ENGL 151 and 152 together may be substituted for ENGL 110. Prerequisite: ENGL 151 or 110.

## **153 - COLLEGE COMPOSITION 3**

### *4.00 Credits*

Writing skills for non-native speakers of English. ENGL 153 may be substituted for ENGL 111. Prerequisites: ENGL 151 and ENGL 152.

## **190 - SPECIAL TOPICS IN ENGLISH**

### *1.00 to 4.00 Credits*

May be repeated as the topic varies.

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Except for ENGL 210, 211-12, 213-14, and 225, 200-level courses are designed for the general student. ENGL 210 is open only to majors and minors. Prerequisites for ENGL 204: ENGL 110, 111, and Sophomore standing. Prerequisite for other 200-level courses: English 110.

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## **204 - GREAT WORKS**

### *4.00 Credits*

Major literary texts from the classical period to the present, including Shakespeare. A general education course. An Arts and Sciences requirement. Not open to Freshmen. Does not count toward an English major or minor. Prerequisites: ENGL 110 and 111.

## **207 - MODERN POETRY**

### *4.00 Credits*

Representative twentieth-century poetry written in English.

## **208 - MODERN WORLD DRAMA**

### *4.00 Credits*

Representative twentieth-century plays from Western and non-Western countries.

## **209 - MODERN FICTION**

### *4.00 Credits*

Representative twentieth-century novels, short stories, and other prose fiction from Western and non-Western countries.

## **210 - ENGLISH STUDIES**

### *4.00 Credits*

An introduction to the English major. An overview of literary terms, genres, historical periods, literary theory, and rhetoric; practice in literary criticism and creative writing; an awareness of career opportunities. Required of majors. Open only to majors and minors. Should be taken during the sophomore year.

## **211 - AMERICAN LITERATURE 1**

### *4.00 Credits*

The early period of American Literature (1492-1870s), including such genres as exploration and spiritual narratives, revolutionary political writing, fiction, and poetry, taking into account social and historical context.

## **212 - AMERICAN LITERATURE 2**

### *4.00 Credits*

The early modern, modern, and contemporary periods of American literature (1870s to the present), including such movements as regionalism, realism, naturalism, modernism, and postmodernism in a variety of genres—mainly poetry, fiction, and drama—in a rapidly changing social milieu.

## **213 - BRITISH LITERATURE 1**

### *4.00 Credits*

A survey of British literature from the Anglo-Saxon period through Neo-classicism in the eighteenth century, focusing on major and minor authors as reflective of both continuity and radical change in literary forms and cultural contexts. (Formerly ENGL 201 and 202)

## **214 - BRITISH LITERATURE 2**

### *4.00 Credits*

A survey of British literature from late eighteenth-century Romanticism to the end of the twentieth century, with continuing emphasis on literary themes and forms within changing cultural contexts. (Formerly ENGL 202 and 203)

## **219 - NON-WESTERN LITERATURE**

### *4.00 Credits*

Representative literary works in English or in English translation from the non-Western world. This course satisfies the Arts and Sciences non-Western requirement.

## **220 - EUROPEAN LITERATURE**

### *4.00 Credits*

The Western tradition in literature, including representative continental literature in translation from the Classical Greek era to the present.

## **225 - CHILDREN'S AND YOUNG ADULT LITERATURE**

### *4.00 Credits*

Literature specifically suited for children and adolescents. The readings selected from various genres will be studied using the same critical approaches that are traditionally used to analyze literature for adults. Open to majors in English and in Early Childhood and Middle Childhood Education, and to students selecting the Church Vocation-Education Option. Others by department permission only.

## **241 - NEWS WRITING**

### *4.00 Credits*

Gathering information and writing for a newspaper.

## **243 - MAGAZINE WRITING**

### *4.00 Credits*

The discipline and technique of writing feature articles for magazines.

## **250 - NEWSPAPER PRACTICUM**

### *1.00 to 6.00 Credits*

One to six credits, depending on role, to be determined by department. May be repeated, but only 12 hours will count toward graduation. Graded S/U. (Formerly Journalism Activities-Newspaper)

## **251 - MAGAZINE PRACTICUM**

### *1.00 to 6.00 Credits*

One to six credits, depending on role, to be determined by department. May be repeated, but only 12 hours will count toward graduation. Graded S/U. (Formerly Journalism Activities-Magazine)

## **260 - INTRODUCTION TO SHAKESPEARE**

### *4.00 Credits*

Representative plays and poetry from the entire span of Shakespeare's career and from each of the genres. For the general student.

## **261 - AFRICAN-AMERICAN LITERATURE**

### *4.00 Credits*

The tradition of African-American literature from the eighteenth-century to the present, including such genres as spiritual and folk poems, autobiography, poetry, short stories, novels and essays, in the context of formative political, historical, and social forces, with a special emphasis on writing as an expression of liberation for the African-American community.

## **262 - AFRICAN LITERATURE**

### *4.00 Credits*

Folktales, traditional epics, and contemporary fiction and drama that reflect African life and thought from the pre-colonial era to present day. This course satisfies the Arts and Sciences non-Western requirement. (Formerly ENGL 370)

## **263 - WOMEN'S LITERATURE**

### *4.00 Credits*

Selected works by or about women in English or in translation, drawn from a variety of genres in all historical eras, viewed from various critical perspectives, including feminist and historical/cultural theories.

## **290 - SPECIAL TOPICS IN ENGLISH**

### *1.00 to 4.00 Credits*

May be repeated as the topic varies.

## **297 - INDEPENDENT STUDY IN ENGLISH**

### *1.00 to 4.00 Credits*

May be repeated as the topic varies.

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ENGL 384: English and Journalism majors only. Other 300-level courses are designed for English or Journalism majors and minors but are open to the general student. Prerequisite for 300-level writing courses (ENGL 341, 342, 343, 346, 347, 371, 375-77): ENG 204, or permission of the department. Prerequisites for other 300-level courses: ENGL 204 and one other 200-level literature course, or permission of the department.

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## **310 - BRITISH LITERATURE BEFORE 1500**

### *4.00 Credits*

The epic, lyric and narrative poetry, tales, myths, and romances, and forms of drama during the early periods of British literature.

## **319 - RENAISSANCE AND JACOBEAN LITERATURE**

### *4.00 Credits*

Major writers, themes, movements, or genres from 1485 to 1660, including such figures as Marlowe, Jonson, Spenser, Donne, and Milton.

## **322 - RESTORATION AND THE EIGHTEENTH CENTURY**

### *4.00 Credits*

The "early modern" period of British literature (1660-1800), including such literary genres as the early novel, neo-classical poetry, and laughing and sentimental comedy, as well as formative political, historical, and social forces.

## **323 - BRITISH ROMANTICISM**

### *4.00 Credits*

Revolutionary changes in British literature between 1790 and 1832, including such innovative thinkers and writers as Blake, the Wordsworths, Coleridge, Byron, Keats, the Shelleys, Wollstonecraft, Radcliffe and Scott.

## **324 - VICTORIAN PERIOD**

### *4.00 Credits*

British literature between 1832 and 1901, with concentration on a few selected writers.

### **325 - TWENTIETH-CENTURY BRITISH LITERATURE**

#### *4.00 Credits*

British literature from 1900 to the present, with concentration on a few selected writers.

### **334 - AMERICAN WRITERS 1**

#### *4.00 Credits*

Selected works by a few nineteenth-century authors within their cultural framework.

### **335 - AMERICAN WRITERS 2**

#### *4.00 Credits*

Selected works by a few twentieth-century authors within their cultural framework.

### **341 - POETRY WRITING**

#### *4.00 Credits*

The discipline and technique of writing poetry. May be continued as ENGL 498-Independent Study in Writing.

### **342 - FICTION WRITING**

#### *4.00 Credits*

The discipline and technique of writing fiction. May be continued as ENGL 498-Independent Study in Writing.

### **342 - PERSUASIVE WRITING**

#### *4.00 Credits*

Analysis of and practice in using traditional rhetorical strategies of persuasion.

### **346 - PRELAW WRITING**

#### *4.00 Credits*

Analysis of fact situations and the writing of quasi-legal essays, memoranda, and briefs. Emphasis on close reading, logical thinking, and clear written expression in standard English.

### **347 - ADVANCED WRITING**

#### *4.00 Credits*

An understanding of and practice in writing various academic genres, from research and analysis to book reviews and abstracts.

### **351 - THE ENGLISH LANGUAGE**

#### *4.00 Credits*

Grammar of the English language as phonology, morphology, and syntax, and a brief history of American English.

### **364 - THE BRITISH NOVEL**

#### *4.00 Credits*

Representative novels, from the early development of the genre in the eighteenth century to romantic and social novels of the nineteenth and experimental novels of the twentieth centuries.

### **365 - THE AMERICAN NOVEL**

#### *4.00 Credits*

Selected novels from the eighteenth century to the present in the context of diverse literary and social influences.

### **371 - JOURNALISM**

#### *4.00 Credits*

American journalism history and principles; contemporary ethical, legal, and diversity issues; the press as a cultural force in society. Prerequisites: ENGL 204 and 241.

### **375 - CREATIVE WRITING WORKSHOP**

#### *1.00 to 4.00 Credits*

Individualized instruction in writing poetry and fiction within a workshop environment. Prerequisites: ENGL 204 and one of the following, ENGL 341, 342, 443, COMM 486, or permission of the department.

### **376 - JOURNALISM WORKSHOP**

#### *1.00 to 4.00 Credits*

Individualized instruction in writing for the print media within a workshop environment. Prerequisites: ENGL 204 and 241, or permission of the department.

### **377 - PROFESSIONAL WRITING WORKSHOP**

#### *1.00 to 4.00 Credits*

Individualized instruction in writing for publication within a workshop environment. Prerequisites: ENGL 204 and either 243 or 443 or permission of the department.

### **384 - DIRECTED READING**

#### *1.00 Credit*

Independent reading and tutorial under the supervision of an instructor. This course begins the senior essay sequence, which continues with ENGL 483-485. Usually taken during the spring quarter of the junior year. Open only to juniors who are English majors or minors. Graded S/U.

### **390 - SPECIAL TOPICS IN ENGLISH**

#### *1.00 to 4.00 Credits*

May be repeated as the topic varies.

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ENGL 420, 483-85: English and Journalism majors only. Other 400-level courses are designed for English or Journalism majors and minors but are open to the general student. Prerequisites for writing courses, ENGL 443 and 470: ENGL 204 and two other English courses above the 100-level, or permission of the department. Prerequisites for other 400-level courses: ENGL 204 and two other literature courses, or permission of the department.

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### **410 - CHAUCER**

#### *4.00 Credits*

The poetry of Chaucer, with special emphasis on the Canterbury Tales, Troilus and Criseyde, and reading and understanding Middle English.

#### **412 - SHAKESPEARE STUDIES**

*4.00 Credits*

Close reading and analysis of Shakespeare's plays within their historical context, using a variety of critical approaches. May be repeated as content varies.

#### **420 - DEPARTMENT NEWSLETTER**

*2.00 Credits*

Writing and laying out the annual department newsletter.

#### **430 - READINGS IN ENGLISH LANGUAGE LITERATURE**

*4.00 Credits*

A major writer, genre, or theme in the literatures of Great Britain or other English-speaking countries, not including the United States, with attention to the cultural context.

#### **431 - READINGS IN AMERICAN LITERATURE**

*4.00 Credits*

A major writer, genre, or theme in American literature, with attention to cultural context.

#### **432 - STUDIES IN COMPARATIVE LITERATURE**

*4.00 Credits*

Issues of special interest to English majors about literary texts from ancient times to the present that highlight differences between Western and non-Western literatures. This course satisfies the Arts and Sciences non-Western requirement.

#### **443 - NONFICTION WRITING**

*4.00 Credits*

A literary approach to the reading and writing of nonfiction essays.

#### **451 - LITERARY CRITICISM**

*4.00 Credits*

Major literary theories of the twentieth century and their historical antecedents, with emphasis on theories currently practiced in university classes and academic journals. (Formerly ENGL 381)

#### **470 - EDITING**

*4.00 Credits*

Editing techniques and concerns critical to producing polished writing on a variety of levels, from corporate communications to book publishing.

#### **481 - INTERNSHIP**

*1.00 to 16.00 Credits*

Internships in English are designed to provide practical experience outside the classroom and to enhance the student's professional interests. Prerequisite: Courses appropriate for the internship. Graded S/U.

#### **483 - READING FOR THE SENIOR ESSAY**

*1.00 Credit*

Independent reading in preparation for the senior essay. Prerequisite: ENGL 384. Graded S/U.

#### **484 - SENIOR ESSAY 1**

*1.00 Credit*

Writing of a rough draft of the Senior Essay. Prerequisite: ENGL 483.

#### **485 - SENIOR ESSAY 2**

*2.00 Credits*

Final draft and oral presentation of the Senior Essay. Prerequisite: ENGL 484.

#### **490 - SPECIAL TOPICS IN ENGLISH**

*1.00 to 4.00 Credits*

May be repeated as the topic varies.

#### **497 - INDEPENDENT STUDY IN LITERATURE**

*1.00 to 4.00 Credits*

May be repeated as the topic varies.

#### **498 - INDEPENDENT STUDY IN WRITING**

*1.00 to 4.00 Credits*

May be repeated as the topic varies.

#### **499 - INDEPENDENT STUDY IN JOURNALISM**

*1.00 to 4.00 Credits*

May be repeated as the topic varies.

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## **DEPARTMENT OF HEALTH, PHYSICAL EDUCATION & SPORT STUDIES**

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Professor Lauth (*Chair*); Associate Professors Campoli, Daugherty, Glon, Keller, Strayer; Assistant Professors Beaschler, Chandler, Coleman, Kaczowski, Meyer, Witte; Instructor Hofman; Lecturers Cole, Jones

#### **Mission Statement**

The department of health, physical education and sport studies' purpose is to help individuals achieve optimum personal development and contribute to the goals of Ohio Northern University and the College of Arts and Sciences. We educate students to become responsible professionals capable of exemplary service in a variety of roles in education and/or sport.

We strive to provide equally accessible opportunities for experience working and playing in a community of students and scholars where application, honesty, hard work, achievement, and appropriate behavior are recognized and encouraged. The education program in the department is designed to equip students with skills and attitudes to design, implement and maintain vital programs in their selected professions. We seek to develop the basis for philo-

sophical reflection on the ethical issues facing the professions. We encourage our students to develop the values of responsibility, thoroughness, respect for others, and ethical behavior. Considerable amount of attention is devoted to developing an appreciation of the importance of health, fitness, and sport and their contribution to quality of life.

The **bachelor of arts and bachelor of science** degrees are available to students enrolled in the department with the opportunity to major in the following academic areas:

Physical Education (pre K-12)	74-76 hours
Health Education (pre K-12)	54 hours
Physical Education (non-teaching)	57-59 hours
Athletic Training (Sports Medicine)	61 hours
Sport Management	72 hours
Wellness	66 hours

The department provides majors an opportunity to acquire both a business option (28 hours) and a management concentration (36 hours).

The department provides courses of study leading to endorsement in the following areas:

Driver Education - by the state of Ohio	9 hours
Athletic Coaching Certification - by Ohio Northern University	20-23 hours

**For specific information concerning these areas, please contact the health, physical education and sport studies department chairperson.**

### Physical Education Service Courses

Service courses are those courses, other than varsity sports, listed below the 100 level (AHPE). Physical education service classes meet two hours per week for one hour credit. Classes are graded on the S/U basis. Students in all colleges with a physical education requirement are required to take a minimum of three hours, except for physical education majors.

Three different areas of activity classes are offered in the service course program to provide diversity in physical education experiences for the university student.

### Wellness Area:

- Wellness Lab
- Weight Control and Nutrition

### Fitness Area:

- Beginning Fitness
- Intermediate Fitness
- Advanced Fitness
- Weight Training and Physical Conditioning
- Aerobic Activities
- Dance Aerobics
- Aquatic Exercise

### Lifetime Activities Area:

- Golf
- Tennis
- Beginners Swimming
- Intermediate Swimming
- Hiking and Backpacking
- Rhythmic Fundamentals
- Sailing and Seamanship
- Snow Skiing
- Social Dance
- Canoeing and Whitewater Rafting
- Bowling
- Billiards
- Archery
- Racquetball
- Self Defense
- Square and Folk Dance
- Volleyball
- Badminton

### Special Equipment or Fee Requirements for HPESS Department Courses

*AHPE activity class special equipment/fee requirements:*

- Tennis-tennis balls and racquet
- Golf-clubs (when possible)
- Intermediate Fitness-bicycle
- Racquetball-racquet, racquetballs, protective goggles
- Canoeing and Whitewater Rafting-fee required
- Bowling-fee required
- Billiards-fee required
- Snow Skiing-fee required
- Hiking and Backpacking-fee required

*HPESS class special equipment/fee requirements:*

- First Aid-Responding to Emergencies-fee required
- Community CPR-fee required
- Lifeguarding-pocket mask and fee required
- Water Satety Instruction-fee required

## Majors in Health, Physical Education and Sport Studies

### Special Requirements for Majors

- All required courses and electives in the curricula of the student's major must be completed with a grade of "C" or better to satisfy graduation requirements.
- In coaching theory course requirements, only one officiating course may apply.
- Physical education majors are exempt from the three-hour service class requirement, but all other department majors must comply with this requirement.
- Majors desiring teacher licensure must complete requirements of the Center for Teacher Education.
- Students desiring to major in athletic training (sports medicine) must be admitted to the athletic training program. Specific requirements may be obtained from the department of health, physical education and sport studies or the athletic training offices.

NOTE: numbers in ( ) indicate credit hours

**Physical Education (pre K-12) 74-76 hours**

HPES 000	Orientation (1)
HPES XXX	Aquatics course (1-3)
HPES 112	First Aid (2)
HPES 113	Community CPR (1)
HPES 132	Gymnastics Methods (2)
HPES 133	General Methods (2)
HPES 147	Basic Movement (2)
HPES 151	HPES Foundations (4)
HPES 211	Team Sports Majors (2)
HPES 212	Dance Majors (3)
HPES 213	Individual & Dual Activities- Majors (2)

HPES 223	Kinesiology (4)
HPES 233	Elem. School Phys. Ed. (4)
HPES 243	Basic Athletic Training (4)
HPES 271	Motor Learning (2)
HPES 303	Org. & Admin. (4)
HPES 304	Teach Tech. (1)
HPES 305	Teach Tech. (1)
HPES 324	Sport Psych. (2)
HPES 360	Test Meas. HPE (4)
HPES 402	Adapt. & Corr. PE (4)
HPES XXX	Coaching Techniques (6) (Only one officiating course may apply)

**Biology Courses**

BIOL 231	Anat. & Physio. I (4)
BIOL 232	Anat. & Physio. II (4)
BIOL 233	Exercise Physio. (4)

**Education Courses**

EDUC 461	Integrated PE Methods (4)
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**Physical Education (non-teaching) 57-59 hours**

HPES 000	Orientation (1)
HPES XXX	Aquatics course (1-3)
HPES 112	First Aid (2)
HPES 113	Community CPR (1)
HPES 132	Gymnastics Methods (2)
HPES 133	General Methods (2)
HPES 147	Basic Movement (2)
HPES 151	HPES Foundations (4)
HPES 211	Team Sports Majors (2)
HPES 212	Dance Majors (3)
HPES 213	Individual & Dual Activities Majors (2)

HPES 223	Kinesiology (4)
HPES 243	Basic Athletic Training (4)
HPES 303	Org. & Admin. (4)
HPES 304	Teach Tech. (1)
HPES 324	Sport Psych. (2)
HPES 360	Test Meas. HPE (4)
HPES 402	Adapt. & Corr. PE (4)

**Biology Courses**

BIOL 231	Anat. & Physio. I (4)
BIOL 232	Anat. & Physio. II (4)

**Education Courses**

EDUC 461	Integrated PE Methods (4)
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**Health Education (pre K-12) 54 hours**

HPES 000	Orientation (1)
HPES 099	Wellness Lab (1)
HPES 110	Sci. Basis of Health & Fit. (4)
HPES 111	Pers. Hlth Prob (4)
HPES 112	First Aid (2)
HPES 113	Community CPR (1)
HPES 119	Sch. & Comm. Hlth. (3)
HPES 151	HPES Foundations (4)
HPES 303	Org. & Admin. (4)
HPES 360	Test Meas. HPE (4)
HPES 402	Adapt. & Corr. PE (4)
HPES 494	Health Seminar (3)

**Biology Courses**

BIOL 231	Anat. & Physio. I (4)
BIOL 232	Anat. & Physio. II (4)
BIOL 233	Exercise Physio. (4)

**Education Courses**

EDUC 460	Integrated Health Methods (4)
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**Pharmacy Courses**

PHBS 350	Nutrition (3)
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**Wellness 66 hours**

AHPE 099	Wellness Lab (1)
HPES 105	Intro to Wellness (2)
HPES 110	Sci. Basis of Health & Fit. (4)
HPES 111	Personal Health Problems (4)
HPES 112	First Aid-Responding to Emergencies (2)
HPES 113	Community CPR (1)
HPES 223	Kinesiology (4)
HPES 261	Exer. Test & Prescription I (4)
HPES 262	Exer. Test & Prescription II (4)
HPES XXX	Wellness Practicum(s) (2)
HPES 355	Org/Adm of Health Promotion (4)
HPES 485	Wellness/Health Promotion Internship (15)

**Biology Courses**

BIOL 231	Anat. & Physio. I (4)
BIOL 232	Anat. & Physio. II (4)
BIOL 233	Exercise Physio. (4)

**Pharmacy Courses**

PHBS 350	Nutrition (3)
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**Electives:**

A minimum of three hours from the following:  
HPES 119, HPES 360, HPES 402, HPES 494,  
HPES 381, or COMM 348

**Athletic Training (Sports Medicine) Major**

*61 hours*

Students must be admitted to the athletic training program. Specific requirements may be obtained from the department of health, physical education and sport studies or the athletic training offices.

HPES 000	Orientation (1)
HPES 111	Pers. Hlth. Prob. (4)

HPES 112	First Aid (2)
HPES 113	Community CPR (1)
HPES 223	Kinesiology (4)
HPES 243	Basic Athletic Training (4)
HPES 275	Eval. Tech. Ath. Tr. (4)
HPES 276	Eval. Tech. Ath. Tr. (4)
HPES 280	Ath. Train. Clin. I (1)
HPES 371	Ther. Modal Ath. Tr. (4)
HPES 372	Exer. Rehab. Ath. Tr. I (4)
HPES 373	Exer. Rehab. Ath. Tr. II (4)
HPES 402	Adapt. & Corr. PE (4)
HPES 480	Ath. Train. Clin. II (1)
HPES 495	Trends Ath. Train. (4)

#### Biology Courses

BIOL 231	Ant. & Physio. I (4)
BIOL 232	Anat. & Physio. II (4)
BIOL 233	Exercise Physio. (4)

#### Pharmacy Courses

PHBS 350	Nutrition (3)
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#### Sport Management Major 72 hours

HPES 000	Orientation (1)
HPES 153	Intro. Sprt. Mgm. (4)
HPES 256	Soc. of Sport (4)
HPES 303	Org. & Adm. (4)
HPES 324	Sprt Psych. (2)
HPES 344, 345, 346	Practicum (1) (Must take one Practicum)
HPES 421	Legal Issues (4)
HPES 486	Sprt. Mgm. Intern (15)
HPES 496	Sprt. Mgm. Seminar (1)

#### Communication Arts Courses

COMM 130	Intro. Pub. Rel. (4)
COMM 211	Public Speaking (4)
COMM 212	Business and Prof. Spkg. (4)
One course from the following:	
COMM 221, 225, 311, 321, 330, 345, 348, 430, 440	

#### Psychology and Sociology Courses

One course from the following:  
SOC 246, 247, PSSC 301

#### Business Administration Courses

ABUS 312	Business Law 1 (4)
MGMT 333	Mgmt. & Org. Beh. (4)

Two courses from the following:

ACCT 211, ABUS 313, MGMT 325, MGMT 334, MGMT 363, MRKT 351, MRKT 371, MRKT 372

Majors in the HPESS department may select the College of Arts and Sciences **Business Option** by successful completion of the following option requirements and electives:

ACCT 211	Prin. of Accounting 1 (4)
ACCT 212	Prin. of Accounting 2 (4)
ABUS 312	Business Law 1 (4)
MGMT 325	Employment Law (4)
MGMT 333	Mgmt. & Org. Beh. (4)
MGMT 334	Cases & Exer. in Org. Beh. (4)
MRKT 351	Prin. of Marketing (4)

In addition to the College of Arts and Sciences **Business Option**, the following concentration, certification and endorsement are available from the department.

#### Management Concentration 36 hours

ABUS 201	Personal Computer Applic. (4)
IBEC 202	Prin. of Microeconomics (4)
IBEC 203	Prin. of Macroeconomics (4)
ACCT 212	Principles of Acct. 2 (4)
MGMT 325	Employment Law (4)
MRKT 351	Principles of Marketing (4)
FINC 362	Managerial Finance (4)
MGMT 363	Human Resource Mgmt. (4)
MRKT 371	Personal Selling (4)

#### ONU Coaching Certification 20-23 hours

HPES 112	First Aid (2)
HPES 113	Community CPR (1)
HPES 243	Basic Ath. Train. (4)
HPES 256	Sociology of Sport (2)
HPES 303	Org. & Admin. (4)
HPES 324	Sprt Psych. (2)
HPES 334	Adv. Coach. (1-4)
Two coaching theory courses (only one officiating course may apply)	

#### Driver Education Endorsement 9 hours

HPES 219	Psych. Factors Driv. (3)
HPES 433	Driver Education (3)
HPES 434	Org. & Admin. Driving (3)

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## Subject - Varsity Sports/Service Courses (AHPE)

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### All AHPE courses graded S/U

#### 001 - VARSITY FOOTBALL PARTICIPATION

1.00 Credit

#### 002 - VARSITY CROSS COUNTRY PARTICIPATION (MEN)

1.00 Credit

#### 003 - VARSITY SOCCER PARTICIPATION (MEN)

1.00 Credit

#### 004 - VARSITY VOLLEYBALL PARTICIPATION

1.00 Credit

#### 005 - VARSITY BASKETBALL PARTICIPATION (MEN)

1.00 Credit

#### 006 - VARSITY BASKETBALL PARTICIPATION (WOMEN)

1.00 Credit

**007 - VARSITY CROSS COUNTRY PARTICIPATION (WOMEN)**

*1.00 Credit*

**008 - VARSITY SOCCER PARTICIPATION (WOMEN)**

*1.00 Credit*

**010 - VARSITY TRACK PARTICIPATION (WOMEN)**

*1.00 Credit*

**011 - VARSITY WRESTLING PARTICIPATION**

*1.00 Credit*

**012 - VARSITY TRACK PARTICIPATION (MEN)**

*1.00 Credit*

**013 - VARSITY TENNIS PARTICIPATION (MEN)**

*1.00 Credit*

**014 - VARSITY TENNIS PARTICIPATION (WOMEN)**

*1.00 Credit*

**015 - VARSITY GOLF PARTICIPATION (MEN)**

*1.00 Credit*

**016 - VARSITY SOFTBALL PARTICIPATION**

*1.00 Credit*

**017 - VARSITY BASEBALL PARTICIPATION**

*1.00 Credit*

**018 - VARSITY SWIMMING PARTICIPATION (MEN AND WOMEN)**

*1.00 Credit*

**019 - VARSITY GOLF PARTICIPATION (WOMEN)**

*1.00 Credit*

**021 - WEIGHT TRAINING AND PHYSICAL CONDITIONING**

*1.00 Credit*

Provide knowledge and skills in various types of weight training and conditioning activities. To provide a knowledge of the Nautilus and Universal equipment. To promote better fitness through weight training activity and exercise. (Fitness)

**024 - BEGINNERS GOLF**

*1.00 Credit*

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

**029 - RACQUETBALL**

*1.00 Credit*

Only for novice and beginning racquetball players. This course is designed to teach the basic skills and rules of the game so that one can become a competent and active participant, an informed spectator, and involved in an activity that will promote physical fitness. (Lifetime Activities)

**030 - BEGINNERS SWIMMING**

*1.00 Credit*

Designed to teach proper breath control along with the five basic swimming strokes (front crawl, back crawl, breaststroke, sidestroke, and elementary backstroke). Also provides the skills and knowledge for personal survival techniques and basic rescue equipment and usage. Only non-swimmers and those who cannot perform strokes with breath control should register for this course. (Lifetime Activities)

**033 - INTERMEDIATE SWIMMING**

*1.00 Credit*

To perfect the five basic strokes learned in beginners swimming. Develops stroke and breathing efficiency necessary to achieve the physiological benefits of swimming. Further develops rescue and survival skills to ensure the safety of oneself and others. Also teaches basic diving skills. Students registering for the course should be able to pass an entrance skills test consisting of the front crawl, back crawl, breaststroke, sidestroke, and elementary backstroke. (Lifetime Activities)

**034 - BOWLING**

*1.00 Credit*

To offer the student an opportunity to understand the fundamentals of bowling. To teach scoring, etiquette and common courtesies. To provide an appreciation of the sport as a carry-over in their personal lives. (Lifetime Activities)

**036 - BEGINNING FITNESS**

*1.00 Credit*

Development of an individualized low intensity fitness program which best fits the physical and mental needs of each student. Programs will be formulated and monitored by the students and instructor. Activities include aerobic exercise and cardiovascular conditioning. (Fitness)

**037 - INTERMEDIATE FITNESS**

*1.00 Credit*

An individualized medium intensity fitness program which best fits the physical and mental needs of each student. Programs will be formulated and monitored by the students and instructor. Activities could include cycling, hydrobics (fitness swimming), running and power walking. (Fitness)

### **038 - ADVANCED FITNESS**

#### *1.00 Credit*

An individualized high intensity fitness program which best fits the physical and mental needs of each student. Programs will be individually prescribed by the instructor in consultation with students. (Fitness)

### **040 - BILLIARDS**

#### *1.00 Credit*

To offer each student the opportunity to learn and participate in the fundamentals of billiards. (Lifetime Activities)

### **042 - HIKING AND BACKPACKING**

#### *1.00 Credit*

Hiking and backpacking skills for the beginner; to include information on equipment and safety procedures. Students will be required to make at least one field trip which may require a lab fee. (Lifetime Activities)

### **045 - RHYTHMIC FUNDAMENTALS**

#### *1.00 Credit*

Physical activities which can be performed with music or other forms of rhythmic accompaniment. Activities include jump rope, bamboo pole, parachute play, lummi sticks and exercise to music. Particularly beneficial for elementary education majors. Offered odd numbered years. (Lifetime Activities)

### **047 - SAILING AND SEAMANSHIP**

#### *1.00 Credit*

The course is taught mostly in the classroom, and lessons in safe boating are included. (Lifetime Activities)

### **049 - SNOW SKIING**

#### *1.00 Credit*

Snow skiing for the beginning skier. Course requirements will include basic classroom instruction dealing with equipment, techniques and safety for the beginner. Field trips will be arranged for the application and practice of skiing techniques. A course fee is required to cover lift tickets, travel expenses and rentals. Medical approval and participation waiver may be required. (Lifetime Activities)

### **050 - SOCIAL DANCE**

#### *1.00 Credit*

The traditional dance (i.e., waltz, foxtrot, swing, samba, rumba, cha-cha, tango). An understanding of dances, courtesies of dances, and identification of music for appropriate dances are emphasized. Develops basic knowledge of social dance steps, execution, leading and following. (Lifetime Activities)

### **052 - CANOEING AND WHITE WATER RAFTING**

#### *1.00 Credit*

Canoeing and white water rafting skills for the beginner; to include information on equipment and safety procedures. A fee is required to cover travel expenses and rentals. Medical approval and participation waiver may be required. (Lifetime Activities)

### **060 - ARCHERY**

#### *1.00 Credit*

The scope and extent of archery, selection of equipment, safety, bracing of the bow, methods of shooting, points of aim, scoring, correction of problems. Use of indoor and outdoor ranges. (Lifetime Activities)

### **065 - AQUATIC EXERCISE**

#### *1.00 Credit*

An opportunity is provided for the student to develop an understanding of the benefits of physical fitness concepts through the use of water exercises and to participate in fitness activities in the pool. Student need not be able to swim to participate, but activities will be in the pool. Does not fulfill physical education major's aquatic requirement. (Fitness)

### **066 - DANCE AEROBICS**

#### *1.00 Credit*

An opportunity is provided for students to develop an understanding of and improve their performance level of dance/step aerobic movements to music and to increase the students' knowledge of cardiovascular intensity levels and mental training needed for a lifetime of fitness. (Fitness)

### **070 - SELF DEFENSE**

#### *1.00 Credit*

Self defense maneuvers will enable the student to gain proficiency with fundamental punches, kicks, blocks and counters. An important part of this class is to create an awareness and an appreciation for self defense. (Lifetime Activities)

### **078 - BADMINTON**

#### *1.00 Credit*

The game of badminton, knowledge of the rules, history, scoring, and strategies of both singles and doubles play will be emphasized. (Lifetime Activities)

### **080 - BEGINNING TENNIS**

#### *1.00 Credit*

Recommended for non-tennis players. The course is designed to develop a basic knowledge of the history, rules, and courtesies of the game of tennis. The fundamental skills of tennis will be presented and practiced. (Lifetime Activities)

**083 - SQUARE AND FOLK DANCE***1.00 Credit*

The skills in folk and square dance are taught. An understanding of the background and tradition (American and other countries) and an appreciation of folk and square dance are emphasized. A carry over activity for later life. (Lifetime Activities)

**086 - VOLLEYBALL***1.00 Credit*

The basic skills, strategies and rules of the game of volleyball will be taught. Participation is expected. (Lifetime Activities)

**087 - AEROBIC ACTIVITIES***1.00 Credit*

To offer each student an understanding of aerobic activities and provide the opportunity to choose an activity to accomplish individual fitness needs. (Fitness)

**088 - WEIGHT CONTROL AND NUTRITION***1.00 Credit*

Basic nutrition and methods of healthy weight loss which could include prescribed activity. (Wellness)

**090 - SPECIAL TOPICS IN HEALTH-  
PHYSICAL EDUCATION-SPORT STUDIES***1.00 to 4.00 Credits*

May be repeated for credit as topic varies.

**099 - WELLNESS LAB***1.00 Credit*

A clinical experience in the evaluation of one's wellness status. Participants will test their own individual fitness levels and will be provided the knowledge to develop personalized exercise prescriptions. Wellness counseling will enable students to select those behaviors which are appropriate to a healthy life style. (Wellness)

***Subject - Health, Physical Education  
and Sport Studies (HPES)***

**000 - ORIENTATION-HEALTH, PHYSICAL  
EDUCATION, SPORT STUDIES***1.00 Credit*

Introduction to the professions of Health, Physical Education, Recreation, Dance, Athletics, Sport Management, and Sports Medicine. Graded S/U.

**101 - WELLNESS ORIENTATION AND  
OBSERVATION***1.00 Credit*

A minimum of 45 clock hours of experience or observation in an organization, corporation, hospital or agency fitness or health promotion program. Graded S/U.

**105 - INTRODUCTION TO WELLNESS***2.00 Credits*

Initial professional experience in wellness curriculum and career opportunities available in wellness, health and fitness, and exercise physiology. Principles of nutrition, exercise training, disease prevention and a healthy lifestyle. Permission of departmental chairperson required for non-HPES majors.

**110 - SCIENTIFIC BASIS OF HEALTH AND  
FITNESS***4.00 Credits*

Basic knowledges, understandings and values of physical activity as well as wise health choices as these physical activities and health choices relate to optimal healthful living and positive wellness. Designed for individuals, regardless of age or sex, who desire total health/wellness through a combination and application of attitudes, knowledge and wise health choices/activities within the realm of diet, nutrition and exercise. Permission of department chairperson required for non-HPES majors.

**111 - PERSONAL HEALTH***4.00 Credits*

A theoretical and practical treatment of the concepts of disease prevention and health promotion. Course content includes topics such as emotional health; aging and death; alcohol, tobacco, and drug abuse; physical fitness; nutrition and dieting; consumer health; chronic and communicable diseases; human sexuality; and stress management.

**112 - FIRST AID-RESPONDING TO  
EMERGENCIES***2.00 Credits*

Lectures, discussion and practice in the giving of first aid in emergencies. The American Red Cross Certification may be obtained by students who pass an examination. Course can be taken only once for graduation credit. Course may be repeated an unlimited number of times for card renewal as space permits. (Fee)

### **113 - COMMUNITY CPR**

#### *1.00 Credit*

Instruct correct techniques in rescue breathing, obstructed airway and CPR for the adult, child and infant. Completion of the course will entitle the student to receive the American Red Cross Community CPR Card. Course can be taken only once for graduation credit. Course may be repeated an unlimited number of times for card renewal as space permits. Graded S/U. (Fee)

### **114 - LIFEGUARDING**

#### *2.00 Credits*

To develop knowledge and skills to aid in the prevention of aquatic accidents and an ability to give assistance to victims. The American Red Cross Advanced Lifeguarding certificate/emblem may be obtained by passing an examination. Prerequisite: Instructor approval. (Fee)

### **115 - WATER SAFETY INSTRUCTION**

#### *3.00 Credits*

Teaching of swimming and water safety skills, methods and techniques. Successful completion of the course will lead to American Red Cross Water Safety Instruction certification. Meets 4 days per week. Prerequisite: Current certification in advanced lifeguarding. (Fee)

### **119 - SCHOOL AND COMMUNITY HEALTH**

#### *3.00 Credits*

Skills and knowledge for aiding teachers and wellness staff to observe and understand the target population in health and illness; the health program of the public schools and the relationship of the school to the students' habits, attitudes and knowledge conducive to good health. Health matters with focus on health problems amenable to community action. Health and physical education majors only or permission of department chair.

### **132 - GYMNASTICS METHODS-MAJORS**

#### *2.00 Credits*

The fundamental skills, methods and techniques in teaching the following activities: tumbling, parallel bars, uneven bars, rings, horse, free exercise, balance beam, vaulting and horizontal bar. Offered odd numbered years.

### **133 - GENERAL METHODS-MAJORS**

#### *2.00 Credits*

The fundamental skills, methods and techniques of teaching the following activities: track and field, basketball, softball, recreational games. Offered even numbered years.

### **147 - BASIC MOVEMENT-MAJORS**

#### *2.00 Credits*

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. Offered even numbered years.

### **151 - HPE/SPORT STUDIES FOUNDATIONS**

#### *4.00 Credits*

Introduction to five foundation areas - the historical, philosophical, psychological, physiological and sociological - of physical education, health education, and sport studies. A sixth unit treats scope, justification and needs of the profession and professional opportunities.

### **153 - INTRODUCTION TO SPORT MANAGEMENT**

#### *4.00 Credits*

Initial professional experience and preparation to pursue the sport management curriculum with enhanced understanding and insight. The basic concepts in sport management; career preparation, professional opportunities and professional skills. Prerequisite: Sport Management major only or with instructor's permission.

### **190 - SPECIAL TOPICS IN HEALTH-PHYSICAL EDUCATION-SPORT STUDIES**

#### *1.00 to 4.00 Credits*

May be repeated for credit as topic varies.

### **201 - AIDS AND OTHER SEXUALLY TRANSMITTED DISEASES**

#### *3.00 Credits*

An introductory, non-technical examination of the biological/ medical, social, psychological, and other ethical aspects of AIDS and other sexually transmitted diseases. Topics include but are not limited to: history of STD's, types, treatment, and prevention of STDs; medical aspects of HIV/AIDS; counseling of AIDS/HIV virus individuals; HIV testing; AIDS education in school systems; religion and AIDS/HIV; minorities/women and AIDS; legal aspects and ethical issues of AIDS/HIV; life with AIDS/HIV (presentation by HIV positive individuals and family members of persons with AIDS).

### **211 - TEAM SPORTS-MAJORS**

#### *2.00 Credits*

Skills, methods and techniques in teaching the following activities: speedball, soccer, various versions of touch football, field hockey, and volleyball. Offered odd numbered years.

## **212 - DANCE-MAJORS**

*3.00 Credits*

The skills and methods of teaching various areas of the dance; folk, square and social dance and rhythmic fundamentals. Offered even numbered years.

## **213 - INDIVIDUAL-DUAL ACTIVITIES-MAJORS**

*2.00 Credits*

The fundamental skills, methods and techniques in teaching the following activities: tennis, badminton, archery, golf, weight lifting and bowling. Offered odd numbered years.

## **219 - PSYCHOLOGICAL FACTORS IN DRIVING**

*3.00 Credits*

Attitudes, motivation, and adjustment and their relationship to unsafe driving. Investigation of principles and methods appropriate in identifying, understanding, and modifying unsatisfactory driving behavior. Prerequisite: PSYC 100 recommended.

## **223 - KINESIOLOGY**

*4.00 Credits*

General body mechanics of the human organism; the activities of the physical education program in their relation to coordination and the proper body mechanics, analysis of movement. Prerequisites: BIOL 231 and 232.

## **233 - PHYSICAL EDUCATION FOR THE ELEMENTARY SCHOOL**

*4.00 Credits*

The aims, objectives, methods, and techniques of teaching physical education in the elementary school. The need for physical activity and practical application of theories are emphasized. Prerequisite: sophomore standing.

## **243 - BASIC ATHLETIC TRAINING**

*4.00 Credits*

A head to toe examination focusing on the initial care and prevention of athletic injuries. Common risk factors and mechanism of athletic injuries will also be identified. Laboratory designed to familiarize the student with taping techniques.

## **256 - SOCIOLOGY OF SPORT**

*4.00 Credits*

Significance of sports in society; examination of relationships of sports to other elements of the culture; how sports contribute to human welfare in advanced technological society.

## **261 - EXERCISE/FITNESS TESTING AND PRESCRIPTION 1**

*4.00 Credits*

The concepts and principles of testing and evaluating fitness levels and the application of those results for the purpose of designing individual exercise prescriptions. Prerequisites: BIOL 231 and HPES 110. BIOL 233 recommended.

## **262 - EXERCISE/FITNESS TESTING AND PRESCRIPTION 2**

*4.00 Credits*

Measurement and evaluation of basic physiological components of exercise and fitness. The assessment and interpretation of physiological parameters associated with fitness and the application of these results to exercise training and prescription. Prerequisites: HPES 261 and HPES major or permission of the instructor.

## **271 - MOTOR LEARNING**

*2.00 Credits*

Provides the future physical educator with opportunities to acquire practical knowledge of the processes and variables that influence the rate, level, and retention of skill acquisition. The student will ultimately be able to develop a sound theoretical basis for instruction, coaching and performance enhancement.

## **275 - EVALUATION TECHNIQUES IN ATHLETIC TRAINING 1**

*4.00 Credits*

The practical application of the injury evaluation process, incorporating origins, insertions, and innervations of selected muscle groups and manual muscle testing of the upper body, including the head and cervical spine. Also prepares students to make assessments of injuries, and formulate written injury evaluations and SOAP notes for documentation purposes. Prerequisites: BIOL 231; HPES 112, 243, and 280.

## **276 - EVALUATION TECHNIQUES IN ATHLETIC TRAINING 2**

*4.00 Credits*

Continuation of HPES 275, but focusing on the lower body, with an in-depth look at postural abnormalities and goniometric measurements of selected joints. Prerequisite: HPES 275.

### **280 - ATHLETIC TRAINING CLINICAL - LEVEL 1**

*1.00 Credit*

Under the supervision of a Certified Athletic Trainer, observation of training room operations and duties of the athletic trainer. The acquisition of basic skills and knowledge is expected. Prerequisites: HPES 112 and 243, and admitted to professional track of the athletic training major. Graded S/U.

### **290 - SPECIAL TOPICS IN HEALTH-PHYSICAL EDUCATION-SPORT STUDIES**

*1.00 to 4.00 Credits*

May be repeated for credit as topic varies.

### **300 - HEALTH PROMOTION PRACTICUM**

*3.00 Credits*

An on campus experience designed to give the student practical experience as a health promotion professional under the direct supervision of departmental staff. Experiences will be in the University Wellness program. Prerequisites: AHPE 099; HPES 110, 112, 243 and 261. Permission of department chair required.

### **303 - ORGANIZATION AND ADMINISTRATION OF HEALTH, PHYSICAL EDUCATION, AND SPORT STUDIES**

*4.00 Credits*

Examination of the philosophy, principles, problems, policies and procedures essential in the organization and administration of meaningful programs in health education, physical education, and sports studies. Prerequisite: HPES majors only and junior status.

### **304 - PRACTICAL TECHNIQUES OF TEACHING PHYSICAL EDUCATION 1**

*1.00 Credit*

Required of all physical education majors, preferably in their junior year. Involves assisting in service classes. Permission of department chair required.

### **305 - PRACTICAL TECHNIQUES OF TEACHING PHYSICAL EDUCATION 2**

*1.00 Credit*

Continuation of HPES 304. Prerequisites: HPES 304 and permission of the department chair.

### **306 - PRACTICAL TECHNIQUES OF TEACHING PHYSICAL EDUCATION 3**

*1.00 Credit*

Continuation of HPES 304,305. Prerequisites: HPES 304 and 305, and permission of department chairperson required.

### **308 - TECHNIQUES-COACHING VOLLEYBALL**

*2.00 Credits*

Develops a basic expertise in the techniques and knowledge of coaching volleyball. Provides laboratory experiences in the practical application of techniques and knowledge of coaching volleyball. Upon successful completion of course requirements and instructor's recommendation, participants may receive USVBA Level I certification. Offered odd numbered years.

### **310 - TECHNIQUES-COACHING SOFTBALL**

*2.00 Credits*

Develops a basic expertise in the knowledge and techniques of coaching softball. Provides laboratory experiences in the practical application of techniques and knowledge of coaching softball. Emphasis is on fast pitch. Offered even numbered years.

### **315 - OFFICIATING-VOLLEYBALL**

*2.00 Credits*

Knowledge and techniques of officiating volleyball. USA and NAGWS rules. Laboratory experiences during class and intramural volleyball. Offered even numbered years. USA and/or NAGWS certification available upon successful completion of course.

### **317 - THEORY OF TRACK AND FIELD OFFICIATING**

*2.00 Credits*

Knowledge and techniques of officiating track and field. National Federation rules. Laboratory experiences during varsity track and field. Offered odd numbered years.

### **319 - THEORY AND METHOD OF COACHING TRACK**

*2.00 Credits*

Methods and forms for all of the events in track and field. Lectures, reports, demonstrations and practice. Offered even numbered years.

### **320 - THEORY OF COACHING AND OFFICIATING WRESTLING**

*2.00 Credits*

Equipment, fundamentals of the art and skill of wrestling. Offered even numbered years.

### **321 - THEORY OF FOOTBALL COACHING**

*2.00 Credits*

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

### **322 - THEORY OF COACHING BASKETBALL**

*2.00 Credits*

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

### **323 - THEORY OF COACHING BASEBALL**

*2.00 Credits*

Individual position and team play in baseball. Lectures, reports, demonstration, and practice.

### **324 - SPORT PSYCHOLOGY**

*2.00 Credits*

The cultural, emotional, psychological and sociological aspects of coaching. Player-coach relationship, understanding the athlete, improving coaching effectiveness. HPESS majors only.

### **327 - THEORY OF COACHING SOCCER**

*2.00 Credits*

Equipment, fundamentals of the game: kicking, passing, playing the ball, strategy and generalship. Offered on demand.

### **334 - ADVANCED COACHING INTERNSHIP-EXTERNSHIP**

*1.00 to 4.00 Credits*

Coaching under supervision in any sport in season. Hours arranged. May be repeated but only six credit hours will count toward graduation. Prerequisite: Permission of department chairperson.

### **342 - BASKETBALL OFFICIATING**

*2.00 Credits*

Basketball rules and mechanics from the standpoint of player, coach and official. Not for certification. Arrangements can be made if certification is desired.

### **344 - SPORT MANAGEMENT PRACTICUM-TEAM PROMOTIONS**

*1.00 Credit*

Designed to give Sport Management majors the opportunity to acquire promotional experience through involvement with a sport team at the University. Course can be taken only once for graduation credit. Course can be repeated an unlimited number of times as space permits. Prerequisite: Junior status and permission of department chairperson.

### **345 - SPORT MANAGEMENT PRACTICUM-FACILITIES MANAGEMENT**

*1.00 Credit*

Designed to give Sport Management majors the opportunity to experience facilities management through involvement with the sports facilities at the University. Course can be taken only once for graduation credit. Course may be repeated an unlimited number of times as space permits. Prerequisite: Junior status and permission of department chairperson.

### **346 - SPORT MANAGEMENT PRACTICUM-TEAM MANAGEMENT**

*1.00 Credit*

Designed to give Sport Management majors the opportunity to experience administrative management of a sport team at the University. Course can be taken only once for graduation credit. Course may be repeated an unlimited number of times as space permits. Prerequisite: Junior status and permission of department chairperson.

### **355 - ORGANIZATION & ADMINISTRATION OF HEALTH PROMOTION PROGRAMS**

*4.00 Credits*

A study of the design implementation, organization, administration and evaluation of health promotion programs; consists of competencies and strategies in administrative tasks, programming, facilities, equipment, marketing, sales, finance and liability. Prerequisite: Junior status.

### **360 - TESTS AND MEASUREMENTS OF HEALTH AND PHYSICAL EDUCATION**

*4.00 Credits*

Fundamental considerations of measurement; physical education and health measurements; test evaluation; criteria of tests; validity of tests; accuracy of tests; physical fitness; skills tests; application of measurement; elements of statistics. HPESS majors only.

### **365 - ATHLETICS TESTING PRACTICUM**

*1.00 Credit*

The collection and interpretation of physiological data associated with the training of athletes under the direct supervision of departmental staff. Various athletic populations will be tested for physiological parameters such as aerobic and anaerobic capacities, strength, power, and metabolism. Testing of a variety of athletic teams at Ohio Northern University, providing the opportunity to gain practical athletics testing experience with the athletics population(s) of the student's choice. Prerequisites: Wellness major, junior status, HPES 262 or permission of the instructor.

### **367 - BODY COMPOSITION PRACTICUM**

*1.00 Credit*

The collection and interpretation of physiological data associated with body composition under the direct supervision of departmental staff. Body composition as determined by skinfold measurement, hydrostatic weighing, and bio-electrical impedance. Prerequisites: Wellness major, junior status, HPES 261 or permission of the instructor.

### **369 - HEALTH AND WELLNESS SCREENING PRACTICUM**

*1.00 Credit*

Organizing and conducting health and wellness screenings under the direct supervision of departmental staff. Experiences include health and fitness assessment of body composition, cardiorespiratory fitness, blood profiles and dietary analysis. Prerequisites: Wellness major, sophomore status, AHPE 099, HPES 110 or permission of the instructor.

### **371 - THERAPEUTIC MODALITIES IN ATHLETIC TRAINING**

*4.00 Credits*

Indications and contraindications of therapeutic modalities in the treatment of athletic injuries as they relate to the healing process. Prerequisites: BIOL 233 and HPES 276.

### **372 - EXERCISE REHABILITATION IN ATHLETIC TRAINING 1**

*4.00 Credits*

Basic components of a comprehensive rehabilitation program. Selection of therapeutic exercises for injuries/corrective surgeries sustained by the recreational athlete. Discussion will focus on the upper extremities. Prerequisite: HPES 371.

### **373 - EXERCISE REHABILITATION IN ATHLETIC TRAINING 2**

*4.00 Credits*

Continuation of HPES 372, but focusing on the lower extremities. Covers basic components of a comprehensive rehabilitation program. Prerequisite: HPES 372. (Formerly part of HPES 372)

### **381 - ECG ANALYSIS**

*2.00 Credits*

The cardiac muscle, electrocardiography, ECG analysis and interpretation in the normal and diseased state. The physiological basis of normal and abnormal ECG tracings as they relate to cardiac physiology. Prerequisites: BIOL 233 and permission of instructor for non-wellness majors.

### **383 - ADULT FITNESS PROGRAM PRACTICUM**

*1.00 Credit*

Comprehensive practical experience working with an adult fitness program under the direct supervision of departmental staff. Practicum is conducted through Ohio Northern University Health and Wellness program. Experiences include client testing, counseling, monitoring, as well as fitness facility management. Prerequisites: Wellness major, junior status, HPES 262 or permission of instructor.

### **390 - SPECIAL TOPICS IN HEALTH-PHYSICAL EDUCATION-SPORT STUDIES**

*1.00 to 4.00 Credits*

May be repeated for credit as topic varies.

### **402 - ADAPTIVE AND CORRECTIVE PHYSICAL EDUCATION**

*4.00 Credits*

For the professionals who are concerned with physical activities for people with disabilities; to develop an understanding of the various disabling conditions and to explore methods of adapting physical activities to meet the needs of the atypical student in the physical education class. Prerequisite: HPES 223.

### **421 - LEGAL ISSUES IN PHYSICAL EDUCATION & SPORT**

*4.00 Credits*

Develops an awareness of the complexities concerning sports litigation, primarily in the focus of educational institutions. To use this new knowledge to assist their professional growth in the field. To have a clear understanding of the Law and its fundamental elements. Prerequisite: Junior status.

### **433 - DRIVER EDUCATION**

*3.00 Credits*

Actual in-car driving and teaching experiences. For those students who plan to teach driver education in the public/private schools.

### **434 - ORGANIZATION AND ADMINISTRATION OF DRIVERS-TRAFFIC SAFETY**

*3.00 Credits*

Organizational and administrative aspects of driver and traffic education as they relate to the total school and other specialized programs. For those who seek state certification in driver training. Historical and philosophical aspects, evaluation, related professional organizations and occupational opportunities.

**480 - ATHLETIC TRAINING CLINICAL - LEVEL 2**

*1.00 Credit*

Under the supervision of a Certified Athletic Trainer, practice of those skills necessary for the athletic trainer. The students who have shown to be capable and responsible will have the major responsibility of covering a sport, to begin to develop independent athletic training skills. Prerequisites: HPES 280 and 1300 hours of internship and/or permission of the instructor. Graded S/U.

**485 - WELLNESS AND HEALTH PROMOTION INTERNSHIP**

*3.00 to 15.00 Credits*

Participation in a broad based, off-campus experience designed for fitness development or health promotion program under the supervision of the University as well as a worksite supervisor. May be repeated but only 15 credit hours will count toward graduation. Prerequisites: Senior status; 2.00 GPA, 2.50 GPA in major; HPES 355; and permission of the department chairperson required.

**486 - SPORT MANAGEMENT INTERNSHIP**

*1.00 to 15.00 Credits*

Specially planned sport management work throughout the quarter to provide direct employment experience. Emphasis is on the practical application of theory and knowledge in developing professional skills. May be repeated but only 15 credit hours will count toward graduation. To be taken with the Sport Management Seminar to assist the students with the integration of field work and classroom learning. Permission of department chairperson required.

**487 - HEALTH, PHYSICAL EDUCATION, AND SPORT STUDIES GENERAL INTERNSHIP**

*4.00 to 16.00 Credits*

Participation in a broad based, off-campus experience designed to accommodate students with a departmental major or multiple majors where discipline-specific or combined discipline internships are not offered. Prerequisites: senior status; 2.00 GPA; 2.50 GPA in major(s); and permission of department chairperson. Course may be repeated but only 16 hours will count toward graduation.

**490 - SPECIAL TOPICS IN HEALTH-PHYSICAL EDUCATION-SPORT STUDIES**

*1.00 to 4.00 Credits*

May be repeated for credit as topic varies.

**494 - HEALTH SEMINAR**

*3.00 Credits*

An in-depth analysis of current health problems, issues and trends as they apply to the teacher of health education.

**495 - TRENDS IN ATHLETIC TRAINING**

*4.00 Credits*

Current topical issues affecting the Athletic Training Profession include organization and administration topics, legal issues, and selected health issues that are present in the athletic population. Prerequisites: Junior or senior status and HPES 372 and/or permission of the instructor. Offered odd numbered years.

**496 - SPORT MANAGEMENT SEMINAR**

*1.00 Credit*

Discussion and analysis of the field setting, practice and organization. Includes monitoring and evaluation of the internships. To be taken concurrently with Sport Management Internship.

**497 - INDEPENDENT STUDY IN HPES**

*1.00 to 4.00 Credits*

An in-depth exploration of a subject of special interest. Can be repeated as topic varies. Prerequisite: junior status and written permission from the faculty-mentor, the department chairperson and the Dean of the College prior to registration.



# DEPARTMENT OF HISTORY, POLITICAL SCIENCE, AND CRIMINAL JUSTICE

Professors Ludanyi, Peltier, Saffell; Associate Professors Lomax, Loughlin, Scott, Wilson (*Chair*); Visiting Assistant Professor D. Smith

The **Wilfred E. Binkley Chair of History and Political Science**, inaugurated in 1971, has been made possible by a grant from the Scaife Foundation of Pittsburgh. The 1998-99 recipient of this professorship is David P. Peltier, professor of history.

The **Kernan Robson Chair of Government**, inaugurated in 1972, has been made possible by a trust established by the late Kernan Robson. The 1998-99 recipient of this professorship is Andrew Ludanyi, professor of political science.

The department offers separate majors in history, political science, criminal justice, international studies and social studies. To pursue a dual major students must complete all the requirements for each separate major.

Majors in history and political science prepare students generally for careers in teaching, law, journalism, government service, or business. Criminal justice prepares students for employment in law enforcement, corrections, and court management. International studies majors prepare for careers in government or business. A major in social studies will qualify the student for licensure in integrated social studies by the State Department of Education of Ohio. There are special departmental advisors for prelaw and teacher licensure.

There are active chapters of Phi Alpha Theta, the national history honorary, Pi Sigma Alpha, the national political science honorary, Alpha Phi Sigma, the national criminal justice honorary and Phi Beta Delta, the national honorary for international scholars. Public service internships are available at all levels of government, including the Ohio Legislature. Public history interns include work in museums and in archival management. Students annually participate in the National Model United Nations in New York City or the Global Model United Nations and the American Mock Trial program in Des Moines, Iowa, and Minneapolis, Minnesota. The department also offers students the opportunity to participate in the Washington Center or the Washington Semester Program sponsored by American University.

The department participates in study-abroad programs. Students majoring in history are encouraged to consider a year abroad at University of Joensuu, the University of Wales, Lampeter, or Louis Kossuth University in Debrecen,

Hungary. Political science, criminal justice, and international studies majors are directed toward Glasgow Caledonian University, Louis Kossuth University, or the University of Joensuu.

## Major in History

Specific requirements for the history major:

HSPS 000	Orientation	1 hour
HIST 110-111	West. Civ. 1 & 2	8 hours
HIST 204	Historiography	4 hours
PLSC 206-207	Am. Gov. 1 & 2	8 hours
HIST 214-215	U.S. History 1 & 2	8 hours
HSPS 222-23-24-25 or GEOG 226	One contemporary course	4 hours
HIST or HSPS 488-489	Sr. Research 1 & 2	3 hours
28 hours history electives at 300 or 400 level, distributed as follows:		
HIST, HSPS	World History	8 hours
HIST, HSPS	U.S. History	8 hours
HIST, HSPS	Electives	12 hours

## Minor in History

HIST 110-111	West. Civ. 1 & 2	8 hours
HIST 204	Historiography	4 hours
HIST 214-215	U.S. History 1 & 2	8 hours
HSPS 222-23-24-25 or GEOG 226	One contemporary course	4 hours
The following must be at the 300 or 400 level:		
HIST, HSPS	World History	4 hours
HIST, HSPS	U.S. History	4 hours
HIST, HSPS	Elective	4 hours

## Major in Political Science

Specific requirements for the political science major are:

HSPS 000	Orientation	1 hour
PLSC 105	Mod. Pol. Conflicts	4 hours
PLSC 205	Scope and Methods	4 hours
PLSC 206-207	Am. Gov. 1 & 2	8 hours
HIST 214 or 215	U.S. History 1 or 2	4 hours
HSPS 222-23-24-25 or GEOG 226	One contemporary course	4 hours
HSPS 458 or 459	West. Pol. Thgt. 1 or 2	4 hours
HSPS or PLSC 488-489	Sr. Research 1 & 2	3 hours
28 hours political science electives at 300 or 400 level, distributed as follows:		
PLSC, HSPS	American politics	8 hours
PLSC, HSPS	World politics	8 hours
PLSC, HSPS	Electives	12 hours

## Minor in Political Science

PLSC 105	Mod. Pol. Conflicts	4 hours
PLSC 205	Scope and Methods	4 hours
PLSC 206-207	Am. Gov. 1 & 2	8 hours

HSPS 222-23-24-25 or GEOG 226	One contemporary course	4 hours
HSPS 458 or 459	West. Pol. Thgt. 1 or 2	4 hours

The following courses must be at the 300 or 400 level:

PLSC, HSPS	Am. politics	4 hours
PLSC, HSPS	World politics	4 hours
PLSC, HSPS	Elective	4 hours

## Major in Criminal Justice

Specific requirements for the Criminal Justice major:

HSPS 000	Orientation	1 hour
PLSC 121	Intro. to Crim. Justice	4 hours
PLSC 122	Police in America	4 hours
PLSC 123	Corrections	4 hours
PLSC 205	Scope and Methods	4 hours
PLSC 207	Am. Gov. 2	4 hours
SOC 261	Criminology	4 hours
PLSC 342	Judicial Process and Criminal Law	4 hours
PLSC 351	Con. Law and Civil Lib.	4 hours
SOC 361	Delinq. & Juv. Just.	4 hours
PSYC 215, 311, 320, 420, or PSSC 301		8 hours
HSPS 311, PLSC 207, 230, 255, 366, 391, 491		8 hours
SOC 240, 243, 246, 247, 351		8 hours
HSPS or PLSC 488-489	Crim. Justice elective Sr. Research 1 & 2	4 hours 3 hours

## Minor in Criminal Justice

PLSC 121	Intro. to Crim. Justice	4 hours
PLSC 122	Police in America	4 hours
PLSC 123	Corrections	4 hours
SOC 261	Criminology	4 hours
PLSC 342	Judicial Process	4 hours
SOC 361	Delinquency	4 hours
	Crim. Justice electives	12 hours

The electives are taken in two of the following disciplines (political science, psychology, and/or sociology) and outside the student's major. These courses must be taken from among those approved for the major. All criminal justice minors must take at least one course in psychology and demonstrate competence in social science methods.

## Major in International Studies

Core requirements for the International Studies major:

HSPS 000	Orientation	1 hour
PLSC 107	Intro. to Int'l. Studies	4 hours
HSPS 222-23-24-25	One contemporary course	4 hours
GEOG 226	World Regional Geog.	4 hours
HIST 384	Modern Europe 2	4 hours
PLSC 388	Int'l. Relations & Law	4 hours
HSPS 395	Int'l. Studies Seminar	4 hours
HSPS 452	Am. Foreign Relations	4 hours
HIST, PLSC, or HSPS 488, 489	Sr. Research 1 & 2	3 hours

Academic or employment experience abroad

Cognate: Second-year proficiency in a foreign language plus one advanced course approved by the department of modern languages.

In addition to the core requirements, students take five courses in Social Sciences **OR** five courses at the 300 or 400 level in their second language or another language other than their own **OR** the business option.

This provides maximum flexibility for students to develop a course of study most appropriate to their interests and goals. In all cases, the selections of electives must be done in close consultation with the student's advisor in International Studies.

## Minor in International Studies

PLSC 107	Intro. to Int'l. Studies	4 hours
HSPS 222-23-24-25	One contemporary course	4 hours
GEOG 226	World Regional Geog.	4 hours
HIST 384	Modern Europe 2	4 hours
PLSC 388	Int'l. Relations & Law	4 hours
HSPS 452	Am. Foreign Relations	4 hours
	Electives (3 courses)	12 hours*

Cognate: second-year proficiency in a foreign language

\*Electives chosen from the following:

SOC 250	Cultural Anthro.	4 hours
PLSC 334	Parliamentary Democ.	4 hours
PLSC 416	East-Central Europe and Russia	4 hours
PLSC 336	Devel. Pol. Syst.	4 hours
SOC 351	World Crim. Justice Syst.	4 hours
HIST 383	Modern Europe 1	4 hours
IBEC 385	Int'l. Econ.	4 hours
HSPS 395	Int'l Studies Seminar	4 hours
IBEC 411	Comp. Econ. Syst.	4 hours
IBEC 442	Econ. Hist. U.S.	4 hours
HIST 471	Ottoman Empire	4 hours
PLSC 475	Model UN	4 hours

MLNG 200, 300, 400 level (lit. and/or civ. courses) or one substitution with approval of department chair

## Options

Options in accounting, business and economics are available to any department major. They are designed to give direction and depth to areas of study related to the major. The courses for the option are in addition to major course work, and the selection of electives must be done in close consultation with the student's advisor. See business options under Arts and Sciences description.

## Teacher Licensure with Major in Social Studies

HSPS 000	Orientation	1 hour
HIST 110-111	West. Civ. 1 & 2	8 hours
HIST 214-215	U.S. History 1 & 2	8 hours
HIST 303	Ohio History	4 hours
HIST 365	African-Am. History	4 hours
HIST/HSPS 300/400 level	Am. History Elective	4 hours
HIST/HSPS 300/400 level	Eur. History Elective	4 hours
HIST 204 or PLSC 205	Historiography or Scope & Methods	4 hours
PLSC 107, 222-225	Intro. to Int'l Studies, Contemporary Affairs	4 hours
GEOG 226	World Regional Geog.	4 hours
PLSC 206	Am. Gov. 1	4 hours
PLSC 207	Am. Gov. 2	4 hours
PLSC/HSPS 300/400 level	Elective	4 hours
IBEC 202	Microeconomics	4 hours
IBEC 203	Macroeconomics	4 hours
PSSC 301	Social Psychology	4 hours
PSYC 100	Psychology	4 hours
SOC 105	Sociology	4 hours
SOC 250	Cultural Anthropology	4 hours
HIST/HSPS 488,489	Physical Geography	4 hours
	Senior Research 1 & 2	3 hours
Professional Education courses		50 hours

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

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### **Subject - Geography (GEOG)** ———

#### **226 - WORLD REGIONAL GEOGRAPHY**

*4.00 Credits*

A regional survey of the world, including its leading cultural, economic, historical, political and appropriate environmental features. Open to freshmen. Formerly HSPS 226.

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### **Subject - History (HIST)** ———

#### **110 - WESTERN CIVILIZATION 1**

*4.00 Credits*

Ideas, attitudes, and institutions basic to civilization as it developed in the West from ancient times to the seventeenth century.

#### **111 - WESTERN CIVILIZATION 2**

*4.00 Credits*

Ideas, attitudes, and institutions basic to civilization as it developed in the West from the seventeenth century to the present.

#### **120 - PUBLIC HISTORY**

*4.00 Credits*

The application of history through discussions, demonstrations, readings and fieldwork on a variety of public history topics including museums and historical societies, historic preservation, material culture, popular culture, and family and ethnic group history.

#### **130 - LOCAL HISTORY**

*4.00 Credits*

Significant aspects of local history for reference and teaching purposes. Investigation, examination and study of a variety of topics and trends in local history theory and practice through readings, discussions, demonstrations, and field trips.

#### **190 - SPECIAL TOPICS IN HISTORY**

*1.00 to 4.00 Credits*

Can be repeated as the topic varies.

#### **204 - HISTORIOGRAPHY**

*4.00 Credits*

Western historical thought from the Greeks to the present. Research methods for history majors and minors. Requires a fully documented research paper on an historical topic. Prerequisite: Sophomore status.

#### **214 - UNITED STATES HISTORY TO 1865**

*4.00 Credits*

American colonies and United States from 1492 to 1865. Emphasis is placed on the formation of American political, economic, and social attitudes and their application in the early Republic.

#### **215 - UNITED STATES HISTORY SINCE 1865**

*4.00 Credits*

The United States since the Civil War. Major topics include the role played by the US in global affairs and US domestic policy.

#### **290 - SPECIAL TOPICS IN HISTORY**

*1.00 to 4.00 Credits*

Can be repeated as topic varies.

#### **303 - OHIO HISTORY**

*4.00 Credits*

The political and cultural evolution of Ohio from the prehistoric period to the late 19th century. Emphasis placed on the late 18th and early 19th century.

**361 - RECENT AMERICAN HISTORY 1**

*4.00 Credits*

The history of the United States from the beginning of World War I until the conclusion of World War II. Formerly HSPS 361.

**362 - RECENT AMERICAN HISTORY 2**

*4.00 Credits*

The history of the United States from the conclusion of World War II to the present-day. Formerly HSPS 362.

**365 - AFRICAN-AMERICAN HISTORY**

*4.00 Credits*

The essential facts, trends, and interpretations in the history of the African-American from the African beginnings to the present-day.

**372 - THE ANCIENT WORLD**

*4.00 Credits*

The political, social, economic, and cultural development of the Near Eastern, Greek, and Roman civilizations of antiquity.

**373 - MEDIEVAL EUROPE**

*4.00 Credits*

The political, social, economic, and cultural development of Europe from the decline of the Roman Empire to the beginning of the Renaissance, with special attention to the emergence of institutions that shaped the modern world. Offered alternate years.

**374 - RENAISSANCE AND REFORMATION**

*4.00 Credits*

The evolution of the Italian communes. European cultural movements from the fourteenth through the sixteenth centuries. The Church and European society in the later Middle Ages, the Protestant Reformation, the Catholic Reformation, and the Wars of Religion. Offered alternate years.

**382 - ABSOLUTISM, ENLIGHTENMENT, AND THE FRENCH REVOLUTION**

*4.00 Credits*

The history of Europe covers the Treaty of Westphalia to the French Revolution. The rise of the modern state, the ancient regime, the origins and nature of the French Revolution, and the coming of Napoleon are stressed. Offered alternate years. Formerly 322, 375 and 376.

**383 - HISTORY OF MODERN EUROPE 1**

*4.00 Credits*

European history from 1815 to the era before World War I. This course covers Europe from the age of Reaction and the Romantics to the age of Realism, Naturalism, and Modernism.

**384 - HISTORY OF MODERN EUROPE 2**

*4.00 Credits*

European history from the origin of World War I to the collapse of the Soviet Empire and the evaluation of the European community.

**390 - SPECIAL TOPICS IN HISTORY**

*1.00 to 4.00 Credits*

Can be repeated as topic varies.

**415 - RUSSIAN HISTORY TO 1815**

*4.00 Credits*

The social, political and economic development of the Russian state from ancient Kiev to Appanage Russia and the Mongol invasion to the Muscovite State of Ivan the Dread, the Time of Troubles, and the Romanov dynasty to 1801. Formerly HSPS 415.

**451 - HISTORY OF LAW**

*4.00 Credits*

The evolution of law as an instrument of dispute resolution and social control. The development of the Roman and civil law tradition and the English common law tradition to the seventeenth century.

**454 - CIVIL WAR AND RECONSTRUCTION**

*4.00 Credits*

Causes, duration, aftermath, and consequences of the American Civil War.

**461 - TOPICS IN NORTH AMERICA TO 1783**

*4.00 Credits*

Included topics such as: Religion in America, the French in North America, the British in North America, Revolutionary America, Race and Gender in America. Formerly HIST 355.

**462 - TOPICS IN NORTH AMERICA SINCE 1783**

*4.00 Credits*

Includes topics such as: the Early Republic, Religion in America, the War of 1812, Mid-19th Century Politics in North America, Race and Gender in North America, and Environmental History.

**463 - TOPICS IN MODERN EUROPE**

*4.00 Credits*

Topics include but are not limited to World War I, the rise of Fascism, Hitler and Nazism and the European Community, the European Avant-Garde, Existentialism, Structuralism, Post-Structuralism, Critical Theory and Deconstruction.

**471 - HISTORY OF THE OTTOMAN EMPIRE**

*4.00 Credits*

The emergence, expansion and decline of Turkish power in South-Eastern Europe, Asia Minor, Central Asia and North Africa from the time of the Seljuks to the Young Turks, with particular emphasis on this non-Western empire's military, political and cultural legacy.

**481 - PUBLIC SERVICE INTERNSHIP PROGRAM**

*1.00 to 16.00 Credits*

Field experience in the area of public service. Work in a close relationship with public offices and officials. Interns serving in a local agency receive four credit hours for ten hours of service per week. Those who work full-time for a quarter receive 16 credit hours. A maximum of 6 hours will count toward major requirements. Graded S/U. Prerequisites: Consultation with the department internship committee and completion of the application process, a 2.75 GPA, and junior or senior status.

**488 - SENIOR RESEARCH PAPER 1**

*1.00 Credit*

Topic selection, development of bibliography and outline for senior paper (See HIST 489) directed by a departmental faculty member. Required of all departmental majors. Students will enroll in this course at least two quarters before the quarter in which they expect to graduate. Prerequisites: Senior status; major in History or International Studies.

**489 - SENIOR RESEARCH PAPER 2**

*2.00 Credits*

Writing of a research paper directed by a department faculty member relevant to their major. Required of all departmental majors. Enrollment before the quarter of expected graduation. Prerequisite: HIST 488.

**490 - SPECIAL TOPICS IN HISTORY**

*1.00 to 4.00 Credits*

Can be repeated as topic varies.

**494 - SEMINAR IN HISTORY**

*1.00 to 4.00 Credits*

Can be repeated as topic varies.

**497 - INDEPENDENT STUDY IN HISTORY**

*1.00 to 4.00 Credits*

Approval of department chairman required prior to registrati

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***Subject - History, Political Science and Criminal Justice (HSPS)***

**000 - HISTORY AND POLITICAL SCIENCE ORIENTATION**

*1.00 Credit*

Familiarization with the department, requirements for majors, planning a program of courses, the University catalog, careers, the library and university services. Required of majors in history, political science, criminal justice and international studies. Graded S/U.

**192 - SPECIAL TOPICS - HISTORY AND POLITICAL SCIENCE**

*1.00 to 4.00 Credits*

Can be repeated as the topic varies.

**222 - CONTEMPORARY ASIA**

*4.00 Credits*

The ways in which Asian people have shaped their culture through politics, art, religion, economics and family. The primary focus is on events since World War II. Open to freshmen.

**223 - CONTEMPORARY AFRICA**

*4.00 Credits*

Political, socioeconomic, and intellectual development of Africa since the conclusion of World War II. Open to freshmen.

**224 - CONTEMPORARY MIDDLE EAST**

*4.00 Credits*

The political, socioeconomic and intellectual development of the Middle East since the conclusion of World War II. A survey of the clash of Western and non-Western power centers in the region. Open to freshmen.

**225 - CONTEMPORARY LATIN AMERICA**

*4.00 Credits*

Political, economic, social, and cultural development of Latin America. The primary focus is on events since World War II. Open to freshmen.

**292 - SPECIAL TOPICS-HISTORY AND POLITICAL SCIENCE**

*1.00 to 4.00 Credits*

Can be repeated as the topic varies.

**311 - URBAN HISTORY AND POLITICS**

*4.00 Credits* The historical development of American cities and the contemporary problems faced by cities and their suburbs.

**378 - INTRODUCTION TO CANADIAN STUDIES**

*4.00 Credits*

Canada's history, politics, geography, environment, economics and literature. Interdisciplinary, team taught. Formerly HSPS 278.

**392 - SPECIAL TOPICS-HISTORY AND POLITICAL SCIENCE**

*1.00 to 4.00 Credits*

Can be repeated as the topic varies.

**395 - SEMINAR IN INTERNATIONAL STUDIES***4.00 Credits*

An in-depth multidisciplinary analysis of a global crisis, an international regional concern, or an issue in global politics. An integrating experience for international studies majors. Focuses on timely or weighty problems in terms of their long-term implications for the international and interstate stability and order of the world. Prerequisite: HIST 204 or PLSC 205.

**452 - AMERICAN FOREIGN RELATIONS***4.00 Credits*

An analytical and conceptual overview of the nature of American Foreign Policy decision-making with a use of case studies to uncover the variables at play in recent American Foreign Policy.

**458 - WESTERN POLITICAL THOUGHT 1***4.00 Credits*

Western political theory commencing with Plato, Aristotle, and the Stoics. Proceeds through Machiavelli and finishes with the Reformation and the wars of religion with an emphasis on their political implications.

**459 - WESTERN POLITICAL THOUGHT 2***4.00 Credits*

Western political theory commencing with the Enlightenment and ending with John Rawls. Constitutionalism, contract theory, conservatism, idealism, liberalism, utilitarianism, Marxism, anarchism, socialism, feminism, and environmentalism shall be considered.

**481 - PUBLIC SERVICE INTERNSHIP***1.00 to 16.00 Credits*

Field experience in the area of public service. Work in a close relationship with public offices and officials. Interns serving in a local agency receive four credit hours for ten hours of service per week. Those who work full-time for a quarter receive 16 credit hours. A maximum of 6 hours will count toward major requirements. Graded S/U. Prerequisites: Consultation with the department internship committee and completion of the application process, 2.75 GPA, and junior or senior status.

**488 - SENIOR RESEARCH PAPER 1***1.00 Credit*

Topic selection, development of bibliography and outline for senior paper(See HSPS 489) directed by a departmental faculty member. May be used as a substitute for HIST 488 or PLSC 488 for students completing a dual major within the department. Prerequisites: Senior standing and dual major.

**489 - SENIOR RESEARCH PAPER 2***2.00 Credits*

Writing of a research paper directed by a department faculty member relevant to their majors. Open to all dual departmental majors. Enrollment before the quarter of expected graduation. Prerequisite: HSPS 488.

**492 - SPECIAL TOPICS - HISTORY AND POLITICAL SCIENCE***1.00 to 4.00 Credits*

Can be repeated as the topic varies.

**Subject - Political Science (PLSC)—****105 - MODERN POLITICAL CONFLICTS AND ISSUES***4.00 Credits*

A comparative examination of government structure, political attitudes and relations among nations.

**107 - INTERNATIONAL STUDIES AND WORLD PROBLEMS***4.00 Credits*

Introduction to the relations of states, governments, political movements and international organizations in the global context, with particular attention on the non-Western world. A survey of the political actors and their objectives in a world of limited resources. Underdevelopment and an ongoing population crisis, with intense competition between the rich and the poor, the major powers and their client states and independence movements. Formerly HSPS 107.

**121 - INTRODUCTION TO CRIMINAL JUSTICE***4.00 Credits*

Concepts, issues, substance, structures of the American criminal justice system, causes of criminal behavior, theories of law and punishment, and the roles of various actors within the system.

**122 - POLICE IN AMERICA***4.00 Credits*

Historical, philosophical and legal basis of police institutions, practices and procedures. Issue oriented course and discussion topics will vary with prevailing issues. Formerly PLSC 241.

**123 - CORRECTIONS***4.00 Credits*

Historical, philosophical and legal basis of correctional procedures and institutions. Issue oriented course and discussion topics will vary with prevailing correctional issues. Formerly PLSC 245.

### **191 - SPECIAL TOPICS IN POLITICAL SCIENCE**

*1.00 to 4.00 Credits*

Can be repeated as topic varies.

### **205 - SCOPE AND METHODS**

*4.00 Credits*

Empirical concepts and tools for analyzing and explaining political phenomena. Nuts and bolts of Political Science analysis. Hands-on experience in applying and developing concepts and tools for modern qualitative and quantitative analysis.

### **206 - AMERICAN GOVERNMENT 1**

*4.00 Credits*

Foundations of federal and state government and the political behavior of the American people as expressed in political parties, interest groups and elections.

### **207 - AMERICAN GOVERNMENT 2**

*4.00 Credits*

Institutions of federal and state government and selected areas of domestic public policy.

### **230 - POVERTY, INEQUALITY AND PUBLIC ISSUES**

*4.00 Credits*

The nature, extent and causes of social mobility in American society, with particular emphasis on poverty, ethnic, racial and gender inequalities in this and other areas of socioeconomic attainment in the United States. The variety of (past, present or future) government actions and/or policies to promote upward mobility and eradicate social inequalities.

### **291 - SPECIAL TOPICS IN POLITICAL SCIENCE**

*1.00 to 4.00 Credits*

Can be repeated as topic varies.

### **306 - ENVIRONMENTAL LAW**

*3.00 Credits*

The American legal system as it is used to preserve the nation's environment. Significant environmental laws and policies developed for implementation. Prerequisites: BIOL 251, CE 323, CE 371 or permission of instructor. Formerly HSPS 306.

### **334 - PARLIAMENTARY DEMOCRACIES**

*4.00 Credits*

A comparison of the politics of contemporary parliamentary democracies, stressing the impact of political culture and the operations of governmental institutions, parties and interest groups in the process of public policy-making.

### **336 - DEVELOPING POLITICAL SYSTEMS**

*4.00 Credits*

A comparison of contemporary politics in developing and non-Western societies, stressing the impact of cultural fragmentation, modernization, social unrest and rising expectations on the stability and effectiveness of governmental institutions and processes.

### **342 - JUDICIAL PROCESS AND CRIMINAL LAW**

*4.00 Credits*

The roles of lawyers, judges, and juries and the organization and operation of federal and state courts, with special emphasis on criminal law procedure.

### **347 - POLITICAL PARTIES-INTEREST GROUPS-ELECTIONS**

*4.00 Credits*

The organization and activities of political parties and interest groups and their impact on the political process, especially their roles in election campaigns.

### **350 - CONSTITUTIONAL LAW AND GOVERNMENT**

*4.00 Credits*

Social and political forces that shaped constitutional political theory and the interaction of law and politics through the Reconstruction era. Relationship of the Supreme Court vis-a-vis Congress, the Executive, States, and emergency powers. Formerly HSPS 350.

### **351 - CONSTITUTIONAL LAW AND CIVIL LIBERTIES**

*4.00 Credits*

Late nineteenth and twentieth century decisions of the Supreme Court with special attention directed to civil liberties, civil rights and criminal justice issues. Formerly HSPS 351.

### **355 - MINORITIES AND WOMEN IN CRIMINAL JUSTICE**

*4.00 Credits*

The role of minorities and women in the American criminal justice system. Issues relating to minorities and women as offenders, victims of crime, and criminal justice professionals will be presented and explored. Additionally, concepts such as racism, prejudice, discrimination and victimization will be examined. Prerequisite: PLSC 121.

### **366 - PUBLIC ADMINISTRATION AND POLICY ANALYSIS**

*4.00 Credits*

Bureaucrats as actors in the American political system, their sources of power, their relationship to elected public officials, the basic dynamics and problems in the policymaking process and widely used analytical approaches to public policy. Offered alternate years.

**388 - INTERNATIONAL RELATIONS AND LAW**

*4.00 Credits*

The factors and forces which determine the policies of nation states and the structure, operation and legal setting of international politics. Particular emphasis is on the role of IGO's and NGO's as well as the changing international legal orders.

**391 - SPECIAL TOPICS IN POLITICAL SCIENCE**

*1.00 to 4.00 Credits*

Can be repeated as topic varies.

**416 - EAST CENTRAL EUROPE AND RUSSIA**

*4.00 Credits*

A comparison of politics of transition between autocratic and democratic political systems in the region formerly dominated by the Soviet Union, traced from Tsarist Russia through the Communist period to present efforts of democratization.

**429 - EXECUTIVE PROCESS**

*4.00 Credits*

The historical development and contemporary operation of the presidency and governorships.

**430 - LEGISLATIVE PROCESS**

*4.00 Credits*

The structure and operation of Congress and state legislatures.

**475 - MODEL UNITED NATIONS**

*1.00 to 4.00 Credits*

Prepares students to participate in the National Model United Nations in New York City. This is an integrated and serious simulation of many aspects of the United Nations. Students travel to New York City in the spring. May be repeated up to 12 credit hours, but only 4 credit hours can count toward major or minor requirements. All 12 hours can fulfill graduation requirements. Formerly HSPS 475.

**476 - MOCK TRIAL**

*1.00 to 4.00 Credits*

Prepares students to participate in both the regional and national mock trial competitions held at the University of Toledo and Drake University respectively. Preparation of both civil and criminal cases including opening and closing arguments, direct/cross examination of witnesses and objections. May be repeated up to 12 credit hours but only 4 credit hours can count toward major or minor requirements. All 12 hours can fulfill graduation requirements. Prerequisite: Permission of instructor. Formerly HSPS 476.

**481 - PUBLIC SERVICE INTERNSHIP PROGRAM**

*1.00 to 16.00 Credits*

Field experience in the area of public service. Work in a close relationship with public offices and officials. Interns serving in a local agency receive four credit hours for ten hours of service per week. Those who work full-time for a quarter receive 16 credit hours. A maximum of 6 hours will count toward major requirements. Graded S/U. Prerequisites: Consultation with the department internship committee and completion of the application process, a 2.75 GPA, and junior or senior status.

**488 - SENIOR RESEARCH PAPER 1**

*1.00 Credit*

Topic selection, development of bibliography and outline for senior paper (see PLSC 489) directed by a departmental faculty member. Required of all departmental majors. Enrollment at least two quarters before expected graduation. Prerequisites: Senior status, major in Political Science, Criminal Justice or International Studies.

**489 - SENIOR RESEARCH PAPER 2**

*2.00 Credits*

Writing of a research paper directed by a department faculty member relevant to their major. Required of all departmental majors. Enrollment one quarter before expected graduation. Prerequisite: PLSC 488.

**491 - SPECIAL TOPICS IN POLITICAL SCIENCE**

*1.00 to 4.00 Credits*

Can be repeated as topic varies.

**495 - SEMINAR IN POLITICAL SCIENCE OR CRIMINAL JUSTICE**

*1.00 to 4.00 Credits*

Can be repeated as topic varies.

**498 - INDEPENDENT STUDY IN POLITICAL SCIENCE, CRIMINAL JUSTICE OR INTERNATIONAL STUDIES**

*1.00 to 4.00 Credits*

Approval of department chairman required prior to registration.

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## DEPARTMENT OF MATHEMATICS

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Professors Hovis (*Chair*), Lhamon, Putt; Associate Professors Boyadzhiev, Evans, Johns, Retterer, Roepke, Song; Assistant Professor Walters; Lecturer Schroeder

The **Mary Reichelderfer Chair in Mathematics and Computer Science** was established in 1983 from funds of the estate of Mary K. Werkman. The 1998-99 recipient of this chair is Danhong Song, associate professor of mathematics.

The department offers majors in mathematics and mathematics/statistics as well as minors in mathematics and applied mathematics. Courses are offered in mathematics and statistics to complement almost all disciplines in the university. Students with a primary major in the department may choose a general education program leading to either the bachelor of arts degree or the bachelor of science degree. In addition, the department cooperates with the Center for Teacher Education in program planning for licensure for those desiring to teach at the secondary school level. The secondary education program in mathematics is nationally accredited by the National Council of Teachers of Mathematics.

Students should consult with the department in which they are considering a major to determine the best choice of courses in mathematics and statistics. In general, the sequence 144-145-146 is designed for students in business administration, 154-155-156-256 for students in pharmacy and life sciences, 163-164-165-263 for students in engineering, physical sciences, mathematics and computer science, 172-173 for prospective early childhood and middle childhood teachers. MATH 142 (Introduction to Statistics) should be of general interest to students in many areas.

MATH 120 and 122 are designed for students who require or desire additional preparation in algebra (120) or trigonometry (122) before enrolling in other required mathematics courses. MATH 160, precalculus, is designed to provide a fast-paced review of the material contained in MATH 120 and 122. The student who needs intensive skill development before taking a calculus course should take 120 and 122; the student needing only a review should take 160.

MATH 105 is designed to meet the needs of students who, although otherwise well-prepared for college work, require remedial work in mathematics before beginning the mathematics required for their chosen major. Because it is a remediation course it carries credit neither toward graduation nor toward any major or minor. It does, however, count in the student's load, rank and GPA calculation. Entrance into MATH 105 is determined by the departmental placement test and requires permission of the department chair. Students whose ACT in mathematics is below 16

(SAT below 370) usually need to take this course before enrolling in any other mathematics course.

All courses in mathematics which are to be counted toward a major or minor in mathematics, or a minor in applied mathematics, must be completed with a grade of "C" or better.

### Department Co-op Program

Students with a major in the department seeking a co-op experience must enroll in MATH 350 (1 hour). At least sophomore status is required for application for admission into a co-op program. Participation requires junior or senior status. Participants must agree to

- register for at least 12 hours of course work each term on campus.
- register for MATH 350 for each term at the co-op site.
- maintain an overall grade point average of at least 2.5.
- submit a co-op practicum report to the departmental co-op director during the ninth week of each work term.
- allow release of academic record to co-op employer and prospective employers and to allow the co-op employer to release employment record to Ohio Northern University.
- arrange to meet all deadlines for completion of paperwork normally associated with attendance at Ohio Northern University (e.g. advance registration, grants and loans, etc.)

Certification of completion of the program will appear as a concentration on the transcript. No other courses can be taken while on a co-op experience. Participation in intercollegiate athletic teams is prohibited while on a co-op experience. A minimum of three quarters of work is required for completion of the co-op experience—a maximum of six quarters of work is allowed. Most co-ops will be expected to do six quarters of work. Acceptance into the program is not guaranteed. Once the experience is begun, it can be terminated by the participant, the department, the university, or the employer for any reason. Co-op employers must meet the requirements of the department and the university. Complete details of the co-op program are available in the department office.

### Mathematics

For any major in the department, the student must complete the following core courses:

MATH 163	Calculus 1
MATH 164	Calculus 2
MATH 165	Calculus 3
MATH 263	Calculus 4
MATH 272	Linear Algebra
MATH 294	Foundations of Mathematics
MATH 370	Junior Seminar
MATH 492	Senior Mathematical Exposition 1
MATH 493	Senior Mathematical Exposition 2

In addition, CS 164 (Programming 1) is a required cognate course.

Mathematics majors must then complete one of the following two sequences:

**\*\*\* Track 1 \*\*\***

Students planning on graduate study in mathematics should plan on meeting the requirements in this track.

MATH 361 Differential Equations  
MATH 311 Abstract Algebra 1  
MATH 312 Abstract Algebra 2  
MATH 352 Real Analysis 1  
MATH 353 Real Analysis 2  
MATH 380 Stat for Sci/Eng

or

MATH 480 Probability Models  
MATH 3XX Elective  
MATH 3XX Elective

**\*\*\* Track 2 \*\*\***

Students completing this track (including Math 301) will have met the Ohio mathematics requirements for Adolescent Teacher Licensure.

MATH 245 History of Math  
MATH 301 Math for Sec. Teaching

or

MATH 3XX Elective  
MATH 361 Differential Equations

or

MATH 332 Operations Research  
MATH 311 Abstract Algebra 1  
MATH 336 Discrete Mathematics  
MATH 352 Real Analysis 1  
MATH 380 Stat for Sci/Eng

or

MATH 480 Probability Models  
and

MATH 481 Math Statistics 1  
MATH 421 Foundations of Geometry

### Mathematics/Statistics

In addition to the core requirements listed above, the mathematics/statistics major must complete the following sequence of courses:

MATH 156 Biostatistics 1  
MATH 256 Biostatistics 2  
MATH 352 Real Analysis 1  
MATH 386 Experimental Design  
MATH 480 Probability Models  
MATH 481 Math Statistics 1  
MATH 482 Math Statistics 2

A MATH/STAT major is strongly encouraged to pursue a minor in an area where statistics has wide applicability. Examples include business, computer science, psychology, technology, biology, environmental studies, and biomedical sciences.

Students interested in a career in Actuarial Science should complete the MATH/STAT major as well as MATH 332, 461, and 462, and IBEC 202, 203, and ACCT 211, 212 from the College of Business Administration.

For a minor in mathematics, the student must complete MATH 163, 164, 165, 272, and 294 plus two additional courses (each four credit hours or more) in mathematics numbered 245 or higher for a total of at least 28 hours.

For a minor in applied mathematics, the student must complete MATH 163, 164, 165, 263, 272, and 380. In addition, the student must choose three electives from among MATH 332, 336, 361, 362, 363, 461, 462, 480, 481, and 482.

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## Subject - Mathematics (MATH) —

### 000 - ORIENTATION

*1.00 Credit*

Familiarization with the department, requirements for majors planning programs of study, University catalog and library. Graded S/U.

### 105 - INTERMEDIATE ALGEBRA

*4.00 Credits*

Algebraic expressions and operations, equations and problem solving, special products and factoring, linear equations, simultaneous equations, exponents, radicals and graphs. For the student whose score on the mathematics placement exam indicates the need for a review of the fundamentals of algebra. Usually the student whose Math ACT is less than 16 should expect to take this course. CREDIT EARNED IN THIS COURSE DOES NOT SATISFY GRADUATION REQUIREMENTS FOR ANY PROGRAM OFFERED AT THE UNIVERSITY.

### 120 - COLLEGE ALGEBRA

*4.00 Credits*

The Real Number System. Polynomials. Equations and Inequalities. Functions and their Graphs. Polynomial and Rational Functions. Exponential and Logarithmic Functions. Not open for credit to students who have received a grade of C or higher in any Calculus course. Prerequisite: Two years of high school algebra and satisfactory performance on the mathematics placement examination.

### 122 - COLLEGE TRIGONOMETRY

*3.00 Credits*

Trigonometric functions, identities, solutions of triangles, complex numbers. Not open for credit to students who have received a grade of C or higher in MATH 163 or above. Prerequisite: MATH 120 or its equivalent.

### 142 - INTRODUCTION TO STATISTICS

*4.00 Credits*

Describing data (visualization, computation, models). Describing relationships (the linear regression model). Producing data. Probability and sampling distributions. Statistical inference. Statistical calculator required. Prerequisite: MATH 105 or its equivalent.

**144 - FINITE MATHEMATICS***4.00 Credits*

Introduction to and applications of topics from algebra and finite mathematics relevant to business: equations and inequalities, systems of linear equations and matrices, linear programming, mathematics of finance, and game theory. Prerequisite: 2 years of high school algebra.

**145 - CALCULUS WITH BUSINESS APPLICATIONS***4.00 Credits*

Algebra and calculus as relevant to business: algebraic, exponential, and logarithmic functions and their graphs, differentiation and applications of the derivative, introduction to integration. Prerequisite: MATH 144.

**146 - BUSINESS STATISTICS***4.00 Credits*

Basic statistical techniques with emphasis on their application in the field of business. Prerequisites: MATH 145 or equivalent.

**154 - CALCULUS FOR LIFE SCIENCES 1***4.00 Credits*

Concepts of differentiation and integration applied to algebraic, exponential, and logarithmic functions. Prerequisite: MATH 120 or equivalent.

**155 - CALCULUS FOR LIFE SCIENCES 2***4.00 Credits*

Additional topics in integration, functions of several variables, elementary differential equations, and probability. Prerequisite: MATH 154 or equivalent.

**156 - BIOSTATISTICS 1***4.00 Credits*

Basic statistical techniques with emphasis on applications to Biological and Health Sciences. Prerequisite: MATH 120 or equivalent.

**160 - PRE-CALCULUS MATHEMATICS***5.00 Credits*

A fast-paced review of algebraic and trigonometric functions, including inverses, graphing, composition, etc. Intended for students requiring review before taking calculus. Not open for credit to students who have received a grade of C or higher in any calculus course or to any student with credit for MATH 120. Prerequisite: Two years of high school algebra and at least one-half year of trigonometry.

**163 - CALCULUS 1***5.00 Credits*

Limit of a function, continuity, the derivative, extrema, curve plotting, Mean Value Theorem, applications of the derivative. Prerequisite: MATH 160 or equivalent.

**164 - CALCULUS 2***4.00 Credits*

The Fundamental Theorem of Calculus, applications of the integral, the exponential function and inverse functions, techniques of integration. Prerequisite: MATH 163. (Formerly MATH 261).

**165 - CALCULUS 3***4.00 Credits*

Sequences and series, Taylor series, polar coordinates, parametric equations, conic sections, vectors, planes and lines in space. Prerequisite: MATH 164. (Formerly MATH 262).

**172 - FUNDAMENTAL MATHEMATICS 1***5.00 Credits*

Problem solving skills and techniques, sets and structure, whole numbers, integers, rationals and reals, theory of arithmetic and introductory number theory. Open only to early and middle education majors.

**173 - FUNDAMENTAL MATHEMATICS 2***4.00 Credits*

Microsoft Works, fundamentals of counting, probability and statistics. Logo and turtle geometry, geometric figures, measurement, congruence, symmetry, constructions, transformations and similarity. Open only to early and middle education majors.

**190 - SPECIAL TOPICS IN MATHEMATICS***1.00 to 5.00 Credits***245 - HISTORY OF MATHEMATICS***4.00 Credits*

The history and origin of mathematics, restricted principally to mathematics through elementary calculus. A chronological study of some mathematicians and their contributions to mathematical thought. Offered alternate years.

**256 - BIOSTATISTICS 2***4.00 Credits*

Review of inferential statistics. Analysis of variance. Linear and multiple regression and correlation. Chi-square Distribution. Non-parametric statistics. Prerequisite: MATH 156.

**263 - CALCULUS 4***4.00 Credits*

Vector-valued functions, multivariate functions, spherical and cylindrical coordinates, differential calculus of multivariate functions, integral calculus of multivariate functions. Prerequisite: MATH 165.

**272 - INTRODUCTION TO LINEAR ALGEBRA***4.00 Credits*

Vector space methods. Vector spaces over the Reals, linear transformations and their matrices, eigenvalues and eigenvectors. Applications. Prerequisites: MATH 164 or consent of the instructor.

**290 - SPECIAL TOPICS IN MATHEMATICS***1.00 to 4.00 Credits***294 - FOUNDATIONS OF MATHEMATICS***4.00 Credits*

Sets, logic and mathematical proof; application of these concepts. Prerequisite: MATH 164.

**301 - MATHEMATICS FOR SECONDARY TEACHERS***4.00 Credits*

Includes topics related to number systems, theory of equations, functions, inequalities, geometry, number theory, etc. Emphasis on Euclidean geometry and LOGO and on discussions of actual questions raised in a secondary mathematics classroom, including discussion of appropriate teaching tactics. THIS COURSE WILL NOT COUNT TOWARD THE MAJOR IN MATHEMATICS. Offered alternate years. Prerequisite: MATH 294.

**311 - ABSTRACT ALGEBRA 1***4.00 Credits*

Algebraic structures, groups, rings and fields. Prerequisite: MATH 294.

**312 - ABSTRACT ALGEBRA 2***4.00 Credits*

Continuation of MATH 311. Offered as needed.

**324 - TOPOLOGY***3.00 Credits*

General point set topology and metric spaces. Offered as needed. Prerequisites: MATH 165 and 294.

**332 - OPERATIONS RESEARCH***4.00 Credits*

Optimal decision making in deterministic systems; linear programming model, simplex method and algorithms, primal and dual problem, sensitivity analysis, transportation and transshipment, assignment, shortest route, minimal spanning tree, maximal flow, PERT, game theory, and non-linear programming. Prerequisite: MATH 272. (Also listed as CS 332.)

**336 - DISCRETE MATHEMATICS***4.00 Credits*

An introduction to discrete mathematical structures: sets, logic, combinatorics, relations and digraphs, functions, elementary graph theory, partially ordered sets, lattices and Boolean Algebras, Karnaugh maps and simple circuit design. Prerequisite: CS/ECE 164 and MATH 164 or MATH 272.

**350 - PROFESSIONAL PRACTICE***1.00 Credit*

Cooperative education at an off-campus site. Involvement in full-time work (40 hours per week or more) requiring knowledge and skills in the major. See description of co-op program in department's catalog narrative for details. Prerequisites: Junior status; 2.5 GPA; and acceptance into the Co-op program. Graded S/U.

**352 - REAL ANALYSIS 1***4.00 Credits*

Mathematical induction. Properties of real and rational numbers. Sequences. Convergence. Limits of functions. Formerly MATH 452. Prerequisites: MATH 263 and 294.

**353 - REAL ANALYSIS 2***4.00 Credits*

Continuous functions in real Cartesian spaces. Theory of functions of one variable (differentiation and integration). Formerly MATH 453. Offered on demand. Prerequisite: MATH 352.

**361 - DIFFERENTIAL EQUATIONS***5.00 Credits*

First order differential equations with applications; second order linear differential equations with applications. Laplace transforms, systems of first order equations. Prerequisites: MATH 165 and 272.

### **362 - FOURIER ANALYSIS AND PDES**

*4.00 Credits*

Fourier series. Fourier integrals. Applications. The heat equation. The wave equation. Additional methods for solving PDEs. Offered alternate years. Prerequisite: MATH 165.

### **363 - COMPLEX VARIABLES**

*4.00 Credits*

Complex algebra, complex calculus, analytic functions, infinite series over the complex plane, theory of residues, conformal mapping. Offered alternate years. Prerequisite: MATH 263.

### **370 - JUNIOR SEMINAR**

*1.00 Credit*

Career options. Graduate and professional school options. Attendance at departmental seminars and Capstone presentations. Mathematics as a computational science. The synergy between mathematics and technology. Prerequisite: Mathematics major with junior standing.

### **380 - STATISTICS FOR SCIENTISTS AND ENGINEERS**

*4.00 Credits*

Probability and its application to problems in mathematics, science and engineering; random variables and their distributions; estimation; hypothesis testing; linear regression; and analysis of variance. Topics in quality control. Prerequisite: MATH 164.

### **386 - EXPERIMENTAL DESIGN**

*4.00 Credits*

An introduction to the design and analysis of experiments including comparative designs, block design, factorial design, fractional factorial design, nested and split-plot design and analysis of variance. Students will design and conduct experiments and analyze the resulting data. Statistical software will be used throughout the course. Prerequisite: MATH 256 or 380.

### **390 - SPECIAL TOPICS IN MATHEMATICS**

*1.00 to 4.00 Credits*

### **421 - FOUNDATIONS OF GEOMETRY**

*4.00 Credits*

An axiomatic approach to geometry including the concepts of incidence, ordering, separation, and congruence in incidence, affine, Euclidean and non-Euclidean geometries. Prerequisite: MATH 294. Offered alternate years.

### **423 - PROJECTIVE GEOMETRY**

*3.00 Credits*

Projectivities, perspective triangles, quadrangular sets, harmonic sets, duality, fundamental theorem and Pappus's Theorem, polarities, the conic, finite projective plane, parallelism, coordinates. Offered as needed. Prerequisite: MATH 294.

### **461 - NUMERICAL ANALYSIS 1**

*4.00 Credits*

Solutions of equations in one variable, interpolation and polynomial approximation, direct methods for solution of linear systems. Offered alternate years. Prerequisites: CS 165; MATH 165 and 272. (Also listed as CS 461)

### **462 - NUMERICAL ANALYSIS 2**

*3.00 Credits*

Numerical differentiation and integration; initial value problems for ordinary differential equations; iterative techniques in matrix algebra. Offered alternate years. Prerequisite: MATH 361. (Also listed as CS 462)

### **480 - PROBABILITY MODELS**

*4.00 Credits*

Axioms of probability theory; discrete and continuous random variables; introduction to stochastic processes. Prerequisite: MATH 263.

### **481 - MATHEMATICAL STATISTICS 1**

*4.00 Credits*

Probability models, random variables, sampling, estimation, hypothesis testing, non-parametric procedures, regression, and correlation. Prerequisites: MATH 263 and 480.

### **482 - MATHEMATICAL STATISTICS 2**

*4.00 Credits*

Hypothesis testing, ANOVA. Analysis of enumerative data, non-parametric statistics. Prerequisite: MATH 481.

### **490 - SPECIAL TOPICS IN MATHEMATICS**

*1.00 to 4.00 Credits*

### **492 - SENIOR MATHEMATICAL EXPOSITION 1**

*1.00 Credit*

The student explores a topic in mathematics with faculty supervision. The student will do research for an expository paper. Graded S/U. Prerequisite: Consent of the instructor or department chairman.

### **493 - SENIOR MATHEMATICAL EXPOSITION 2**

*1.00 Credit*

Continuation of MATH 492. The student prepares an expository paper and gives a lecture on the paper. Prerequisite: MATH 492.

### **494 - SEMINAR IN MATHEMATICS**

*1.00 to 4.00 Credits*

### **497 - INDEPENDENT STUDY IN MATHEMATICS**

*1.00 to 4.00 Credits*

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## DEPARTMENT OF MODERN LANGUAGES

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Professors Davey, Lippert; Associate Professors Dickson, Dufault (*Chair*), Walter; Assistant Professor Sutherland

The modern language program is designed to train students to speak, understand, read, and write another language; to ensure a strong background in the culture and literature of peoples whose language they are studying; to provide the language ability necessary for students to work in a number of fields; to prepare students for graduate work; to train students to be teachers of French and Spanish at the elementary and secondary levels.

The university Audio Center provides students with opportunities for language practice and extends contact with the living language. Audio and video materials and interactive computer programs are used as an adjunct to class work and coordinated with class instruction to give students ample opportunity for aural comprehension, audio-visual drill, speaking, and self-correction.

The Elementary French, German and Spanish sequences fulfill the language competency requirement for students enrolled in a Bachelor of Arts degree program.

Students take placement tests to determine their appropriate course level. Placement credit counts toward fulfillment of requirements for language majors and minors, and toward language competency requirements.

Requirements for a **non-teacher licensure major in French or Spanish**: 52 hours are required beginning with French 120 or Spanish 140; to include eight hours of civilization courses. Ordinarily courses are taken in sequence through French 312 or Spanish 342. Unless otherwise indicated, courses at the 300- and 400- level assume completion of French 310 or 312, or Spanish 342.

Requirements for a **teacher-licensure (Ohio) major in French or Spanish**: 68 hours are required beginning with French 120 or Spanish 140; to include eight hours of civilization courses and eight hours of literature courses. Ordinarily courses are taken in sequence through French 312 or Spanish 342. Unless otherwise indicated, courses at the 300- and 400-level assume completion of French 310 or 312, or Spanish 342.

It is strongly recommended, although not required, that language majors take part in summer-study abroad or junior-year abroad pro-

grams. Approved course work completed abroad counts toward requirements for language majors and minors. Students are encouraged to develop a second academic area of interest in addition to their language major.

For a **minor in French, German or Spanish**: 36 hours are required beginning with French 120, German 130, or Spanish 140.

### **Business Option for Spanish/French Majors**

A student wishing a major in French or Spanish may complete the College of Arts and Sciences business option.

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## **Subject - French (FREN)**

### **120 - ELEMENTARY FRENCH 1**

#### *4.00 Credits*

Basic proficiency in understanding, speaking, reading and writing French in everyday situations. Emphasis on comprehension and speaking. Video, slides, music and other authentic materials illustrate French and francophone ways of life. Four classes per week.

### **121 - ELEMENTARY FRENCH 2**

#### *4.00 Credits*

Continuation of FREN 120. Four classes per week. Prerequisite: FREN 120 or proficiency established by placement test.

### **122 - ELEMENTARY FRENCH 3**

#### *4.00 Credits*

Continuation of FREN 121. Four classes per week. Prerequisite: FREN 121 or proficiency established by placement test.

### **214 - INTERMEDIATE FRENCH 1**

#### *4.00 Credits*

Continued development of proficiency in understanding, speaking, reading and writing French. Emphasis on high-frequency vocabulary and grammatical structures as well as phonetics. Video, slides, music and other authentic materials illustrate language usage and cultural contexts. Four classes per week. Prerequisite: FREN 122 or proficiency established by placement test.

### **215 - INTERMEDIATE FRENCH 2**

#### *4.00 Credits*

Continuation of FREN 214. Prerequisite: FREN 214 or proficiency established by placement test.

### **216 - INTERMEDIATE FRENCH 3**

#### *4.00 Credits*

Continuation of FREN 215. Prerequisite: FREN 215 or proficiency established by placement test.

### **219 - INTRODUCTION TO FRENCH LITERATURE**

#### *4.00 Credits*

Basic principles of analyzing and appreciating French poetry, prose and theatre. Reading and discussion in French of representative texts. Four classes per week. Prerequisite: FREN 215 and permission of the department.

### **297 - INDEPENDENT STUDY IN FRENCH**

#### *1.00 to 4.00 Credits*

May be repeated as topic varies.

### **310 - ADVANCED FRENCH: READING**

#### *4.00 Credits*

Development of reading skills through authentic cultural and literary texts. Vocabulary building. Review of grammar as needed. Prerequisite: FREN 216.

### **311 - ADVANCED FRENCH: SPEAKING**

#### *4.00 Credits*

Intensive practice of oral communication in conversations, role playing, oral interviews. Oral reports on authentic texts and oral interpretation of dramatic scenes or poetry may be included. Review of phonetic symbols and sounds. Prerequisite: FREN 216.

### **312 - ADVANCED FRENCH: WRITING**

#### *4.00 Credits*

Intensive writing practice including letters, resumes of interviews and accounts of personal experiences. Written analysis of authentic texts. Vocabulary development. Review of grammar as needed. Prerequisite: FREN 216.

### **313 - BUSINESS FRENCH**

#### *4.00 Credits*

Development of oral and written proficiency within a business context. Business vocabulary, readings, business and cultural concepts, and situational practice. Prerequisite: FREN 216 and permission of the department.

### **315 - THE FRENCH TEXT: THE NOVEL**

#### *4.00 Credits*

Reading and discussion in French of representative works in their historical and cultural contexts. Four classes per week. Prerequisite: FREN 310 or 312.

### **316 - THE FRENCH TEXT: THE ESSAY AND NON-LITERARY TEXTS**

#### *4.00 Credits*

Reading and discussion in French of representative classic authors and texts from contemporary French periodicals. Four classes per week. Prerequisite: FREN 310 or 312.

### **319 - FRENCH POETRY AND SONG**

#### *4.00 Credits*

Discussion and analysis in French of representative French and francophone works in their historical and cultural contexts. Rules of French versification. Interpretations of poetry into song. Classic and contemporary "chansonniers." Four classes per week. Prerequisite: FREN 310 or 312.

### **324 - THE FRENCH FILM**

#### *4.00 Credits*

Viewing of representative films and discussion in French of well-known directors and actors, from the origins of French cinema to the present. Four classes per week. Prerequisite: FREN 216 and permission of the department.

### **327 - FRENCH CIVILIZATION: CONTEMPORARY FRANCE**

#### *4.00 Credits*

Discussion in French of twentieth century French culture with emphasis on the family, education, employment, politics, technology and cultural values based on videos, readings and other authentic materials. Four classes per week. Prerequisite: FREN 310 or 312.

### **328 - FRENCH CIVILIZATION: HISTORY OF FRANCE**

#### *4.00 Credits*

Discussion in French of the history, political institutions and artistic expressions of France from their origins to the twentieth century. Films, slides and appropriate texts enhance historical perspectives and emphasize cultural values. Four classes per week. Prerequisite: FREN 310 or 312.

### **329 - FRENCH CIVILIZATION: FRANCOPHONE CULTURES**

#### *4.00 Credits*

Discussion in French of francophone cultures, emphasizing Quebec and West Africa, in terms of historical perspectives and contemporary concerns. Video, films, slides and appropriate texts illustrate cultural values and provide the basis for discussion. Four classes per week. Prerequisite: FREN 310 or 312. NOTE: Fulfills the non-Western studies requirement.

**390 - SPECIAL TOPICS IN FRENCH**

*1.00 to 4.00 Credits*

May be repeated as topic varies. Prerequisite: FREN 310 or 312.

**416 - THE FRENCH THEATRE**

*4.00 Credits*

Reading and discussion in French of representative works from the 17th century to the present. Recordings, films, and actual performances enhance discussions as available and appropriate. Four classes per week. Prerequisite: FREN 310 or 312.

**418 - FRANCOPHONE LITERATURE OF THE TWENTIETH CENTURY**

*4.00 Credits*

Reading and discussion in French of works by contemporary writers in various French-speaking countries. Four classes per week. Prerequisite: FREN 310 or 312. NOTE: Fulfills the non-Western studies requirement.

**497 - INDEPENDENT STUDY IN FRENCH**

*1.00 to 4.00 Credits*

May be repeated as topic varies.

**Subject - German (GRMN)****130 - ELEMENTARY GERMAN 1**

*4.00 Credits*

Basic proficiency in understanding, speaking, reading and writing German in everyday situations. Emphasis on comprehension and speaking. Videos, slides, music and other authentic materials illustrate life in Germany and Austria. Four classes per week.

**131 - ELEMENTARY GERMAN 2**

*4.00 Credits*

Continuation of GRMN 130. Four classes per week. Prerequisite: GRMN 130 or proficiency established by placement test.

**132 - ELEMENTARY GERMAN 3**

*4.00 Credits*

Continuation of GRMN 131. Four classes per week. Prerequisite: GRMN 131 or proficiency established by placement test.

**224 - INTERMEDIATE GERMAN 1**

*4.00 Credits*

Continued development of proficiency in understanding, speaking, reading and writing German. Emphasis on high-frequency vocabulary and grammatical structures, short writing assignments. Authentic materials and videos illustrate language usage and cultural context. Four classes per week. Prerequisite: GRMN 132 or proficiency established by placement test.

**225 - INTERMEDIATE GERMAN 2**

*4.00 Credits*

Continuation of GRMN 224. Four classes per week. Prerequisite: GRMN 224 or proficiency established by placement test.

**226 - INTERMEDIATE GERMAN 3**

*4.00 Credits* Continuation of GRMN 225.

Emphasis on reading. Comprehension of authentic video. Four classes per week. Prerequisite: GRMN 225 or proficiency established by placement test.

**261 - INTRODUCTION TO GERMAN LITERATURE**

*4.00 Credits*

Basic principles of analyzing and appreciating German essays, short stories, poetry, plays, novellas. Vocabulary building. Reading and discussions in German. Four classes per week. Prerequisite: GRMN 225.

**298 - INDEPENDENT STUDY IN GERMAN**

*1.00 to 4.00 Credits*

May be repeated as topic varies.

**311 - ADVANCED GERMAN 1**

*4.00 Credits*

Intensive practice in using vocabulary and high-frequency grammatical structures. Advanced grammar and syntax. Written compositions. Reading of short texts. Conversation and discussion. Four classes per week. Prerequisite: GRMN 226 or permission of instructor.

**312 - ADVANCED GERMAN 2**

*4.00 Credits*

Intensive practice in using vocabulary and high-frequency grammatical structures. Advanced grammar and syntax. Written compositions. Readings of short texts. Conversation and discussion. Four classes per week. Prerequisite: GRMN 226 or permission of instructor.

### **313 - ADVANCED GERMAN 3**

#### *4.00 Credits*

Intensive practice in using vocabulary and high-frequency grammatical structures. Advanced grammar and syntax. Written compositions. Reading of short texts. Conversation and discussion. Prerequisite: GRMN 226 or permission of instructor.

### **336 - BUSINESS GERMAN**

#### *4.00 Credits*

Vocabulary and language structures pertaining to business culture in Germany. Letter and resume writing. Video and authentic materials. Four classes per week. Prerequisite: GRMN 226.

### **337 - GERMAN CIVILIZATION**

#### *4.00 Credits*

Geographical, political, economic, social and cultural forces in German-speaking Central Europe from the 5th century AD to the present. Discussion in German. Four classes per week. Prerequisite: GRMN 226.

### **338 - CONTEMPORARY GERMANY AND AUSTRIA**

#### *4.00 Credits*

German and Austrian culture since the Second World War with emphasis on family, education, employment, politics, technology, and social values based on readings, videos and other materials. Discussion in German. Four classes per week. Prerequisite: GRMN 226.

### **361 - GERMAN LITERATURE**

#### *4.00 Credits*

Readings and discussion in German of drama, the Novelle, poetry, the short story. Four classes per week. Prerequisite: GRMN 261 or permission of the department.

### **391 - SPECIAL TOPICS IN GERMAN**

#### *1.00 to 4.00 Credits*

May be repeated as topic varies. Prerequisite: GRMN 226 or permission of the department.

### **498 - INDEPENDENT STUDY IN GERMAN**

#### *1.00 to 4.00 Credits*

May be repeated as topic varies.

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## **Subject - Modern Languages (MLNG)**

### **111 - JAPANESE**

#### *1.00 to 3.00 Credits*

Individualized study of modern spoken Japanese. Coverage of material based on number of credits applied for (1-3). Will meet one hour per week with tutor for additional help and practice. Availability may vary from quarter to quarter. Graded S/U. NOTE: Does not satisfy the general education language requirement.

### **112 - WELSH**

#### *1.00 to 3.00 Credits*

Individualized study of modern spoken Welsh. Coverage of material based on number of credits applied for (1-3). Will meet one hour per week with tutor for additional help and practice. Availability may vary from quarter to quarter. Graded S/U. NOTE: Does not satisfy the general education language requirement.

### **113 - PORTUGUESE (BRAZILIAN)**

#### *1.00 to 3.00 Credits*

Individualized study of modern spoken Brazilian Portuguese. Coverage of material based on number of credits applied for (1-3). Will meet one hour per week with tutor for additional help and practice. Availability may vary from quarter to quarter. Graded S/U. NOTE: Does not satisfy the general education language requirement.

### **190 - INDIVIDUALIZED LANGUAGE STUDY**

#### *1.00 to 3.00 Credits*

Individualized study of a modern spoken language for motivated students with a particular interest in or need for study of languages other than French, German, Spanish or Russian. Availability of any given language may vary from quarter to quarter. See department. Coverage of material based on number of credits applied for (1-3). Meets one hour per week with tutor for additional help and practice. Graded S/U. NOTE: Does not satisfy the general education language requirement.

### **403 - LITERATURE IN TRANSLATION**

#### *4.00 Credits*

Either Spanish, French or German literature in translation. Focus on major writers and literary trends of different periods. Lectures and assignments in English. Does not fulfill the general education language requirement.

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## **Subject - Russian (RUSS)**

### **150 - ELEMENTARY RUSSIAN 1**

#### *4.00 Credits*

Basic proficiency in understanding, speaking, reading and writing Russian in everyday situations. Emphasis on comprehension and speaking. Authentic materials illustrate life in Russia and the former Soviet Union. Four classes per week.

### **151 - ELEMENTARY RUSSIAN 2**

#### *4.00 Credits*

Continuation of RUSS 150. Four classes per week. Prerequisite: RUSS 150 or demonstrated proficiency.

### **152 - ELEMENTARY RUSSIAN 3**

#### *4.00 Credits*

Continuation of RUSS 151. Four classes per week. Prerequisite: RUSS 151 or demonstrated proficiency.

## **296 - INDEPENDENT STUDY IN RUSSIAN**

*1.00 to 3.00 Credits*

May be repeated. Prerequisite: Permission of the department. Graded S/U.

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## **Subject - Spanish (SPAN)**

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### **140 - ELEMENTARY SPANISH 1**

*4.00 Credits*

Basic proficiency in understanding, speaking, reading, and writing Spanish with emphasis on listening, speaking, and pronunciation. Videos, slides, music and other authentic materials illustrate Hispanic way of life. Four classes per week.

### **141 - ELEMENTARY SPANISH 2**

*4.00 Credits*

Continuation of SPAN 140. Four classes per week. Prerequisite: SPAN 140 or proficiency established by placement test.

### **142 - ELEMENTARY SPANISH 3**

*4.00 Credits*

Continuation of SPAN 141. Four classes per week. Prerequisite: SPAN 141 or proficiency established by placement test.

### **244 - INTERMEDIATE SPANISH 1**

*4.00 Credits*

Continued development of proficiency in understanding, speaking, reading and writing Spanish with emphasis on pronunciation and speaking. Four classes per week. Prerequisite: SPAN 142 or proficiency established by placement test.

### **245 - INTERMEDIATE SPANISH 2**

*4.00 Credits*

Continuation of SPAN 244. Four classes per week. Prerequisite: SPAN 244 or proficiency established by placement test.

### **246 - INTERMEDIATE SPANISH 3**

*4.00 Credits*

Continuation of SPAN 245. Four classes per week. Prerequisite: SPAN 245 or proficiency established by placement test.

### **247 - INTRODUCTION TO HISPANIC LITERATURE**

*4.00 Credits*

Critical principles in the assessment of prose, fiction, poetry and drama as applied to selected readings in Spanish and Latin American literature. Prerequisite: SPAN 245 and permission of the department.

## **250 - SPANISH PHONETICS**

*4.00 Credits*

Introduction to linguistic terminology and a comparative analysis of the Spanish and English sound systems, with emphasis on improving students' pronunciation in Spanish. Prerequisite: SPAN 245 and permission of the department.

## **299 - INDEPENDENT STUDY IN SPANISH**

*1.00 to 4.00 Credits*

May be repeated as topic varies.

## **341 - SPANISH CONVERSATION AND COMPOSITION**

*4.00 Credits*

Development of greater proficiency in using vocabulary and grammatical structures through intensive oral and written practice. Prerequisite: SPAN 246.

## **342 - ADVANCED SPANISH LANGUAGE STUDY**

*4.00 Credits*

Intensive study of grammar and syntax emphasizing high-frequency constructions. Prerequisite: SPAN 246.

## **343 - BUSINESS SPANISH**

*4.00 Credits*

Development of oral and written proficiency within a business context. Business vocabulary, readings, business and cultural concepts, situational practice and case studies. Prerequisites: SPAN 246 and permission of the department.

## **351 - HISPANIC CULTURAL PERSPECTIVES**

*4.00 Credits*

Contrasts Hispanic and American world views with emphasis on social attitudes and life styles. Prerequisite: SPAN 246 and permission of the department. NOTE: Fulfills the non-Western studies requirement.

## **353 - SPANISH CIVILIZATION**

*4.00 Credits*

Geographical, political, economic, social and cultural forces in Spain from prehistoric times to the present. Prerequisite: SPAN 246 and permission of the department.

## **354 - LATIN AMERICAN CIVILIZATION**

*4.00 Credits*

Geography, history and culture of Latin America from Mezoamerica to the present. Prerequisite: SPAN 246 and permission of the department. NOTE: Fulfills the non-Western studies requirement.

### 356 - SPANISH ART, MUSIC AND DANCE

#### 4.00 Credits

Development of Spanish art, architecture, music and dance from prehistoric times to the present. Prerequisite: SPAN 246 and permission of the department.

### 357 - LATIN AMERICAN ART, MUSIC AND DANCE

#### 4.00 Credits

Development of Latin American art, architecture, music and dance from Mezoamerica to the present. Prerequisite: SPAN 246 and permission of the department.

NOTE: Fulfills the non-Western studies requirement.

### 360 - HISPANIC MEDIA

#### 4.00 Credits

Contemporary Spanish and Latin American radio, television, newspapers and magazines. Prerequisite: SPAN 246 and permission of the department.

### 392 - SPECIAL TOPICS IN SPANISH

#### 1.00 to 4.00 Credits

May be repeated as topic varies. Prerequisites: SPAN 246, or SPAN 341 and 342, depending on topic, and permission of the department.

### 451 - SPANISH LITERATURE TO 1681

#### 4.00 Credits

Works of major Spanish authors from beginnings to Golden Age. Prerequisites: SPAN 341 and 342.

### 452 - EIGHTEENTH- AND NINETEENTH-CENTURY SPANISH LITERATURE

#### 4.00 Credits

Neoclassicism, Romanticism, Realism and Generation of 1898. Prerequisites: SPAN 341 and 342.

### 453 - TWENTIETH-CENTURY SPANISH LITERATURE

#### 4.00 Credits

Main currents of Spanish literature from the Generation of 1898 to the present. Prerequisites: SPAN 341 and 342.

### 456 - NINETEENTH-CENTURY LATIN AMERICAN LITERATURE

#### 4.00 Credits

Romanticism, Realism and Modernism. Prerequisites: SPAN 341 and 342.

### 457 - TWENTIETH-CENTURY LATIN AMERICAN LITERATURE

#### 4.00 Credits

Main currents from post-Modernism to the present. Prerequisites: SPAN 341 and 342.

### 499 - INDEPENDENT STUDY IN SPANISH

#### 1.00 to 4.00 Credits

May be repeated as topic varies.

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## DEPARTMENT OF MUSIC

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Professor E. Williams (*Chair*); Associate Professors Bates, D'Arca, Kratzer, Zank; Assistant Professor Casey; Resident Artists Osburn, R. Williams; Lecturers D. Altstaetter, L. Altstaetter, Ashmore, Beck, Dyke, Eichelberger, Gramm, Grim, Laukhuf, Lincoln, Neeley, Rike, Russell, Sherrick, Simons, Sycks, Zickafoose

The department of music offers a full course of music, music business and music education studies for the aspiring music educator, composer, entrepreneur, or professional performer. The department also serves the general university community through its course offerings, its performing groups which are open to all students, and through its many concerts, recitals, and other performances which enhance the cultural life and atmosphere of the university. Ohio Northern University is an accredited institutional member of the National Association of Schools of Music.

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

A variety of degree programs are offered: Bachelor of Music with majors in music education, performance, composition, music major: with elective studies in business; and Bachelor of Arts with a major in music. A minor in music is also offered. Specific degree requirements are listed below.

### Bachelor of Music

A candidate for the Bachelor of Music degree must complete the following general education requirements:

MUSC 000	Orientation	1 hr.
ART 100,		
COMM 105		
or equiv.	Art, Theater Appreciation	4 hrs.
COMM 211 or	Public Speaking or	
225	Interpersonal Comm.	4 hrs.
ENGL 110, 111	Writing 1 and 2	8 hrs.
ENGL 204	Great Works	4 hrs.
MLNG	2 qtrs. of one language	8 hrs.
RELG	105 or equivalent	4 hrs.
HIST 110, 111	Western Civ. 1 and 2	8 hrs.
MUSC 200	Non-Western Music	4 hrs.
Soc. Sciences	Economics (Music Majors with Elective Studies in Business take IBEC 202), GEOG 226, Pol.Sci., Psychology (Music Education Majors take PSYC 100) or Sociology	4 hrs.

Math & Natural Sciences	Mathematics, Biological or Physical Sciences - two courses (Mus. Ed. Majors take MATH 120 or equiv. and one add. course)	8 hrs.	MUSC 043	Classroom Instruments	1 hr.
			MUSC 334	Woodwind Methods	2 hrs.
			MUSC 336	Brass Methods	2 hrs.
			MUSC 338	Percussion Methods	2 hrs.
			MUSC 339	String Methods	2 hrs.
Computer Literacy	Comp. Sci. or equiv. (Mus. Ed. Majors take CS 130 or equiv.)	4 hrs.	MUSC 461	Secondary Choral Meth. and Techniques	3 hrs.
Health & P.E.	Wellness Elective	1 hr.	MUSC 462	Secondary Instrumental Meth. and Techniques	3 hrs.
	Fitness Elective	1 hr.	MUSC 463	Marching Band Methods and Techniques (instrumental majors only)	2 hrs.
	Lifetime Activities	1 hr.			

All majors include the following basic musicianship and supportive courses:

MUSC 001	Concert and Recital Observation (each qtr.)	0 hrs.
MUSC 100	Music	4 hrs.
MUSC 121, 122, 123	Theory of Music 1, 2, 3	9 hrs.
MUSC 131, 132, 133	Ear Training 1, 2, 3	3 hrs.
MUSC 200	Non-Western Music	4 hrs.
MUSC 221, 222, 223	Advanced Theory of Music 1, 2, 3	9 hrs.
MUSC 231, 232, 233	Adv. Ear Training 1, 2, 3	3 hrs.
MUSC 311	Counterpoint	2 hrs.
MUSC 312	Form and Analysis	2 hrs.
MUSC 313	Orchestration	2 hrs.
MUSC 321, 322, 323	Music History and Literature 1, 2, 3	9 hrs.
MUSC 241	Basic Conducting	2 hrs.
MUSC 342	Advanced Conducting-Instrumental	2 hrs.
MUSC 343	Adv. Conducting-Choral	2 hrs.
MUSC 280	Piano Proficiency	0 hrs.
	Must be passed by the end of fall qtr. of the junior year. Private piano is taken until the exam is passed.	
MUSC 480	Senior Recital	0 hrs.

*For vocal majors only*

MUSC 261	Latin/Italian Diction for Singers	1 hr.
MUSC 262	French Diction for Singers	1 hr.
MUSC 263	German Diction for Singers	1 hr.

### **Bachelor of Music in Music Education Major**

MUSC 015-075	Applied Mus.-Major Area	22 hrs.
MUSC 080 or 083	Major Vocal Ensemble (for voice or piano majors) each qtr. or	11 hrs.
MUSC 084, 087, 090 or 096	Major Instrumental Ens. (for instrumental or piano majors) each qtr.	11 hrs.

MUSC 010 or 015	Voice Class or Individual	1+ hrs.
MUSC 020 or 025	Piano Class or Individual	1+ hrs.
	Guitar Proficiency must be passed before student teaching.	
EDUC 115	Culture and Schooling	4 hrs.
EDUC 150	Five day field experience (twice)	0 hrs.
EDUC 210	Exceptional Learner	4 hrs.
EDUC 223	Child Dev. and Psy.	4 hrs.
EDUC 224	Young and Late Adolescent Psy.	4 hrs.
EDUC 285	Curriculum	4 hrs.
	Admission to Teacher Education is required for the following courses:	
EDUC 320	Instructional Media and Educational Technologies	4 hrs.
EDUC 342	Read. in the Content Area	4 hrs.
EDUC 440	Classroom Strategies	4 hrs.
EDUC 445	Org. and Admin. of Schls. in Am. Society	2 hrs.
EDUC 459	Integrated Music Meth.	4 hrs.
EDUC 470	Student Teaching-Early Childhood	7 hrs.
EDUC 475	Student Teaching Sem.	1 hr.
EDUC 480	Student Teaching-Adolescent	8 hrs.

300 hours of course related field experience

### **Bachelor of Music in Performance Major**

All performance majors must pass a thirty minute recital hearing before being admitted to the program.

MUSC 015-075	Applied Mus.-Major Area	36 hrs.
MUSC 020 or 025	Piano Class or Indv.	1+ hrs.
MUSC 080 or 083	Major Vocal Ensemble (for voice or piano majors) each qtr. or	12 hrs.
MUSC 084,	Major Instrumental	

087, 090 or 096	Ensemble (for instr. or piano majors) each qtr.	12 hrs.	MGMT 363	Human Res. Management	4 hrs.
			MRKT 370	Retailing	4 hrs.
			MRKT 371	Personal Selling	4 hrs.
			MRKT 372	Advertising	4 hrs.
MUSC 081, 082, 085, 089 or 099	Minor Vocal Ensemble or	6 hrs.	MUSC	Music Electives	5 hrs.
				Non-music Electives	14 hrs.
MUSC 088, 092, 094, 095, 096, 098 or 099	Minor Instrumental Ens.	6 hrs.			
MUSC 371, 372, 373	Applied Field Lit. and Pedagogy 1, 2, 3	3 hrs.			
MUSC 380	Junior Recital	0 hrs.			
MUSC	Music Electives	5 hrs.			
	Free Electives	18 hrs.			

### Bachelor of Music in Composition Major

MUSC 015-075	Applied Music-Primary	12 hrs.
	Applied Music-Sec.	6 hrs.
MUSC 025	Piano Individual	6+ hrs.
MUSC 080, 083, 084, 087, 090, or 096	Major Ensemble each qtr.	12 hrs.
MUSC 211	Electronic Music	2 hrs.
MUSC 314	Music Composition	18 hrs.
MUSC 411	Advanced Electronic Music Composition	2 hrs.
MUSC 497	Independent Study-Senior Composition Proj.	3 hrs.
MUSC	Music Electives	4 hrs.
	Free Electives	18 hrs.

### Bachelor of Music: Music Major with Elective Studies in Business

MUSC 015-075	Applied Music-Indv. (major instrument or voice)	24 hrs.
MUSC 080, 083, 084, 087, 090, or 096	Major Ensemble (each qtr.)	12 hrs.
MUSC 025	Piano Individual	1+ hrs.
MUSC 270	Intro. To Mus. Industry	3 hrs.
IBEC 202	Principles of Microeconomics	4 hrs.
IBEC 203	Principles of Macroeconomics	4 hrs.
ACCT 211, 212	Principles of Acct. 1, 2	8 hrs.
MGMT 333	Management and Organ. Behavior	4 hrs.
MRKT 351	Principles of Marketing	4 hrs.
ABUS 312	Business Law 1	4 hrs.
COMM 380	Arts Administration	4 hrs.
MUSC 470	Music Business Internship	3 hrs.

Two courses selected from the following:

FINC 362	Managerial Finance	4 hrs.
MGMT 325	Employment Law	4 hrs.
MGMT 334	Cases and Exercises in Organizational Behavior	4 hrs.

### Bachelor of Arts in Music

The candidate for the Bachelor of Arts degree must complete the bachelor of arts general education requirements listed earlier in this catalog.

MUSC 001	Concert and Recital Observation (each qtr.)	0 hrs.
MUSC 100	Music	4 hrs.
MUSC 200	Non-Western Music	4 hrs.
MUSC 121, 122, 123	Music Theory 1, 2, 3	9 hrs.
MUSC 131, 132, 133	Ear Training 1, 2, 3	3 hrs.
MUSC 221, 222, 223	Advanced Theory of Music 1, 2, 3	9 hrs.
MUSC 231, 232, 233	Advanced Ear Training 1, 2, 3	3 hrs.
MUSC 321, 322, 323	Music History and Literature 1, 2, 3	9 hrs.
MUSC 020 or 025	Piano Class or Individual	1+ hrs.
MUSC 280	Piano Proficiency	0 hrs.
MUSC 480 or 497	Senior Project/Recital	0-3 hrs.
MUSC 015-075	Applied Music-Indiv. (distributed over four yrs.)	12 hrs.
MUSC 080 or 083	Major Vocal Ensemble (for voice or piano majors)	6 hrs.
	or	
MUSC 084, 087, 090 or 096	Major Instrumental Ensemble (for instrumental or piano majors)	6 hrs.
MUSC	Music Electives	8 hrs.
	General Stud. Electives	31 hrs.

A **minor in music** may be earned by taking a minimum of 39 hours which must include music 121, 122, 123, 131, 132, 133, 321, 322, 323; six quarters of private applied instruction in one area and six quarters in major performing group.

**Applied Music** Individual instruction is offered for varying hours of credit. Each music major generally takes two or three credit hours of individual instruction in his/her major applied area each quarter. Non-music majors and music majors studying minor applied areas usually register for one credit hour of class or individual instruction each quarter. Non-music and non-musical theatre majors are assessed an extra fee for individual lessons, and the availability of these lessons is dependent upon the schedule and load of the instructor involved. Generally, one half hour of individual instruction is given for each hour of credit taken.

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## **Subject - Applied Music and Performance (AMUS)**

### **010 - VOICE CLASS**

*1.00 Credit*

### **015 - VOICE-INDIVIDUAL**

*1.00 to 3.00 Credits*

### **016 - MUSICAL THEATRE VOICE**

*1.00 Credit*

A basic voice class with a focus on musical theatre singing styles. Preparatory course for students who intend to audition for the musical theatre concentration.

### **020 - PIANO CLASS**

*1.00 Credit*

### **021 - PIANO CLASS-MAJORS**

*1.00 Credit*

### **025 - PIANO-INDIVIDUAL**

*1.00 to 3.00 Credits*

### **026 - HARPSICHORD-INDIVIDUAL**

*1.00 to 3.00 Credits*

### **030 - ORGAN CLASS**

*1.00 Credit*

### **035 - ORGAN-INDIVIDUAL**

*1.00 to 3.00 Credits*

### **040 - STRINGS CLASS**

*1.00 Credit*

### **041 - VIOLIN-VIOLA CLASS**

*1.00 Credit*

### **042 - CELLO-BASS CLASS**

*1.00 Credit*

### **043 - CLASSROOM INSTRUMENTS**

*1.00 Credit*

### **045 - VIOLIN-INDIVIDUAL**

*1.00 to 3.00 Credits*

### **046 - VIOLA-INDIVIDUAL**

*1.00 to 3.00 Credits*

### **047 - CELLO-INDIVIDUAL**

*1.00 to 3.00 Credits*

### **048 - DOUBLE BASS-INDIVIDUAL**

*1.00 to 3.00 Credits*

### **049 - GUITAR-INDIVIDUAL**

*1.00 to 3.00 Credits*

### **050 - WOODWIND CLASS**

*1.00 Credit*

### **055 - FLUTE-INDIVIDUAL**

*1.00 to 3.00 Credits*

### **056 - OBOE-INDIVIDUAL**

*1.00 to 3.00 Credits*

### **057 - CLARINET-INDIVIDUAL**

*1.00 to 3.00 Credits*

### **058 - BASSOON-INDIVIDUAL**

*1.00 to 3.00 Credits*

### **059 - SAXOPHONE-INDIVIDUAL**

*1.00 to 3.00 Credits*

### **060 - BRASS CLASS**

*1.00 Credit*

### **065 - TRUMPET-INDIVIDUAL**

*1.00 to 3.00 Credits*

### **066 - FRENCH HORN-INDIVIDUAL**

*1.00 to 3.00 Credits*

### **067 - TROMBONE-INDIVIDUAL**

*1.00 to 3.00 Credits*

### **068 - EUPHONIUM-INDIVIDUAL**

*1.00 to 3.00 Credits*

### **069 - TUBA-INDIVIDUAL**

*1.00 to 3.00 Credits*

### **070 - PERCUSSION CLASS**

*1.00 Credit*

### **075 - PERCUSSION-INDIVIDUAL**

*1.00 to 3.00 Credits*

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## **Music Performing Groups**

Membership in performing groups is open to all University students, and they are encouraged to participate. Students may enroll as many times as they wish; however, there are certain restrictions on the amount of ensemble credit which may count toward minimal graduation requirements in the College of Arts and Sciences. Requirements in fine arts may be satisfied by two to four years of membership in a major performing group.

***May be repeated on an unlimited basis by music majors, other students must check with their college Dean for specific college requirements.***

**080 - CHORUS**

*1.00 Credit*

A large choral group open to all qualified students. Music of all types, accompanied and a cappella, is studied and sung throughout the year in concerts and performances on and off campus.

**081 - CHAPEL CHOIR**

*1.00 Credit*

A choral group open to all students for the study and performance of sacred and traditional music. The Chapel Choir sings at chapel services and gives occasional concerts.

**082 - ADDED ATTRACTION**

*1.00 Credit*

Select show choir of singer/dancers performing characteristic literature including Broadway, pop, vocal jazz and country-western. Performances include concerts on and off campus. Membership by audition.

**083 - UNIVERSITY SINGERS**

*1.00 Credit*

A select group of men and women vocalists designed to perform a wide variety of choral literature with the highest musical standards. Performances include concerts on and off campus and on tour. Membership by audition.

**084 - WIND ENSEMBLE**

*1.00 Credit*

A concert ensemble open to qualified students who play band instruments. A wide variety of band literature is studied and performed in regular campus concerts. Membership by audition.

**085 - CHAMBER CHORALE**

*1.00 Credit*

A highly select choral ensemble specializing in the study and performance of music of the Renaissance and Baroque periods with the inclusion of both sacred and secular choral masterworks from Madrigals to Cantatas. Prerequisite: Permission of the instructor or audition.

**086 - PEP BAND**

*1.00 Credit*

A band specially organized to provide music for athletic events.

**087 - SYMPHONIC BAND**

*1.00 Credit*

A fully-instrumented concert ensemble studying and performing the finest band literature with the highest musical standards. Performances include concerts and programs on campus and tour concerts.

**088 - JAZZ ENSEMBLE**

*1.00 Credit*

Selected ensembles for the study and performance of jazz and popular music. Performances on and off campus are scheduled throughout the year. Membership is by audition and priority is given to members of symphonic and concert bands.

**089 - OPERA WORKSHOP**

*1.00 to 3.00 Credits*

Instruction and experience in preparation for opera performance, including study of operatic literature and coaching of singers for specific roles in public performance of opera scenes and/or full staged operas. Prerequisite: Approval of the instructor or audition.

**090 - MARCHING BAND**

*1.00 Credit*

The preparation and performance of football game shows at home and selected away games. Open to all university students who play band instruments or who are accepted for auxiliary groups. Fall Quarter only. Includes a drill camp in advance of the Fall Quarter.

**091 - CHAPEL BAND**

*1.00 Credit*

Select ensemble of musicians devoted to the preparation and performance of contemporary instrumental and/or vocal music suitable for a university chapel service.

**092 - WOODWIND ENSEMBLE**

*1.00 Credit*

Selected ensembles of woodwind instrumentalists for the study and performance of characteristic literature.

**094 - BRASS ENSEMBLE**

*1.00 Credit*

Selected ensembles of brass instrumentalists for the study and performance of characteristic literature.

**095 - PERCUSSION ENSEMBLE**

*1.00 Credit*

Selected ensembles of percussionists for the study and performance of characteristic literature.

**096 - SYMPHONY ORCHESTRA**

*1.00 Credit*

Credit may be earned for membership by audition in the ONU Symphony and for orchestras on campus which perform for large choral works and musical theatre productions. Permission of instructor is required.

**097 - NORTHERNAIRES**

*1.00 Credit*

A highly select vocal jazz quartet with backup instrumental ensemble performing a wide variety of representative music. Performances include concerts both on and off campus. Membership by audition.

## **098 - STRING ENSEMBLE**

*1.00 Credit*

Ensembles of string instrumentalists for the study and performance of characteristic literature.

## **099 - NEW MUSIC ENSEMBLE**

*1.00 Credit*

The rehearsal and performance of solo, chamber, and small ensemble music from the twentieth century. In addition, significant experimental music from previous centuries will be included. Emphasis will be on landmark works by major composers, and post-1960 music. Permission of the instructor.

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## **Subject - Music (MUSC)**

### **000 - ORIENTATION**

*1.00 Credit*

Familiarization with the department, departmental technology, requirements for majors, planning programs of courses, university catalog and library. Required of departmental majors. Graded S/U.

### **001 - CONCERT AND RECITAL OBSERVATION**

*.00 Credit*

A required number of concerts and recitals to be attended each quarter. Required of all full-time music majors. Graded S/U.

### **100 - MUSIC**

*4.00 Credits*

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.

### **101 - MUSIC - MAJORS**

*3.00 Credits*

A basic music course for music majors only.

### **110 - FUNDAMENTALS OF MUSIC FOR THE NON-MUSIC MAJOR**

*4.00 Credits*

Basic components of music. The perception and reading of musical symbols. Includes listening experiences of representative literature and recognition of major composers.

### **121 - THEORY OF MUSIC 1**

*3.00 Credits*

Basic music theory and harmony, scales, intervals, chords, part-writing, creative projects in composition and arranging. Required of all freshmen music majors. Continuation courses must be taken in sequence.

### **122 - THEORY OF MUSIC 2**

*3.00 Credits*

Continuation of MUSC 121.

### **123 - THEORY OF MUSIC 3**

*3.00 Credits*

Continuation of MUSC 122.

### **131 - EAR TRAINING 1**

*1.00 Credit*

Sight-singing; melodic, rhythmic and harmonic dictation; keyboard harmony; conducting; improvisation taught in a laboratory setting. Supplemental and taken in conjunction with first year of music theory studies. Level determined by proficiency.

### **132 - EAR TRAINING 2**

*1.00 Credit*

Continuation of MUSC 131.

### **133 - EAR TRAINING 3**

*1.00 Credit*

Continuation of MUSC 132.

### **190 - SPECIAL TOPICS IN MUSIC**

*1.00 to 4.00 Credits*

### **200 - NON-WESTERN MUSIC**

*4.00 Credits*

The fundamental concepts of music in any culture with an in-depth exploration of the music of a limited number of non-Western groups. Emphasis on listening and understanding.

### **210 - JAZZ HISTORY AND LITERATURE**

*3.00 Credits*

Modern jazz, from its roots in African tribal music through the gradual evolution of this American art form as it appears today.

### **211 - ELECTRONIC MUSIC**

*2.00 Credits*

History, development, materials, and techniques of electronic music. Emphasis on composition in the medium. Concentration of classical (tape recorder) techniques and use of synthesizer. Work in the electronic laboratory. May be repeated on an unlimited basis by music majors. Prerequisite: Permission of the instructor.

### **221 - ADVANCED THEORY OF MUSIC 1**

*3.00 Credits*

Continuation of MUSC 123. Study of 18th, 19th and 20th century compositional techniques, orchestration, and counterpoint. Development of analytical skills. Creative projects in composition using computers and other technology at various times throughout the sequence. Continuation courses must be taken in sequence. Prerequisite: MUSC 123.

**222 - ADVANCED THEORY OF MUSIC 2**

*3.00 Credits*

Continuation of MUSC 221.

**223 - ADVANCED THEORY OF MUSIC 3**

*3.00 Credits*

Continuation of MUSC 222.

**231 - ADVANCED EAR TRAINING 1**

*1.00 Credit*

Continuation of MUSC 131, 132 and 133. Supplemental and taken in conjunction with second year of music theory. Elements of traditional improvisation included in the keyboard harmony portion.

**232 - ADVANCED EAR TRAINING 2**

*1.00 Credit*

Continuation of MUSC 231.

**233 - ADVANCED EAR TRAINING 3**

*1.00 Credit*

Continuation of MUSC 232.

**241 - BASIC CONDUCTING**

*2.00 Credits*

General conducting techniques and principles of score study. Laboratory experiences. Continuation courses must be taken in sequence. Prerequisite: MUSC 121.

**261 - LATIN AND ITALIAN DICTION FOR SINGERS**

*1.00 Credit*

The proper pronunciation of vocal and choral texts in Latin and Italian. Required of all vocal music majors.

**262 - FRENCH DICTION FOR SINGERS**

*1.00 Credit*

Continuation of MUSC 261 in French.

**263 - GERMAN DICTION FOR SINGERS**

*1.00 Credit*

Continuation of MUSC 262 in German.

**270 - INTRODUCTION TO THE MUSIC INDUSTRY**

*3.00 Credits*

The various elements of the music industry - retailing, marketing, arts management, publishing, manufacturing, recording, unions and licensing. Prerequisite: MUSC 100.

**280 - PIANO PROFICIENCY .**

*00 Credit*

**290 - SPECIAL TOPICS IN MUSIC**

*1.00 to 4.00 Credits*

**310 - AMERICAN MUSIC**

*4.00 Credits*

Sacred and secular American music from colonial America to the present with particular attention to native art music and the incorporation of jazz into symphonic and stage works of the twentieth century.

**311 - COUNTERPOINT**

*2.00 Credits*

Polyphonic music in various styles with particular emphasis on that of the eighteenth century. Creative projects in contrapuntal writing. Prerequisite: MUSC 223.

**312 - FORM AND ANALYSIS**

*2.00 Credits*

Musical forms and styles from the Baroque to the present. Theoretical and stylistic analysis of representative music. Prerequisite: MUSC 223.

**313 - ORCHESTRATION**

*2.00 Credits*

The instruments of the band and orchestra. Arrangements for the band and orchestra. Arrangements for string, woodwind and brass combinations. Orchestrations by classical, romantic, and modern composers. Prerequisite: MUSC 223.

**314 - MUSIC COMPOSITION**

*3.00 Credits*

Principles general to all compositional styles, and application of these principles through weekly composition projects. Includes work in the electronic music laboratory. In class performances. May be repeated on an unlimited basis by music majors. Prerequisite: Permission of the instructor.

**321 - MUSIC HISTORY AND LITERATURE 1**

*3.00 Credits*

The historical development of music literature. Representative literature and composers: Ancient, Medieval and Renaissance periods. Prerequisite: MUSC 100.

**322 - MUSIC HISTORY AND LITERATURE 2**

*3.00 Credits*

Baroque and Classical periods. Prerequisite: MUSC 100.

**323 - MUSIC HISTORY AND LITERATURE 3**

*3.00 Credits*

Romantic and Twentieth Century periods. Prerequisite: MUSC 100.

**334 - WOODWIND METHODS**

*2.00 Credits*

Study, elementary performance skills, pedagogy, and materials of the woodwind instruments. For future school music teachers.

**336 - BRASS METHODS***2.00 Credits*

Study, elementary performance skills, pedagogy, and materials of the brass instruments. For future school music teachers.

**338 - PERCUSSION METHODS***2.00 Credits*

Study, elementary performance skills, pedagogy, and materials of the percussion instruments. For future school music teachers.

**339 - STRING METHODS***2.00 Credits*

Study, elementary performance skills, pedagogy, and materials of the orchestral stringed instruments. For future school music teachers.

**342 - ADVANCED CONDUCTING - INSTRUMENTAL***2.00 Credits*

Further development of baton techniques and other conducting skills relating to practice, reading and preparation of scores for working with instrumental ensembles.

(Formerly MUSC 242). Prerequisite: MUSC 241.

**343 - ADVANCED CONDUCTING - CHORAL***2.00 Credits*

Adaptation of basic conducting techniques to the choral ensemble, including leadership, error detection, tonal development, stylistic accuracy and analysis. Exploration of choral philosophy and development.

(Formerly MUSC 341.) Prerequisite: MUSC 241.

**371 - APPLIED FIELD LITERATURE-PEDAGOGY 1***1.00 Credit*

Study of the professional and educational literature in a specific applied field.

**372 - APPLIED FIELD LITERATURE-PEDAGOGY 2***1.00 Credit*

Continuation of MUSC 371.

**373 - APPLIED FIELD LITERATURE-PEDAGOGY 3***1.00 Credit*

Continuation of MUSC 372.

**380 - JUNIOR RECITAL .***00 Credit Graded S/U.***390 - SPECIAL TOPICS IN MUSIC***1.00 to 4.00 Credits***411 - ADVANCED ELECTRONIC MUSIC COMPOSITION***2.00 Credits*

Study and creative work in the area of electronic music. Focuses upon advanced synthesis, recording and notational techniques as they relate to creative efforts. Relevant historical topics and a survey of the electronic music literature will be included. May be repeated on an unlimited basis by music majors.

**461 - SECONDARY CHORAL METHODS AND TECHNIQUES***3.00 Credits*

Procedures in the development and direction of school choral groups, including choral literature of all types. Includes laboratory experience in teaching vocal techniques in the approximately 20 hours of field experience. Prerequisite: Admission to Teacher Education Program or approval of the director of Teacher Education.

**462 - SECONDARY INSTRUMENTAL METHODS AND TECHNIQUES***3.00 Credits*

Procedures in the development and direction of school bands and orchestras, including band literature of all types. Includes laboratory experience in teaching beginning instrumental students individually, in small groups and larger classes in the approximately 20 hours of field experience. Prerequisite: Admission to the Teacher Education Program or approval of the director of Teacher Education.

**463 - MARCHING BAND METHODS AND TECHNIQUES***2.00 Credits*

Methods, materials, and techniques in the development and direction of the marching band. Show planning, precision drill, rehearsal techniques, experience with the latest technology, and selection and rehearsal of music. Membership in Marching Band required in conjunction with the class. Includes approximately 8 hours of field experience.

**470 - INTERNSHIP IN MUSIC BUSINESS***3.00 Credits*

Professional experience in one area of music business. Application of classroom theory to practice through working in an outside organization or business. Can not be repeated for additional credit. Prerequisites: Completion of all business-related course work and permission of the department chair.

**480 - SENIOR RECITAL .***00 Credits***490 - SPECIAL TOPICS IN MUSIC***1.00 to 4.00 Credits*

Group study of approved specialized topics not offered in catalog.

**497 - INDEPENDENT STUDY IN MUSIC***1.00 to 4.00 Credits*

A wide variety of specialized musical subjects are available through individual study with a faculty member.



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## DEPARTMENT OF PHILOSOPHY AND RELIGION

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Professors Beanblossom, Lenssen (*Chair*); Associate Professors Morrison, Person

The orientation of the department is non-sectarian and reflects a serious commitment to the academic study of philosophy and religion within the liberal arts tradition. Recognizing that both philosophy and religion, as academic disciplines, are concerned with basic questions of meaning and value in human life and with historical approaches to those questions, the department offers a range of general and specialized courses designed to broaden the educational experience of all undergraduate students at Ohio Northern. Students wishing a more concentrated study of philosophy or religion may choose to major or minor in the department.

**General Education Requirements** in philosophy or in religion may be met by any course offered in the appropriate discipline (except for Philosophy 234 which does not count toward the philosophy requirement; except for Religion 271, 272, 281, and 282 which do not count toward the religion requirement). 100-level courses are available to all students. 200-level courses require at least sophomore standing or consent of the instructor, and 300- or 400-level courses require at least junior standing or consent of the instructor.

**Philosophy Major** The major in philosophy requires a minimum of 44 quarter hours beyond Philosophy 100, including the following courses: 234; two of the following (237, 238, 340); two courses in the history of philosophy (102, 331, 343, 371, 374); and either 480 or 483. With departmental approval, a maximum of three courses in religion may be applied to the philosophy major.

**Religion Major** The major in religion requires a minimum of 44 hours, including the following courses: either 105 or 107; either 109 or 110; either 241 or 264; 325; two additional courses in biblical studies; at least one course in the history of Christian thought (310, 311 or 312); and either 481 or 484. (No more than 12 hours of 100-level courses in religion may count toward the major.) With departmental approval, a maximum of three courses in philosophy may be applied to the religion major.

**Philosophy and Religion Major** The major in philosophy and religion requires a minimum of 44 quarter hours. Selection of courses is subject to

approval by the department and must include 480 or 481 or else 483 or 484.

It is recommended that majors in the department who plan to attend graduate or theological school or seminary take two years of foreign language.

**Minor Programs** Minors are offered in both philosophy and religion. A minimum of 28 hours is required, with the selection of courses subject to approval by the department. Contact the department chair for further information about these programs.

**Prelaw Program** The department cooperates with the Pettit College of Law in the "guaranteed admission" prelaw program (see elsewhere in this catalog). Information about the curricular requirements of the program can be secured from the department chair.

**Preseminary** A faculty member in the department of philosophy and religion serves as advisor to preseminary students in planning a preprofessional program. The recommendations of the American Association of Theological Schools are followed in advising students. A major in the department of philosophy and religion or in another appropriate department may be selected.

**Church Vocations Option** Designed for students interested in working as lay professionals in the church. One of three emphases may be selected. A core of courses in religion is the basis for each emphasis. Internships in either area churches or the students' home churches complete the program. Students wishing to enter this program must let the director know no later than the end of their sophomore year.

### Religion Core:

- RELG 109 Introduction to the Old Testament, 4 hrs.
- RELG 110 Introduction to the New Testament, 4 hrs.
- RELG 365 Jesus and the Gospels, 4 hrs.
- RELG 410 Church Vocations Internship, 1-4 hrs.

Two courses outside biblical studies, at least one of which must be in theology, 8 hrs.

### A. Financial Management Emphasis:

- IBEC 100 Economics, 4 hrs.
- ACCT 211 Principles of Accounting 1, 4 hrs.
- ACCT 212 Principles of Accounting 2, 4 hrs.
- MGMT 333 Mgmt. & Org. Beh., 4 hrs.

### B. Education Emphasis:

- PSYC 100 Psychology, 4 hrs.
- EDUC 223 Child Dev. and Psy, 4 hrs.
- EDUC 224 Young and Late Adolescent Psy., 4 hrs.
- ENGL 225 Children's and Young Adult Literature, 4 hrs.
- PSSC 301 Social Psychology, 4 hrs.

### **C. Music Emphasis:**

MUSC 081	Chapel Choir, <i>at least 1 hr.</i>
MUSC 035	Organ - Individual, <i>at least 1 hr.</i>
MUSC 121	Theory of Music 1, <i>3 hrs.</i>
MUSC 122	Theory of Music 2, <i>3 hrs.</i>
MUSC 123	Theory of Music 3, <i>3 hrs.</i>
MUSC 131, 132, 133	Ear Training 1-3, <i>3 hrs. total</i>
MUSC 241	Basic Conducting, <i>2 hrs.</i>
MUSC 343	Advanced Conducting - Choral, <i>2 hrs.</i>

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## **Philosophy**

Philosophy is a quest for a comprehensive understanding of human existence. The objective of philosophy is to consider the rational justification of logical inferences, human values, criteria for establishing the claims of knowledge and certainty, and interpretations of the nature of reality. The diverse insights of significant philosophers from ancient times to the present contribute resources to stimulate contemporary philosophical thinking in each of these areas.

A major in philosophy prepares students generally for careers in areas which require the ability to analyze problems and to think and write clearly. It is an appropriate major for students planning to continue their education for professional careers such as law, medicine, or theology.

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### **Subject - Philosophy (PHIL)**

#### **000 - ORIENTATION**

*1.00 Credit*

Familiarization with the department, requirements for majors, planning program of courses, University catalog and library. Graded S/U.

#### **100 - INTRODUCTION TO PHILOSOPHY**

*4.00 Credits*

Philosophical inquiry, its scope and methodology, through a study of representative philosophical problems such as the nature of ethical values, principles of correct reasoning, the possibility and limits of knowledge, and the distinction between appearance and reality.

#### **102 - GREAT PHILOSOPHERS**

*4.00 Credits*

Philosophical inquiry, its scope, methodology, and persistent problems through a study of major philosophers from Bacon to James, including such thinkers as Descartes, Hobbes, Locke, Hume and Kant.

#### **190 - SPECIAL TOPICS IN PHILOSOPHY**

*1.00 to 4.00 Credits*

May be repeated for credit, depending on content.

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PREREQUISITE FOR THE COURSES BELOW:  
ONE COURSE IN PHILOSOPHY; OR SOPHOMORE STANDING (FOR 200-LEVEL COURSES); OR AT LEAST JUNIOR STANDING (FOR 300 OR 400-LEVEL COURSES); OR CONSENT OF INSTRUCTOR.

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#### **234 - LOGIC**

*4.00 Credits*

Logical fallacies and the principles of correct reasoning. The application of formal logical analysis to arguments encountered in ordinary language. WILL NOT SATISFY THE GENERAL EDUCATION REQUIREMENT IN PHILOSOPHY.

#### **237 - KNOWLEDGE AND TRUTH**

*4.00 Credits*

The scope and justification of knowledge with reference to problems such as skepticism, sense perception, reason, belief, and truth.

#### **238 - ETHICS**

*4.00 Credits*

Selected ethical theories and their rational justification. The use of ethical theories for resolving ethical issues in personal and social decision-making.

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#### **290 - SPECIAL TOPICS IN PHILOSOPHY**

*1.00 to 4.00 Credits*

May be repeated for credit, depending on content.

#### **310 - ENVIRONMENTAL ETHICS**

*4.00 Credits*

Theories of value, with special emphasis on the possible justification of extending the moral community to include non-human nature. Foci will include: future generations, pollution, the commons, "jobs vs. wilderness", and legal and moral rights.

#### **320 - SOCIAL JUSTICE**

*4.00 Credits*

Theories of justice in contemporary society including conceptions of the law, human rights, equality, liberty, and responsibility.

#### **325 - PHILOSOPHY OF RELIGION**

*4.00 Credits*

Critical inquiry into issues such as the nature and existence of God, the problem of evil, the significance of religious experience, the justification of religious belief, and the relation of faith and reason. (Also listed as RELG 325)

**331 - PLATO AND ARISTOTLE***4.00 Credits*

The Greek philosophers Plato and Aristotle, against the background of the Pre-Socratics and Socrates.

**336 - ETHICS IN PROFESSIONAL LIFE***4.00 Credits*

Ethical behavior with emphases on ethical theories and their rational justification, on such problems as relativism and why be moral, and on resolving issues as they arise in case studies from engineering, business, and health care.

**340 - THEORIES OF BEING***4.00 Credits*

Theories of being with reference to problems such as reality, existence, essence, nature and their implications for knowledge and values.

**341 - AESTHETICS***4.00 Credits*

Classical and contemporary theories of art and aesthetic experience. Consideration of the nature of various arts and of issues such as meaning, truth, and value in art.

**343 - AMERICAN PHILOSOPHY***4.00 Credits*

Main currents in American philosophy, including representative thinkers in such traditions as Puritanism, Transcendentalism, Pragmatism, and Realism.

**345 - EXISTENTIALISM***4.00 Credits*

The historical roots of existentialism in Kierkegaard and Nietzsche, and the thought of representative writers such as Heidegger, Sartre, Camus, Dostoyevsky and Kafka.

**371 - MAJOR PHILOSOPHICAL MOVEMENTS***4.00 Credits*

The writings of a major, distinctive philosophical school of thought or period such as Idealism, Utilitarianism, Continental Rationalism, British Empiricism. To be offered every other year or on demand. May be repeated for credit, depending on content.

**374 - MAJOR PHILOSOPHERS***4.00 Credits*

The thought and important writings of a single philosopher, or a pair or triad of philosophers such as Augustine, Descartes, Mill, Hume and Kant, Hegel and Marx. To be offered every other year or on demand. May be repeated for credit, depending on content.

**390 - SPECIAL TOPICS IN PHILOSOPHY***1.00 to 4.00 Credits*

May be repeated for credit, depending on content.

**394 - SEMINAR IN PHILOSOPHY***1.00 to 4.00 Credits*

May be repeated for credit, depending on content.

**480 - PHILOSOPHY SENIOR ESSAY***4.00 Credits*

A critical essay on a topic selected in consultation with a faculty advisor. Enrollment in the quarter during which the paper is to be completed. However, preliminary work on this project commences no later than the beginning of the senior year. (For majors only.)

**483 - PHILOSOPHY SENIOR HONORS ESSAY***4.00 Credits*

Open to students with at least a 3.5 cumulative GPA in their Philosophy or Philosophy and Religion major. Enrollment in the quarter during which a critical essay is to be completed on a topic selected in consultation with a faculty advisor. However, preliminary work on this project commences no later than the beginning of the senior year.

**497 - INDEPENDENT STUDY IN PHILOSOPHY***1.00 to 4.00 Credits*

Departmental permission required. May be repeated for credit, depending on content.

## Religion

Religion is an integral part of human life and culture. It includes the ultimate commitments, attitudes, beliefs and forms of worship by which people live and find meaning for their personal and social existence. The courses in religion are intended to acquaint the student with the living religious traditions, primarily of the West, through an examination of their origins and development, their interaction with the changing cultural context, and their insights for dealing with the perennial questions of human existence and destiny. The approach to the study is ecumenical and makes use of current scholarly methods of research and findings.

### **Subject - Religion (RELG)** \_\_\_\_\_

**000 - ORIENTATION***1.00 Credit*

Familiarization with the department, requirements for majors, planning program of courses, University catalog and library. Graded S/U.

## **105 - RELIGION IN HUMAN LIFE**

### *4.00 Credits*

The religious dimension of the human search for personal identity, meaningful existence, and ultimate reality, through the examination of various aspects and expressions of the religious life of humanity.

## **107 - RELIGIONS EAST AND WEST**

### *4.00 Credits*

Representative major religions of the world, their origins, sacred writings, basic beliefs, and life practices, with special attention to non-Western religious traditions.

## **109 - INTRODUCTION TO THE OLD TESTAMENT**

### *4.00 Credits*

Critical reading of the Old Testament (the Hebrew Bible): its historical background, literary features, and theological claims.

## **110 - INTRODUCTION TO THE NEW TESTAMENT**

### *4.00 Credits*

Critical reading of the New Testament: its historical background, literary features, and theological claims.

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PREREQUISITE FOR THE COURSES BELOW:  
ONE COURSE IN RELIGION; OR SOPHOMORE  
STANDING (FOR 200-LEVEL COURSES); OR AT  
LEAST JUNIOR STANDING (FOR 300 OR 400-LEVEL  
COURSES); OR CONSENT OF INSTRUCTOR.

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## **210 - WOMEN IN THE BIBLE**

### *4.00 Credits*

The portrayal of women in the Old and New Testaments with secondary readings of feminist theory.

## **231 - RELIGIOUS EXPERIENCE**

### *4.00 Credits*

A comparative exploration of diverse encounters with the sacred, as portrayed in literature from around the world. (Also counts as an English literature course.)

## **241 - ISLAM AND CHRISTIANITY**

### *4.00 Credits*

The Islamic and Christian traditions, including the history, theology, and politics of each as well as an exploration of their interactions. Formerly RELG 108 and RELG 266.

## **243 - THE BIBLE AND THE THIRD WORLD**

### *4.00 Credits*

Reading interpretations by Third World authors to learn more about the Bible, the cultures of the Third World, and how one's social location affects one's interpretation of texts. Prerequisite: RELG 109 or RELG 110.

## **263 - CHRISTIAN ETHICS**

### *4.00 Credits*

The relation of biblical and theological thought to the development of ethical principles. Application to personal and social moral issues, such as marriage, family, race, politico-economic life, and international affairs.

## **264 - BUDDHISM**

### *4.00 Credits*

The ideas and practices of the Buddhist tradition in East and Southeast Asia, with emphasis on the life and teaching of the Buddha and the growth of different forms of Buddhism.

## **271 - BIBLICAL HEBREW 1**

### *3.00 Credits*

Biblical Hebrew with heavy emphasis on grammar and vocabulary. Offered on demand.

## **272 - BIBLICAL HEBREW 2**

### *3.00 Credits*

Continuation of RELG 271. Offered on demand. Prerequisite: RELG 271.

## **273 - BIBLICAL HEBREW 3**

### *3.00 Credits*

Biblical Hebrew with heavy emphasis on readings from the Hebrew Bible. Offered on demand. Prerequisite: RELG 272.

## **281 - HELLENISTIC GREEK 1**

### *3.00 Credits*

Hellenistic Greek with heavy emphasis on grammar, and some readings from the Greek New Testament. Offered on demand.

## **282 - HELLENISTIC GREEK 2**

### *3.00 Credits*

Hellenistic Greek with heavy emphasis on grammar, and readings from the Greek New Testament. Offered on demand. Prerequisite: RELG 281.

## **283 - HELLENISTIC GREEK 3**

*3.00 Credits* Hellenistic Greek with heavy emphasis on grammar, and readings from the Greek New Testament and other early Christian literature. Offered on demand. Prerequisite: RELG 282.

## **291 - SPECIAL TOPICS IN RELIGION**

### *1.00 to 4.00 Credits*

May be repeated for credit, depending on content.

**310 - EARLY CHRISTIAN THOUGHT**

*4.00 Credits*

Christian history and theology from the formative period of the Church to the early Middle Ages. Diverse responses to cultural settings and efforts to formulate credal statements. Formerly RELG 346.

**311 - MEDIEVAL AND REFORMATION THOUGHT**

*4.00 Credits*

Church history and theology from the High Middle Ages to the beginning of the modern period. Philosophers, theologians, mystics and reformers. Formerly RELG 347.

**312 - NINETEENTH AND TWENTIETH CENTURY CHRISTIAN THOUGHT**

*4.00 Credits*

Church history and theology over the past 200 years. Representative thinkers and issues.

**320 - LIFE AND TEACHINGS OF ST. PAUL**

*4.00 Credits*

The insights of the most influential thinker and apostle in the early church. Formerly RELG 463.

**325 - PHILOSOPHY OF RELIGION**

*4.00 Credits*

Critical inquiry into issues such as the nature and existence of God, the problem of evil, the significance of religious experience, the justification of religious belief, the relation of faith and reason. (Also listed as PHIL 325.)

**363 - OLD TESTAMENT PROPHETS**

*4.00 Credits*

Critical examination of the prophetic books of the Old Testament from historical, literary and theological perspectives.

### 365 - JESUS AND THE GOSPELS

4.00 Credits

Critical examination of the New Testament Gospels: their portrayals of Jesus, their theological perspectives and their reliability as sources for the life of Jesus.

### 391 - SPECIAL TOPICS IN RELIGION

1.00 to 4.00 Credits

May be repeated for credit, depending on content.

### 410 - CHURCH VOCATIONS INTERNSHIP

1.00 to 4.00 Credits

Lay-professional work in any context relevant to the student's selected Church Vocations emphasis (financial management, education, or music) in either a local church or the student's home church. Each credit hour requires 25 hours in internship. Prerequisites: Participation in Church Vocations Option and approval of the Church Vocations Coordinator prior to registration.

### 481 - RELIGION SENIOR ESSAY

4.00 Credits

A critical essay on a topic selected in consultation with a faculty advisor. Enrollment in the quarter during which the paper is to be completed. However, preliminary work on this project commences no later than the beginning of the senior year. (For majors only.)

### 484 - RELIGION SENIOR HONORS ESSAY

4.00 Credits

Open to students with at least a 3.5 cumulative GPA in their Religion or Philosophy and Religion major. Enrollment in the quarter during which a critical essay is to be completed on a topic selected in consultation with a faculty advisor. However, preliminary work on this project commences no later than the beginning of the senior year.

### 498 - INDEPENDENT STUDY IN RELIGION

1.00 to 4.00 Credits

Departmental permission required. May be repeated for credit, depending on content.

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## DEPARTMENT OF PHYSICS

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Associate Professor Johnson (*Chair*); Assistant Professors Fisher, Petkie, Theisen

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 vocational value.

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

Ohio Northern University offers the major in physics with both the bachelor of arts degree and the bachelor of sciences degree. The physics major is achieved by one of two tracks: the traditional track and the modified track.

The traditional track toward the **physics major** consists of 56 credit hours. The required courses are: Freshman Seminar or Orientation, PHYS 231, 232, 233, 234, 235, 236, 303, 345, 351, 352, 360, 411, 412, and four hours of the Advanced Laboratory, PHYS 300. Additionally, in consultation with the chair of the department, eight hours must be taken from among PHYS 353, 361, 364, 413, or 432. Required cognate courses are MATH 163, 164, 165, 263, 272, and 361. Students desiring graduate study in physics are also encouraged to take MATH 362 and 363.

The modified track toward the **physics major** consists of 45 credit hours. It is intended for students who are completing the requirements for a second program in addition to the physics major. Examples of this second program include a second major or minor or a program of courses leading to licensure for public school teaching. The required courses for the modified physics track are: PHYS 231 or 211, 232 or 212, 233 or 213, 234, 235, 236, 252, 303, 345, 351, 411, and two hours of the Advanced Laboratory, PHYS 300 (maximum 4 hours). Additionally, in consultation with the chair of the department, eight hours of physics electives must be taken. Required cognates are MATH 163, 164, 165, and one of the following three sequences (i) CHEM 181, 182, 183, (ii) BIOL 121, 122, 123, or (iii) CS 164, 165, 166.

A comprehensive examination is not required for either the Bachelor of Arts or the Bachelor of Science degree.

The candidate for the Bachelor of Science or the Bachelor of Arts degree with a major in physics will be required to make a presentation describing some experimental project undertaken or some theoretical work pursued. This presentation will serve as a capstone to the work completed as an undergraduate with a major in physics. Some flexibility in this requirement will be permitted, dependent upon the candidate's interests and the facilities available. The presentation will be made during the last quarter of the senior year to the physics faculty, physics majors and any other interested students and faculty. Credit for Physics 490 will indicate that this requirement has been satisfied. This course will be graded on an S/U basis.

The physics department also offers a **minor in physics**. The student desiring to complete the requirements for the physics minor must complete 31 hours within the department of physics. The required courses are PHYS 231, 232, 233, 234, 235, 236, 303, and three advanced courses in physics approved by the chair of the physics department. PHYS 211, 212, or 213 may be substituted respectively for PHYS 231, 232, or 233 with additional approved physics courses taken to complete the 31-hour requirement.

The physics department also offers a program leading to licensure for teaching physics in the Ohio public schools. The secondary education program is nationally accredited by the National Science Teachers Association. The program is designed for the student whose goal is to teach physics in the high schools. Due to the nature of the programs permitted by the state of Ohio, the student will also obtain licensure to teach chemistry. Typically, the student will complete the modified track toward the physics major, a minor in chemistry, and a number of hours in the education department specified by state licensure requirements.

Physics majors are eligible for the Business Option of the College of Arts and Sciences. Information about specific requirements can be found in the opening pages of the College of Arts and Sciences section of the catalog.

Substitution for courses specified in the **physics major** or **physics minor** may be made with the approval of the chair of the department of physics. Substituted courses may be either internal to the department of physics or external. A maximum of 8 external credit hours may be substituted provided a grade of C or better is earned in the corresponding course. Substitutions which may be allowed are GE 214 for PHYS 351, ECE 331 for PHYS 411, or CHEM 343 for PHYS 432.

Some of the courses listed below contain material which is similar but treated at different levels. Consequently, credit for both Physics 211 and 231, or 212 and 232, or 213 and 233

cannot be given toward satisfying minimum program requirements. Further, the department chair, in consultation with the registrar and dean of the College of Arts and Sciences, will evaluate transcripts from students who transfer to Ohio Northern University with physics courses from other institutions. Suitable credit will be awarded as appropriate.

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## **Subject - Physics (PHYS)**

### **000 - ORIENTATION**

#### *1.00 Credit*

Familiarization with the department, requirements for majors' programs, University catalog and library. Required of departmental majors. AASG 100, Freshman Seminar, may be used to satisfy this requirement. Graded S/U.

### **100 - PHYSICS**

#### *4.00 Credits*

Elementary presentation of classical mechanics, heat, atomic and nuclear physics. Issues involving science and society will also be considered. Available for credit for non science majors in the College of Arts and Sciences, and students enrolled in the College of Business Administration. In special circumstances, others may enroll with permission of the department chair.

### **101 - PHYSICAL AND EARTH SCIENCES- EARLY & MIDDLE CHILDHOOD MAJORS**

#### *4.00 Credits*

The first of a three-term integrated sequence of physics, earth, and life science. An investigation of the nature of matter and energy and of their interactions as an introduction to the fundamental principles comprising the disciplines of physics and chemistry. Attention is given to the expression of these principles in everyday experience and technology. Science teaching methods will be included. For early childhood and middle childhood licenses only. Prerequisite: MATH 173

### **110 - INTRODUCTION TO PHYSICS**

#### *4.00 Credits*

Mathematical expression of basic principles and numerical solution of problems chosen from mechanics, waves, heat, electricity, and magnetism. For students who have not had high school physics or who desire additional preparation for PHYS 231-232-233. **DOES NOT SATISFY A GENERAL EDUCATION REQUIREMENT AND IT CANNOT BE USED TO SATISFY SPECIFIC DEPARTMENTAL OR PROGRAM REQUIREMENTS.** Prerequisites: High school algebra, geometry and trigonometry.

## **120 - PHYSICS WITH HEALTH SCIENCE APPLICATIONS**

### *4.00 Credits*

Selected basic physical principles and their application to health science. Topics include levers and torques, fluid dynamics, electrical conduction, magnetism, optics, and radiation. Offered every term. Prerequisite: High school physics.

## **211 - GENERAL PHYSICS: MECHANICS OF SOLIDS AND FLUIDS**

### *3.00 Credits*

Basic principles of Newtonian mechanics of solids and liquids. The corresponding laboratory is PHYS 234. Offered every year in the Fall Term.

## **212 - GENERAL PHYSICS: SOUND, HEAT, AND LIGHT**

### *3.00 Credits*

Basic principles of sound propagation, heat and heat transfer, and light propagation. The corresponding laboratory is PHYS 235. Offered Winter Term. Prerequisite: PHYS 211 or 231.

## **213 - GENERAL PHYSICS: ELECTRICITY AND MAGNETISM**

### *3.00 Credits*

Basic principles of electrical and magnetic phenomena. The corresponding laboratory is PHYS 236. Offered Spring Term. Prerequisite: PHYS 211 or 231.

## **231 - PHYSICS: MECHANICS OF SOLIDS AND FLUIDS**

### *4.00 Credits*

Basic principles of Newtonian mechanics of solids and fluids employing the differential and integral calculus. The corresponding laboratory course is PHYS 234. Prerequisite: MATH 163.

## **232 - PHYSICS: HEAT, SOUND, AND LIGHT**

### *4.00 Credits*

Basic principles of sound propagation, heat transfer and light propagation. Differential and integral calculus are used. The corresponding laboratory course is PHYS 235. Offered Fall and Winter Terms. Prerequisites: MATH 164 and PHYS 231.

## **233 - PHYSICS: ELECTRICITY AND MAGNETISM**

### *4.00 Credits*

Basic principles of electrical and magnetic phenomena. Differential and integral calculus are used. The corresponding laboratory course is PHYS 236. Offered Spring Term. Prerequisites: MATH 164 and PHYS 231.

## **234 - PHYSICS LABORATORY: MECHANICS**

### *1.00 Credit*

Experiments in basic Newtonian mechanics. PHYS 211 or 231 should be taken concurrently, or instructor's permission must be obtained.

## **235 - PHYSICS LABORATORY: HEAT, SOUND, AND LIGHT**

### *1.00 Credit*

Experiments in heat, sound and light. PHYS 212 or 232 should be taken concurrently, or instructor's permission must be obtained. Offered every year in the Fall and Winter Terms.

## **236 - PHYSICS LABORATORY: ELECTRICITY AND MAGNETISM**

### *1.00 Credit*

Experiments with basic electrical and magnetic phenomena. PHYS 213 or 233 should be taken concurrently or instructor's permission must be obtained. Offered every year in the Spring Term.

## **252 - EARTH SCIENCE AND PLANETARY ASTRONOMY**

### *4.00 Credits*

The fundamentals of astronomy. This will include familiarization with the history of astronomy, the tools of astronomy, basic earth science and an introduction to solar system science. This course was formerly named Astronomy.

## **253 - STELLAR AND GALACTIC ASTRONOMY**

### *4.00 Credits*

Structure, motions and evolution of stars, interstellar material, galaxies and the universe as a whole.

## **290 - SPECIAL TOPICS IN PHYSICS**

### *1.00 to 4.00 Credits*

## **300 - ADVANCED PHYSICS LAB**

### *1.00 to 3.00 Credits*

Laboratory projects from Mechanics, Heat, Sound, Light, Nuclear, Solid State Physics chosen to help foster the interests at some intermediate or advanced level. Will substitute for courses PHYS 310, 320, 330 or 340, up to a maximum of 4 credit hours. Prerequisites: PHYS 231, 232, 233, 234, 235 and 236.

## **303 - MODERN PHYSICS**

### *4.00 Credits*

Relativity, quantum and wave mechanics, atomic structure and absorption and emission processes. Prerequisites: MATH 361 and PHYS 233.

**345 - MATH METHODS IN PHYSICS***4.00 Credits*

Vector algebra, vector calculus in arbitrary coordinate systems, Fourier Analysis, contour integration in complex plane, special functions. Prerequisites: MATH 165 and one year of college level physics.

**351 - ANALYTICAL MECHANICS 1***4.00 Credits*

Vector analysis, kinematics, conservative forces, planetary motion, pendulum, free and forced oscillations, coupled systems and normal coordinates, angular momentum, rigid bodies. Part of the physics major program and offered when needed. Prerequisites: MATH 361 and PHYS 233.

**352 - ANALYTICAL MECHANICS 2***4.00 Credits*

LaGrange equations, canonical formulation, principle of least action, normal coordinates, rigid bodies, special relativity, mathematical methods. Part of the Physics major program and offered when needed. Prerequisites: PHYS 351.

**353 - NUCLEAR PHYSICS***4.00 Credits*

Nuclear radiation detection instruments, nuclear constituents and structure, nuclear models, nuclear reactions, fundamentals of nuclear reactor theory and design, shielding and safety principles in nuclear physics. Prerequisites: PHYS 231, 232, 233, and 303.

### **360 - QUANTUM MECHANICS**

#### *4.00 Credits*

Eigenvalues and eigenvectors, commutators, bra-ket notation, postulates of quantum theory, solution of the Schrodinger wave equation for square well potential, harmonic oscillator, hydrogen atom, and other potentials. Perturbation theory. Prerequisite: PHYS 303 and 352. Corequisites: MATH 361 and 362.

### **361 - ELECTRONICS**

*4.00 Credits* Theory of solid state devices, rectifier circuits, transistor amplifiers, oscillators and modulators, instrumentation applications. Offered as needed. Prerequisite: PHYS 213 or 233, 234, 236 and MATH 363.

### **364 - OPTICS**

#### *4.00 Credits*

The laws of geometrical and physical optics. Image formation by mirrors and lenses and optical aberrations. Interference and diffraction. Part of the physics major program and offered when needed. Prerequisites: PHYS 231, 232 and 233. Formerly PHYS 363 and 463.

### **371 - INTRODUCTORY ASTROPHYSICS**

#### *4.00 Credits*

Motions and physical nature of objects in the solar system, electromagnetic radiation, telescopes and astronomical detectors. Prerequisites: MATH 165, PHYS 231, 232, 233, or permission of the instructor.

### **375 - PLASMA PHYSICS**

#### *4.00 Credits*

A study of selected areas of plasma physics. Single particle motions. Plasmas as fluids. Waves and wave formation in plasmas. Nonlinear effects in plasmas. Prerequisites: PHYS 231, 232 and 233.

### **411 - ELECTRICITY AND MAGNETISM 1**

#### *4.00 Credits*

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. Part of the Physics major program and offered when needed. Prerequisites: MATH 361 and PHYS 233.

### **412 - ELECTRICITY AND MAGNETISM 2**

#### *4.00 Credits*

Advanced electric and magnetic fields; electric and magnetic properties of solids, electromagnetic radiation. Part of the Physics major program and offered when needed. Prerequisites: MATH 362 and PHYS 411.

### **413 - SOLID STATE**

#### *4.00 Credits*

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. Part of the Physics major program and offered when needed. Prerequisite: PHYS 303.

### **423 - STATISTICAL PHYSICS**

#### *4.00 Credits*

Properties of gases, thermal properties of solids and liquids. Elementary thermodynamic laws and techniques. Heat transfer. Elements of kinetic thermodynamics laws and techniques. Part of the Physics major program and offered when needed. Prerequisites: MATH 362 and PHYS 232, 303.

### **490 - SPECIAL TOPICS IN PHYSICS**

#### *1.00 to 3.00 Credits*

Part of the Physics major program and offered when needed.

### **497 - INDEPENDENT STUDY**

#### *1.00 to 3.00 Credits*

Part of the Physics major program and offered when needed.

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## DEPARTMENT OF PSYCHOLOGY AND SOCIOLOGY

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Professors Compton, Cohoe, Wildman  
(*Chair*); Visiting Assistant Professor Kauffman

The objectives of the department are to develop within each student an understanding of human relationships, institutions, and social processes; familiarity with the nature and causes of social problems; acquaintance with the theories of behavior; ability to think more critically and to integrate insights for useful participation in community life; and preparation for advanced study in the individual's selected field.

### **Prelaw with Psychology and Sociology**

Study in the behavioral sciences provides an especially suitable background for prelaw students. The department, in cooperation with the College of Law at Ohio Northern University, offers a formal prelaw program with "guaranteed admission" to the law school. Detailed information appears on page 33 of this catalog.

The program requires specially selected electives. Specific curricular requirements are available from the department chair.

**Course Numbering Code** To simplify identification of courses in the department the following numbering code is used:

1st Digit—Level (1st year, 2nd year, etc.)

2nd Two digits—discipline:

0—multi-discipline (except for 100,105)

10's, 20's, 30's—psychology

40's, 50's—sociology

90's—special topics, independent study

Examples:

141—1st year, sociology

335—3rd year, psychology

**Field Work, Externships and Practica** The department offers a number of opportunities for out-of-class learning through field work, externships and practica. See the department chairman for details and eligibility requirements.

**Careers in the Behavioral Sciences** The study of the various behavioral sciences provides preparation for entry into a number of different job opportunities. Consult with department faculty to explore various career options.

**Psi Chi** is the national honor society in psychology, founded in 1929 for the purpose of encouraging, stimulating, and maintaining excellence in scholarship and advancing the science of psychology. Membership in the society is selective and based on high academic performance.

**Psi Sigma** is a student organization open to all students with an interest in either psychology or sociology. The club sponsors field trips, speakers, and social activities.

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## Psychology

The psychology core is required for both the major and minor in psychology:

### **Core**

1. Psychology 100

2. Psychology 111

3. Psychology 210

4. Psychology 211

5. Biology 121

6. Math 142

### For the **major**

1. Psychology 000

2. The Psychology Core

3. 30 hours of Psychology Electives

4. Biology 122 & 124 or 2 approved mathematics courses

### For the **minor**

1. The Psychology Core

2. 16 hours of psychology electives

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## **Subject - Psychology and Sociology (PSSC)**

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### **301 - SOCIAL PSYCHOLOGY**

*4.00 Credits*

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. Prerequisite: PSYC 100.

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## **Subject - Psychology (PSYC)**

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### **000 - ORIENTATION**

*1.00 Credit*

Familiarization with the departmental requirements for majors, planning programs of courses, University catalog and library; career options. Graded S/U.

## **100 - PSYCHOLOGY**

### *4.00 Credits*

General research and concepts in human behavior. Lectures, demonstrations, and observations.

## **111 - INTRODUCTORY LABORATORY**

### *2.00 Credits*

Experiments which demonstrate basic psychological principles and acquaint the student with laboratory procedures and report writing. Usually to be taken concurrently with PSYC 100, but can be taken later. Required for Psychology majors, optional for other students enrolled in PSYC 100.

## **210 - EXPERIMENTAL PSYCHOLOGY 1**

### *4.00 Credits*

The logic of experimental research and the application of the methods of science to the study of behavior. Particular emphasis on framing empirically testable hypotheses, experimental design, and analysis of data. Taught through lecture, computer simulation, and actual research experience. Extensive instruction in scientific communication and the APA Publications Manual. Prerequisites: MATH 142 and PSYC 100 and 111.

## **211 - EXPERIMENTAL PSYCHOLOGY 2**

### *4.00 Credits*

Continuation of PSYC 210.

## **212 - PRINCIPLES OF BEHAVIOR MANAGEMENT**

*4.00 Credits* The theory and supporting research which underlie behavior modification. Taught through lecture and laboratory demonstrations. Prerequisite: PSYC 100.

## **215 - DEVELOPMENTAL PSYCHOLOGY**

*4.00 Credits* Basic theories in human development from conception through old age; contemporary research at each age level. Prerequisite: PSYC 100.

## **218 - PSYCHOLOGY OF THE EXCEPTIONAL CHILD**

*4.00 Credits* The atypical child. Diagnosis and treatment of disorders of infancy, childhood and adolescence. Prerequisite: PSYC 100.

## **226 - HUMAN SEXUAL BEHAVIOR**

*4.00 Credits* Use of research literature in an attempt to provide an understanding of what is known (as well as what is not known) about the major facets of human sexual behavior. Prerequisite: PSYC 100.

## **290 - SPECIAL TOPICS IN PSYCHOLOGY 1.00 to 4.00 Credits**

## **311 - PSYCHOLOGY OF PERSONALITY**

*4.00 Credits* The major theories of personality from Freud to contemporary theoretical approaches. Prerequisite: PSYC 100.

## **312 - PSYCHOLOGICAL ASSESSMENT**

*4.00 Credits* 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: PSYC 100.

## **315 - LEARNING THEORY AND RESEARCH**

*4.00 Credits* The major theories of learning and major empirical issues and findings related to classical and instrumental conditioning. Current research in learning is covered on both the animal and human level.

## **320 - PSYCHOLOGY AND THE LAW**

*4.00 Credits* A review of the role of the psychologist in civil commitment procedures, the insanity defense, patient's rights, the determination of competency, and testifying as an expert witness. An examination of: significant court cases involving psychology and the law, research in the areas of jury selection, eye witness testimony and psychologists' licensing procedures. Prerequisite: PSYC 100.

## **335 - PHYSIOLOGICAL PSYCHOLOGY**

*4.00 Credits* Psychology as a biological science. Physiological events underlying behavior, including sensory, neural, and glandular involvement in such topics as motivation, emotion, and learning. Prerequisite: PSYC 100 and BIOL 231 or 331.

## **390 - SPECIAL TOPICS IN PSYCHOLOGY**

*1.00 to 4.00 Credits*

## **394 - JUNIOR SEMINAR**

*1.00 Credit* A professional preparation seminar for psychology majors. Discussion of career options, graduate school admissions, resume writing, placement services, GRE, practicum and other topics of importance in the senior year. Prerequisites: Junior status; only psychology majors.

## **420 - ABNORMAL PSYCHOLOGY**

*4.00 Credits* The development of a scientific approach to abnormal behavior. A review of the psychological, sociological, and biological factors related to the development of abnormal behavior. A review of the research of, the causal factors related to, and the diagnosis and treatment of mental disorders and mental retardation. Prerequisite: PSYC 100.

#### **426 - PRACTICUM IN PSYCHOLOGY**

*8.00 to 16.00 Credits* A field experience in the area of psychology. Open to seniors. Prerequisite: Approval of chairman.

#### **434 - HISTORY AND SYSTEMS OF PSYCHOLOGY**

*4.00 Credits* An overview of the major lines of thinking which have influenced the field of psychology beginning with ancient Greek philosopher-scientists to the twentieth century. Emphasis is given to theories of Empiricism, Associationism, and Scientific Materialism as well as twentieth century schools of psychological thought. Prerequisite: PSYC 100.

#### **497 - INDEPENDENT STUDY IN PSYCHOLOGY**

*1.00 to 4.00 Credits* Prerequisite: Approval of chairman.

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## **Sociology**

A **major in sociology** consists of the following requirements:

1. Sociology 000
2. Sociology 105
3. Sociology 251
4. Sociology 252
5. Sociology 446
6. Math 142
7. 28 hours of sociology electives

A **minor in sociology** consists of the following requirements:

1. Sociology 105
2. Sociology 251
3. Sociology 252
4. Sociology 446
5. Math 142
6. Additional sociology courses totaling 12 hours, selected in consultation with a member of the sociology faculty.

**Sociology and the American Sociological Association** Outstanding students with sophomore or junior standing are encouraged to participate in this special program of independent study. In the first phase of the program, each student reads independently during the summer on a selected topic. In the second phase, the student attends the annual meeting of the American Sociological Association to hear reports of current research, to attend business sessions of the Association, and to learn about career opportunities in sociology. In the third phase, the student writes a paper on the topic of the summer reading and submits other reports on the activities at the annual meeting. Each student completing the program earns transferable credit from the University of Iowa, the home institution of the

coordinators of the program. Further information and applications can be secured from the ONU sociology faculty.

**Psi Sigma** is a student organization open to all students with an interest in either psychology or sociology. The club sponsors field trips, speakers, and social activities.

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## **Subject - Sociology (SOC)**

### **000 - ORIENTATION**

*1.00 Credit*

Familiarization with the department, requirements for majors, planning program of courses, University catalog and library. Graded S/U.

### **105 - SOCIOLOGY**

*4.00 Credits*

The basic phenomena and processes of social life: culture, socialization, deviance, social institutions (family, polity, economy, education, religion, military), bureaucratization, social inequality, collective behavior, social movements, and population. Analysis of the interplay between the person and social groups.

### **240 - MARRIAGE AND THE FAMILY**

*4.00 Credits*

An institutional perspective on the family, patterns of courting, marital parental behavior, trends in the contemporary American family. Prerequisite: SOC 105.

### **243 - SOCIAL DEVIANCE 1**

*4.00 Credits*

Sociological perspectives on the processes of individual and group deviance. An examination of how deviant behavior is defined, how the definitions are maintained, and how the violators are processed. Theory and research regarding specific classes of deviants are explored, and current public policy issues concerning deviants are discussed. Prerequisite: SOC 105.

### **246 - ORGANIZATIONS AND WORK**

*4.00 Credits*

The nature of work and organizations from a sociological perspective. The history of work, job satisfaction, and the nature of work in contemporary society are examined. The structure of complex organizations is analyzed, focusing on dimensions of organizations, formalization, power and authority, conflict and change, communications, and the external environment. Prerequisite: SOC 105. (Formerly SOC 245)

**247 - SOCIAL INEQUALITY***4.00 Credits*

The variety of stratification systems; status attainment, social mobility, and social immobility; detailed descriptions of life among the poor, rich and middle classes in America and elsewhere.

Prerequisite: SOC 105.

**250 - CULTURAL ANTHROPOLOGY***4.00 Credits*

The major concepts and principles of cultural anthropology, emphasizing the understanding of the total configuration and interrelationships of culture traits, complexes, and social relationships in a particular geographic environment and historical context. Prerequisite: SOC 105.

**251 - QUANTITATIVE METHODS IN BEHAVIORAL RESEARCH***4.00 Credits*

Applications in the behavioral sciences of several sampling distributions (binomial, normal, Student's *t*, Chi square, *F*, and certain distributions used in "nonparametric tests") as well as correlation and regression. Major emphasis on testing behaviorally meaningful hypotheses.

Prerequisites: MATH 142, SOC 105.

**252 - QUALITATIVE METHODS IN BEHAVIORAL RESEARCH***4.00 Credits*

Major research techniques, including participant and non-participant observation, interview, questionnaire, use of available data, and experiment. Other topics include sampling and establishing causality in non-experimental research. Prerequisite: SOC 105.

**261 - CRIMINOLOGY***4.00 Credits*

The nature and extent of crime, development of criminological theory, major forms of criminal behavior, and society's attempts at prevention and control of crime. The major perspectives, issues and diverse concerns that characterize contemporary criminology are presented.

Prerequisite: SOC 105.

**291 - SPECIAL TOPICS IN SOCIOLOGY***1.00 to 4.00 Credits***348 - MEDICAL SOCIOLOGY***4.00 Credits*

Social interaction between patient and physicians, nurses, pharmacists, and other healthcare personnel; social interaction among those personnel; social definition of illness; societal response to illness; social epidemiology; education and training of medical personnel.

Prerequisite: SOC 105.

**351 - WORLD CRIMINAL JUSTICE SYSTEMS***4.00 Credits*

The organization and operation of the criminal and juvenile justice systems in England, Russia, France, Japan, Egypt, India, South Korea, China and Saudi Arabia. Crime and delinquency rates in these countries are reviewed, the police, courts and corrections systems are analyzed, and prevention and control issues are discussed. Satisfies the Non-Western requirement.

Prerequisite: SOC 105.

**361 - DELINQUENCY AND JUVENILE JUSTICE***4.00 Credits*

An analysis of competing theoretical approaches to the causes of delinquent behavior, and the study of the prevention, treatment, and control of delinquency. Procedures and major contemporary issues in Juvenile Justice are addressed.

Prerequisite: SOC 105.

**391 - SPECIAL TOPICS IN SOCIOLOGY***1.00 to 4.00 Credits***446 - SOCIAL THOUGHT***4.00 Credits*

Traces sociological theorizing from sociology's historical origins through the classical and contemporary periods. Important theorists covered include Karl Marx, Emile Durkheim, Max Weber, George Herbert Mead, Talcott Parsons. Emphasis is placed on comparing and contrasting the major theoretical perspectives which provide the foundation for a scientific study of social life. Prerequisite: SOC 105.

**492 - SENIOR RESEARCH PAPER***2.00 Credits*

The writing of a library research paper examining social thought in the context of a social issue under the direction of a department faculty member. For sociology majors only. Prerequisite: SOC 446.

**498 - INDEPENDENT STUDY IN SOCIOLOGY***1.00 to 4.00 Credits*

Prerequisite: Approval of chairman.

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## DEPARTMENT OF TECHNOLOGY

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Associate Professors Rouch (Chair), Shearrow;  
Assistant Professor Jeffrey

The course work comprising the curriculum in technology is designed to prepare students for careers in professional, technical fields throughout industry and education. The intent is to provide broad, foundational experiences in the technologies and applied sciences that comprise modern industrial-technical society. Carefully structured classroom and laboratory activities feature numerous operations and processes that promote realistic involvement with the construction, manufacturing, technical communications, energy, power, and transportation-related fields. Course work and associated laboratory assignments place emphasis on researching, designing, experimenting, fabricating, and managing.

Both the bachelor of science and the bachelor of arts degree options are available. The number of quarter hours in the major varies depending upon the career path selected. Those selecting the technology education teacher licensure route must complete all state and university requirements for licensure. Those selecting the technology/industrial management path must complete an option/minor comprised of a minimum of 28 hours in one of the following: advanced manufacturing, graphic communication, design analysis, business, or a specially selected option/minor. The business option is outlined in the Arts and Sciences course overview.

The department offers two work experience programs for the industry-bound student. The first is a one-quarter internship designed to give the student a ten-week real-world experience, which is completed during the normal four-year program, usually during the fall of the senior year. The other is a five-year co-op program in which the student completes six quarters (two summer and four normal quarters) of work experience, usually with the same company. The program is divided into two, 3-quarter experiences, one completed after the sophomore year and the other after the junior year. The student gains considerable experience and is able to help offset the cost of school.

The department has established articulation programs with several area community and technical colleges. Refer to a later section and the department chair for more details.

A minor in virtual simulation and another in

technology content is available to students in other majors who wish to enter technology-related careers.

The department has developed an extensive program of field work involving visits to industrial centers, museums, and schools. Students are required to participate in these excursions and are encouraged to participate in a variety of other organized professional activities.

### **Technology Major** (industry bound) (all TECH courses)

Orientation 000

Introduction to Technology 110

Metallic Materials and Process I 130

Microcomputer Applications in Technology 140

Introduction to Computer-Assisted Drafting 220

Computer-Assisted Construction Design 221 or  
Solid Modeling for Design 421

Computer-Assisted Product Design 223

Metallic Materials and Processes II 230

Product Manufacturing 232

Introduction to Communication Technology 240

Sophomore Seminar in Technology 294

CAD/CAM and Industrial Robotics 332

Manufacturing Automation Systems 335

Construction Technology 350

Fundamentals of Electricity/Electronics 361

Manufacturing Management 412

Nonmetallic Materials and Processes 430

Energy and Transportation 460

Digital Electronics: Concepts and Applications 462

Quality Control and Work Measurement 470

Senior Seminar in Technology 494

Senior Project in Technology 495

Tour of American Industries 496

### **Options/Minors** (28 hours)

An option or minor is required of all technology-industrial bound students. The business option is outlined in the Arts and Sciences overview section. The departmental structured options to select from are as follows:

#### **Graphic Communication Option**

ART 150 Studio Foundations

ART 222 Graphic Design I

ENGL 243 Magazine Writing

ART 340 Printmaking 2

TECH 340 Advanced Graphic  
Communications

TECH 341 Photography

TECH 421 Solid Modeling for Design

TECH 441 Advanced Photography

#### **Design Analysis Option**

GE 101 Fundamentals of Engineering

GE 102 Engineering Problem Solving  
and CAD

GE 113	Statics	294, 335, 340, 341, 361, 412, 421, 430, 441, 460, 462, 490, 494, 495, 496, or 497.
MATH 163	Calculus 1	
MATH 164	Calculus 2	
GE 214	Dynamics	
GE 223	Strength of Materials	
PHYS 231	Physics: Mechanics of Solids & Fluids	

**Advanced Manufacturing Option** (This option is not open to students who have a virtual simulation minor)

CS 164	Programming I
ABUS 395	Multimedia Design & Development
TECH 421	Solid Modeling for Design
TECH 435	Advanced Robotics (2 times)
TECH 321	Basics of Virtual Simulation
TECH 322	Virtual Simulation of Systems
TECH 423	Virtual Sim. Production & Mngmt.

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

### Internship

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

### Co-op

The co-op is a five-year school/work program designed to integrate classroom study with planned and supervised work experiences. Technology co-op students normally are employed in manufacturing, construction or other industry related companies in semi-professional capacities. The employment sessions begin during the summer after the sophomore year. The student contracts for a total of four to six quarters of co-op during which they enroll in TECH 380 (Professional Practice in Technology).

### Technology Minor (28 hours)

Students from other disciplines who desire to gain a basic introduction to industry may select a minor as follows (all TECH courses):

- Metallic Materials and Processes I 130
  - Introduction to Computer-Assisted Drafting 220
  - Introduction to Communication Technology 240
  - CAD/CAM and Industrial Robotics 332
  - Construction Technology 350
  - Electives (minimum of eight credit hours)
- Selected from 140, 200, 221, 223, 231, 232,

### Virtual Simulation Minor

The Virtual Simulation Minor is designed to give Ohio Northern University students the opportunity to experience state-of-the-art automation, simulation, and animation procedures that are becoming important supports for multiple disciplines. This minor is available to students with any major who want a concentration of course work in virtual simulation and animation concepts. The minor in Virtual Simulation is not open to students who have an Advanced Manufacturing Option.

CS 164	Programming I
ABUS 395	Multimedia Design & Dev.
MATH 142	Introduction to Statistics
TECH 321	Basics of Virtual Simulation
TECH 322	Virtual Simulation of Systems
TECH 423	Virtual Sim. Production & Mngmt.
MATH 122, 160	
163, or 164	(Choose one)

### Articulation Programs

The department has developed articulation programs with several northwest Ohio community and technical colleges. These programs allow students who have completed associate degrees in technical areas to transfer to the technology program and usually complete the bachelor's degree in two full-time years or four years of part-time attendance. Consult the department chair for details.

### Technology Teacher Education (4-12) Vocational Licensure (all TECH courses)

- Orientation 000
- Introduction to Technology 110
- Metallic Materials and Processes I 130
- Microcomputer Applications in Technology 140
- Introduction to Computer-Assisted Drafting 220
- Computer-Assisted Construction Design 221
- Computer-Assisted Product Design 223
- Metallic Materials and Processes II 230
- Product Manufacturing 232
- Introduction to Communication Technology 240
- Sophomore Seminar in Technology 294
- CAD/CAM and Industrial Robotics 332
- Manufacturing Automation Systems 335
- Construction Technology 350
- Fundamental of Electricity/Electronics 361
- Non-metallic Materials and Processes 430
- Energy and Transportation 460
- Student Teaching Seminar 491
- Senior Seminar in Technology 494
- Senior Project in Technology 495
- Tour of American Industries 496

All students pursuing teacher licensure must complete the professional education sequence; see Center for Teacher Education.

### **Technical Electives - All Majors**

There are several technical courses offered by the department, which may be selected by students to add greater depth. These include (all TECH courses):

Technology and Society 200  
Construction Design 221  
Custom Woodworking 231  
Product Manufacturing 232  
Basics of Virtual Simulation 321  
Advanced Graphic Communication 340  
Photography 341  
Solid Modeling for Design 421  
Advanced Photography 441  
Introduction to Technical Education 474

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## **Subject - Technology (TECH)**

### **000 - ORIENTATION**

*1.00 Credit*

An introduction to the department, introduction to college life. Familiarization with the basic curriculum options. Planning a course program. University student services. The library. The departmental major requirements. Required of all department majors. Graded S/U.

### **110 - INTRODUCTION TO TECHNOLOGY**

*4.00 Credits*

For students majoring, minoring, or interested in the Department of Technology. An overview of technology and industry and the two career path options offered by the Department: technology management and technology education. Major technology systems: constructions, manufacturing, communication, energy/power/transportation, and management. Lab activities and visitations utilized to reinforce concepts.

### **130 - METALLIC MATERIALS AND PROCESSES 1**

*4.00 Credits*

Major metallic industrial materials and their processes. The conversion of raw materials via extraction, refining, and processing into consumer products. An emphasis on safety, metallurgy, nondestructive testing, destructive testing and material processing will be applied.

### **140 - MICROCOMPUTER APPLICATIONS IN TECHNOLOGY**

*4.00 Credits*

Operating microcomputers and various software programs. Utilization of the University's network will be emphasized during course activities. Windows based machines will be utilized. No prior experience with a computer is required.

### **190 - SPECIAL TOPICS IN TECHNOLOGY**

*1.00 to 3.00 Credits*

May be repeated as the topic varies.

### **200 - TECHNOLOGY AND SOCIETY**

*4.00 Credits*

The major concepts of technology; its development, its effects on society, and the problems associated with it. Critical evaluations through written and verbal activities.

### **220 - INTRODUCTION TO COMPUTER ASSISTED DRAFTING**

*4.00 Credits*

Graphic representation using the personal computer. Attention will be placed on the standards of the technical graphics field and the graphic illustration and visualization techniques as applied to CAD software. Develop proficient use of AutoCAD software for: orthographic projection, sections and conventions, auxiliary views, 3D drawings, and applied geometry.

### **221 - COMPUTER ASSISTED CONSTRUCTION DESIGN**

*4.00 Credits*

Construction planning, design, engineering and layout. Light construction principles, architectural details, plot surveying and layout, creation of architectural working drawings and cost estimating using softdesk PC-CAD software. Prerequisite: TECH 220 or permission.

### **223 - COMPUTER ASSISTED PRODUCT DESIGN**

*4.00 Credits*

Technical sketching, product design processes and the components/variables of good design. Utilization of the computer in the design process to generate working drawing/designs for manufactured products. Oral presentations, analysis of product designs through solids modeling, prototype development and market surveys.

## **230 - METALLIC MATERIALS AND PROCESSES 2**

### *4.00 Credits*

The metallic material processes involved in fabricating and machining of consumer products. Machining technologies include basic traditional machining and non-traditional processes such as EDM, abrasive water and laser technologies. Fabrication operations to be investigated are MIG, TIG, SMAW, resistance, and OXY-acetylene.

## **231 - CUSTOM WOODWORKING**

### *3.00 Credits*

Basic processes, tools, and materials employed in the production of custom, individually designed, and crafted wood products. May be repeated up to a total of nine hours.

## **232 - PRODUCT MANUFACTURING**

### *4.00 Credits*

Machine operations in the manufacture of various types of products, primarily the processing of wood materials into consumer products. Emphasis on process design, material handling, organization of work, division of labor, distribution and sales practices relating to the mass production industries. A major line production will be completed by each class. Formerly TECH 431.

## **240 - INTRODUCTION TO COMMUNICATION TECHNOLOGY**

### *4.00 Credits*

The history of communication technologies, present day procedures, equipment, and materials that are associated with the graphic reproduction techniques of relief, lithography, screen, and copying/duplication, as well as, graphic layout, design, and composition using desktop publishing technology and finishing and binding. Video communication technology will be covered in addition to graphic reproduction topics.

## **280 - COOPERATIVE EXPERIENCE ORIENTATION**

### *1.00 Credit*

Preparation to begin the co-op experience. Topics discussed include: identifying a position, development of the Co-op Plan, preparing for the first day, position expectations, outline of co-op requirements, getting the most from the experience, and record keeping. Sophomore technology majors with preliminary acceptance in the co-op program. Graded S/U.

## **290 - SPECIAL TOPICS IN TECHNOLOGY**

### *1.00 to 3.00 Credits*

May be repeated as the topic varies.

## **294 - SOPHOMORE SEMINAR IN TECHNOLOGY**

### *1.00 Credit*

Required of all technology majors near the end of their second year of college. Topics: assessment of basic skills, career planning, minor/option selection, review of academic performance, study skills, personality testing, and related topics. Meets one hour per week. Prerequisite: department major and five quarter's work. Graded S/U.

## **321 - BASICS OF VIRTUAL SIMULATION**

### *4.00 Credits*

Development of the basic skills needed to perform simulation construction in the virtual environments provided within IGRIP, Virtual NC, and QUEST. Topics will include: user interface, importing and exporting of files, creating parts and devices, jogging devices, configuring files and paths, loading and running simulations, system setup and collision, graphical simulation language concepts, motion kinematics and analysis functions.

## **322 - VIRTUAL SIMULATION OF SYSTEMS**

### *4.00 Credits*

Development of in-depth virtual simulations of discrete events provided by industrial and educational partners. Each student will utilize one or more software packages (IGRIP, Virtual NC, QUEST, ASSEMBLY, and ERGO) to produce simulations that represent a concept provided by a partner. Team work and problem solving is required. Prerequisite: TECH 321.

## **332 - CAD/CAM AND INDUSTRIAL ROBOTICS**

### *4.00 Credits*

Computer automated manufacturing practices (CAD/CAM) converting CAD drawings to NC Machine Code, customization of machine code, and production of metallic and non-metallic products. Industrial robotics will be introduced and hands-on programming of industrial robots will include tasks such as welding, pick and place, finish application, and robot integration into manufacturing facilities. Microcomputer applications in TECH 140 would be helpful. Prerequisites: TECH 130 and 220 or equivalent.

## **335 - MANUFACTURING AUTOMATION SYSTEMS**

### *4.00 Credits*

Automated manipulation of industrial materials using educational robots, programmable logic controllers, and computer integrated manufacturing techniques including automatic storage and retrieval, vision, and product identification. Microcomputer applications in TECH 140 would be helpful in completing the lab assignments. Prerequisites: TECH 220 and 332 or equivalent.

### **340 - ADVANCED GRAPHIC COMMUNICATIONS**

*3.00 Credits*

Advanced offset lithography processes including line and produce flast, platemaking, and press operations. Simple Advanced graphic communication techniques including prepress design, scanning, digital photography, graphic design, and animation; offset printing, screen printing, signature work, binding and finishing. Individual as well as group projects will be undertaken. May be repeated to a total of six hours. Prerequisite: TECH 240 or permission of instructor.

### **341 - PHOTOGRAPHY**

*3.00 Credits*

Techniques of photographic composition, camera types, uses and accessories, photographic optics, and laboratory methods and materials; dark room developing and printing of black and white photography.

### **350 - CONSTRUCTION TECHNOLOGY**

*4.00 Credits*

Basic concepts of construction techniques used today; including the methods and materials involved in framing, enclosing, and finishing residential and light commercial buildings. Study of financing, contracting, procuring, supervising, site-operation, foundation, structural elements, utilities, landscaping, and personnel associated with construction activities.

### **361 - FUNDAMENTALS OF ELECTRICITY AND ELECTRONICS**

*4.00 Credits*

The fundamentals of alternating and direct current will be explored in the context of changing technological advances. Basic electrical circuits and electronic parts will be utilized in electronic communication activities. The use and maintenance of test equipment will be emphasized during the testing of analog and basic digital circuits. Formerly TECH 461.

### **380 - PROFESSIONAL PRACTICE IN TECHNOLOGY**

*1.00 Credit*

Study and professional experience in a technology-related occupation in an industrial enterprise, consulting firm, or governmental agency. A mid-term and final report on the assignment and employer's evaluation are required. May be repeated up to a total of 6 hours. Prerequisites: TECH 280, junior status, and minimum 2.5 accumulative GPA. Graded S/U.

### **390 - SPECIAL TOPICS IN TECHNOLOGY**

*1.00 to 3.00 Credits*

May be repeated as the topic varies.

### **412 - MANUFACTURING MANAGEMENT**

*4.00 Credits*

Manufacturing planning, organizing, controlling and directing. Productivity, management foundational concepts, manufacturing enterprise organization, design and equipment design of facilities and processes, equipment selection and maintenance, materials handling inventory control, purchasing and safety. Case studies of industry.

### **421 - SOLID MODELING FOR DESIGN**

*3.00 Credits*

Techniques of illustration and 3D solid modeling with CAD software. Activities include the design and analysis of 3D solid models, rapid prototyping, and graphic illustration techniques of designed and finished products or constructed facilities.

### **423 - VIRTUAL SIMULATION PRODUCTION AND MANAGEMENT**

*4.00 Credits*

Development of virtual simulations of discrete events provided by industrial partners. IGRIP, Virtual NC, QUEST, Assembly and Ergo will be utilized to develop advanced models for educational partners as group projects. Focus on the management of requested projects, delivery and presentation of the simulations. Prerequisites: TECH 321 and TECH 322.

### **430 - NONMETALLIC MATERIALS AND PROCESSES**

*4.00 Credits*

Nonmetallic materials and processing. Conversion of raw materials into consumer products via refining and processing. Major emphasis on polymers, ceramics, wood, and composites, with coverage of fibers, fabrics, leathers, and miscellaneous nonmetallics.

### **435 - ADVANCED ROBOTICS/AUTOMATION**

*2.00 Credits*

Advanced investigation of robotics and automated equipment. Topics of investigation will include robot construction, robot programming, PLC's, CAD/CAM, CIM, FMS, workcell construction. Problem solving based in manufacturing situations is the main emphasis. Prerequisites: TECH 140, 220, 332 and 335. May be repeated up to a maximum of 8 hours.

#### **441 - ADVANCED PHOTOGRAPHY**

*3.00 Credits*

Advanced camera handling techniques, darkroom manipulations of negatives, the large format black and white medium, color positive photography, digital photography. Prerequisite: TECH 341 or equivalent.

#### **460 - ENERGY AND TRANSPORTATION**

*4.00 Credits*

Concepts of energy conversion, power transmission, and applications. Methods of maintaining and repairing energy conversion and transmission devices. A focus is placed on the major components of transportation systems such as propulsion, guidance, suspension, control, support, and structure systems used in stationary and vehicular systems. Formerly TECH 360.

#### **462 - DIGITAL ELECTRONICS: CONCEPTS AND APPLICATIONS**

*4.00 Credits*

Concepts and applications of digital, advanced digital, and basic microprocessor electronic circuits will be explored. An industrial based application of these concepts will include the areas of robot construction, robotic interfacing, computer interfacing, sensors, controllers, and digital communication. Prerequisite: TECH 361.

#### **470 - QUALITY CONTROL AND WORK MEASUREMENT**

*4.00 Credits*

Methods applied to quality assurance and work measurement in mass production industries. Consideration will be given to statistical applications, qualitative and quantitative analysis, bio mechanics, work station design, and the planning of systems for total quality assurance programs. Case studies of industry.

#### **474 - INTRODUCTION TO TECHNICAL EDUCATION**

*4.00 Credits*

Elements of instruction, instructional scope and sequence, development of training programs, and planning, organizing, and administering technical laboratories for students planning on careers in teaching/training in industry and vocational/technical secondary and postsecondary schools. Required for Technical Training Option.

#### **484 - INTERNSHIP IN TECHNOLOGY**

*5.00 to 15.00 Credits*

A supervised program of experiences in production practices, management techniques, research applications, and other activities representative in modern industry. Selection is based upon proper application, screening, and acceptance by an appropriate industry. Five hours of credit for 3-4 weeks of full time work in the summer or fifteen hours of credit for one full time quarter during the year. Graded S/U. A maximum of fifteen hours to count toward graduation.

#### **490 - SPECIAL TOPICS IN TECHNOLOGY**

*1.00 to 3.00 Credits*

May be repeated as the topic varies.

#### **491 - STUDENT TEACHING SEMINAR**

*1.00 Credit*

Required to be taken concurrently with student teaching and is in addition to Education Department Seminar EDUC 475. Reinforces field experiences as well as develops insights into implementation of recent curriculum development in Technology Education. Corequisites: EDUC 470 and/or 480. Graded S/U.

#### **492 - INTERNSHIP SEMINAR**

*1.00 Credit*

Provides for a structured method for weekly review and evaluation of the internship experience. Prerequisites: Junior standing and technology major. Graded S/U. Corequisite: TECH 484.

#### **494 - SENIOR SEMINAR IN TECHNOLOGY**

*1.00 Credit*

Required of majors in technology who are within three quarters of graduation. Career planning, placement services, the employment search, graduate school, senior project review, graduation procedures, and related issues. Graded S/U.

#### **495 - SENIOR PROJECT IN TECHNOLOGY**

*1.00 Credit*

Individual studies and investigations involving the application of knowledge to the solution of technical problems including research and development, testing, fabrication, assembly, and evaluation. Must be repeated to a total of 3 hours.

#### **496 - TOUR OF AMERICAN INDUSTRIES**

*1.00 Credit*

Participation with the annual department-sponsored comprehensive tour of industries including the structured pre- and post-trip seminars and the submission of a written technical report pertaining to one or more facets of the experience. May be repeated to a total of five hours. Graded S/U.

#### **497 - INDEPENDENT STUDY IN TECHNOLOGY**

*1.00 to 3.00 Credits*



# THE COLLEGE OF Business Administration

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## Terry L. Maris, *Dean*

Professors Cooper, Goldberg, Meininger (Associate Dean), Woods; Associate Professors Chipalkatti, Ewing, Rishi, Savino; Assistant Professors Banfe, Christopher, Govekar, Kloft, Zekany; Computer Applications Professional Elsass

### Patton Chair

**The George Willard Patton Chair of Business and Economics**, endowed by the Richard King Mellon Charitable Trust of Pittsburgh, Pennsylvania, has been established beginning with the academic year 1973-74. The 1998-99 recipient of this endowed professorship is Nirranjan Chipalkatti, associate professor of accounting.

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## Mission Statement

The College of Business Administration will provide students an excellent business education within the context of the liberal arts tradition and the mission of Ohio Northern University. Our intrinsic ability to pursue this mission derives from our primary emphasis upon undergraduate education; the size and reputation of the University; and a curriculum that stresses knowledge and skills within one's major blended with the extensive liberal arts curriculum of the University.

Quality education will be achieved through emphasis on highly effective teaching and applied research to bring current perspectives on both domestic and international business subjects into the classroom.

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## Admissions Standards

Candidates seeking admission to the College of Business Administration are required to meet the general requirements for admission to the University. The College of Business Administration accepts high school graduates who have 16 acceptable units of high school credits. Thirteen of these units are prescribed as follows: Four units of English; three units of mathematics (including algebra and geometry); six units in history, social studies, language, or natural science, or any combination thereof. Candidates are encouraged to pursue a foreign

language while in high school. Acceptable scores on the American College Test or the College Entrance Examination Board Test are expected of all candidates.

**Transfer Students** The Ohio Northern University College of Business Administration welcomes students from other accredited colleges and universities. Applications for transfer will be considered only if the student has a prior grade point average of 2.00 on a 4.00 scale, and the student is eligible to return to his/her former institution.

Students transferring from a two-year associate degree program are advised that courses in advanced business subjects (i.e., offered at the college's 300 or 400 level) taken at a two-year institution are not normally granted credit as equivalents of the business courses taught at Ohio Northern University. Such courses can be accepted as general electives. Under certain circumstances, students could establish equivalent credit through college-administered proficiency tests.

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## Degree Requirements in General Education

*Orientation* (ABUS 000)

*Communication Skills*

1. Writing 1 and 2 (ENGL 110 and 111)
2. One other English course

*Fine Arts*

1. One Fine Arts course (ART 100, MUSC 100, or COMM 105)

*Humanities*

1. One Religion course (RELG 105, 107, 109 or 110)
2. One philosophy course
3. Western Civilization 1 and 2 (HIST 110 and 111)

*Social Sciences*

1. One Social Science Division course

*Mathematics and Natural Sciences*

1. Finite Mathematics (MATH 144), Calculus with Business Applications (MATH 145), and Statistics (MATH 146)
2. One science course

*Health and Physical Education*

1. Three physical education service courses (AHPE). A maximum of six such hrs. will count toward graduation.

*Additional General Education Requirements*

**For accounting and management majors:**

- A. Public Speaking (COMM 211), Interpersonal Communication (COMM 225), and one additional

speech communication course

B. Eight elective hrs. taken in the College of Arts and Sciences

**For international business and economics majors:**

A. Public Speaking (COMM 211) or Interpersonal Communication (COMM 225)

B. Demonstrated competency in a foreign language through the second year of college level studies. This requirement may be waived for students whose native language is other than English.

C. An international study and/or internship experience.

**Business Administration Core Courses**

ABUS 000	Orientation
ABUS 120	Ethics in Bus. Prac.
ABUS 201	Personal Computer Appl. for Business
IBEC 202	Prin. of Microeconomics
IBEC 203	Prin. of Macroeconomics
ACCT 211 & 212	Prin. of Acct. 1 and 2
MGMT 240	Mgmt. Info. Systems
IBEC 300	Environ. of Int'l. Bus.
ABUS 312	Business Law 1
MGMT 333	Mgmt. & Org. Beh.
MRKT 351	Prin. of Marketing
FINC 362	Managerial Finance
MGMT 364	Production and Op. Mgmt.
MGMT 485	Bus. Policy and Strategy
One elective in economics discipline area	

**SPECIFIC MAJORS AND MAJOR COURSE REQUIREMENTS**

Beyond the general education requirements and the business core, students must also complete specific requirements in their major areas.

The College of Business Administration offers three major areas of study: accounting; international business and economics; and management.

**Accounting**

The accounting program offers a four-year (182 quarter hour) degree program and is designed for students interested in (1) a career in corporate accounting and who may plan to take the Certified Management Accounting or the Certified Internal Auditing examinations as a professional qualification and (2) a career in public accounting and who plan to take the CPA examination. Students planning to sit for the Certified Public Accounting examination after

1999 will have to have earned 150 semester (225 quarter) hours of academic credit.

The curriculum core for the accounting major includes ACCT 301, 302, 314, 315, 435, and eight hours of upper division accounting electives.

**Bachelor of Science In Business Administration Accounting Major**

*First Year*

ABUS 000	Orientation	1 hr.
ABUS 120	Ethics in Bus. Prac.	2 hrs.
ABUS 201	Pers. Computer Appl.	4 hrs.
AHPE	Phys. Ed. Electives	2 hrs.
COMM 211	Public Speaking	4 hrs.
ENGL 110, 111	Writing 1 and 2	8 hrs.
HIST 110, 111	W. Civ. 1 and 2	8 hrs.
MATH 144	Finite Math.	4 hrs.
MATH 145	Calc. with Bus. Appl.	4 hrs.
ART 100 or COMM 105 or MUSC 100	Fine Arts Elective	4 hrs.
RELG	Religion Elective	4 hrs.
	Soc. Sci. Elective	4 hrs.
<b>TOTAL</b>		<b>49 hrs.</b>

*Second Year*

MATH 146	Statistics	4 hrs.
ACCT 211, 212	Prin. of Acct. 1, 2	8 hrs.
AHPE	Phys. Ed. Elective	1 hr.
IBEC 202, 203	Micro. & Macro.	8 hrs.
MGMT 240	Mgmt. Info. Syst.	4 hrs.
ENGL	English Elective	4 hrs.
PHIL	Philosophy Elective	4 hrs.
BIOL or CHEM or PHYS	Science Elective	4 hrs.
COMM 225	Interpersonal Comm.	4 hrs.
COMM	Speech Elective	4 hrs.
<b>TOTAL</b>		<b>45 hrs.</b>

*Third Year*

ACCT 301, 302	Intermediate Acct. 1, 2	8 hrs.
ABUS 312	Business Law 1	4 hrs.
ACCT 314, 315	Int. Manag. Acct. 1, 2	8 hrs.
IBEC 300	Environ. of Int'l. Bus.	4 hrs.
MGMT 333	Mgmt. & Org. Beh.	4 hrs.
MRKT 351	Prin. of Marketing	4 hrs.
FINC 362	Managerial Finance	4 hrs.
MGMT 364	Prod. & Ops. Mgmt.	4 hrs.
	Arts & Sciences Elect.	8 hrs.
<b>TOTAL</b>		<b>48 hrs.</b>

*Fourth Year*

ACCT 435	International Acct.	4 hrs.
MGMT 485	Bus. Policy & Strategy	4 hrs.
ACCT	Accounting Electives	8 hrs.
IBEC	Economics Elective	4 hrs.
	General Electives	20 hrs.
<b>TOTAL</b>		<b>40 hrs.</b>

## CPA Program

Students planning to sit for the Certified Public Accounting examination after 1999 will have to have earned 150 semester (225 quarter) hours of academic credit. A 225 quarter-hour program has been developed to serve those students who are affected by the changes. The additional recommended courses for the CPA program include ACCT 303, 387, 388, 389, 392, 402, 403, 404, and ABUS 313. Twelve additional hours of elective course work in the College of Arts and Sciences are required.

## International Business and Economics

The curriculum core for the international business and economics major includes: IBEC 352, 385, 453, 467, and 486.

## Bachelor of Science in Business Administration International Business and Economics Major Curriculum

### First Year

ABUS 000	Orientation	1 hr.
ABUS 120	Ethics in Bus. Prac.	2 hrs.
ABUS 201	Pers. Computer Appl.	4 hrs.
AHPE	Phys. Ed. Electives	2 hrs.
ENGL 110, 111	Writing 1 and 2	8 hrs.
HIST 110, 111	Western Civ. 1 and 2	8 hrs.
MATH 144	Finite Math.	4 hrs.
MATH 145	Calc. with Bus. Appl.	4 hrs.
ART 100 or COMM 105 or MUSC 100	Fine Arts Elective Foreign Language	4 hrs. 12 hrs.
<b>TOTAL</b>		<b>49 hrs.</b>

### Second Year

AHPE	Phys. Ed. Elective	1 hr.
ACCT 211, 212 or 225	Prin. of Accounting 1, 2	8 hrs.
COMM 211	Speech Comm.	4 hrs.
IBEC 202, 203	Microeconomics and Macroeconomics	8 hrs.
MATH 146	Statistics	4 hrs.
MGMT 240	Mgmt. Information Syst.	4 hrs.
ENGL	English Elective Foreign Language	4 hrs. 12 hrs.
<b>TOTAL</b>		<b>45 hrs.</b>

### Third Year

ABUS 300	Environ. of Int'l. Bus.	4 hrs.
ABUS 312	Business Law 1	4 hrs.
MGMT 333	Mgmt. & Org. Beh.	4 hrs.
MRKT 351	Prin. of Marketing	4 hrs.
IBEC 352	Money & Banking	4 hrs.
FINC 362	Managerial Finance	4 hrs.
IBEC 385	Int'l. Economics	4 hrs.

IBEC 467	Int'l. Finance	4 hrs.
PHIL	Philosophy Elective	4 hrs.
BIOL or CHEM or PHYS	Science Elective	4 hrs.
RELG	Religion Elective	4 hrs.
	Social Science Elective	4 hrs.
<b>TOTAL</b>		<b>48 hrs.</b>

### Fourth Year

MGMT 364	Prod. & Ops. Mgmt.	4 hrs.
IBEC 453	Int'l. Mrkt.	4 hrs.
MGMT 485	Bus. Policy & Strat.	4 hrs.
IBEC 486	Int'l. Mgmt.	4 hrs.
IBEC	Economics Elective General Electives	4 hrs. 20 hrs.
<b>TOTAL</b>		<b>40 hrs.</b>

## Management

The curriculum core for the management major includes: MGMT 334, 363, 486, and 12 hrs. of upper division management electives.

## Bachelor of Science in Business Administration Management Major Curriculum

### First Year

ABUS 000	Orientation	1 hr.
ABUS 120	Ethics in Bus. Prac.	2 hrs.
ABUS 201	Pers. Computer Appl.	4 hrs.
AHPE	Phys. Ed. Electives	2 hrs.
COMM 211	Public Speaking	4 hrs.
ENGL 110, 111	Writing 1 and 2	8 hrs.
HIST 110, 111	Western Civ. 1 and 2	8 hrs.
MATH 144	Finite Math.	4 hrs.
MATH 145	Calc. with Bus. Appl.	4 hrs.
ART 100 or COMM 105 or MUSC 100	Fine Arts Elective Philosophy Elective Social Science Elective	4 hrs. 4 hrs. 4 hrs.
<b>TOTAL</b>		<b>49 hrs.</b>

### Second Year

AHPE	Phys. Ed. Elective	1 hr.
ACCT 211, 212 or 225	Prin. of Accounting 1, 2	8 hrs.
IBEC 202, 203	Microeconomics and Macroeconomics	8 hrs.
MATH 146	Statistics	4 hrs.
MGMT 240	Mgmt. Information Syst.	4 hrs.
MGMT 333	Mgmt. & Org. Beh.	4 hrs.
ENGL	English Elective	4 hrs.
RELG	Religion Elective	4 hrs.
BIOL or CHEM or PHYS	Science Elective	4 hrs.
COMM 225	Interpersonal Comm.	4 hrs.
<b>TOTAL</b>		<b>45 hrs.</b>

### Third Year

IBEC 300	Environ. of Int'l. Bus.	4 hrs.
ABUS 312	Business Law 1	4 hrs.
MGMT 334	Cases & Exer. in Org. Beh.	4 hrs.
MRKT 351	Prin. of Marketing	4 hrs.
FINC 362	Managerial Finance	4 hrs.
MGMT 363	Human Resource Mgmt.	4 hrs.

MGMT 364	Prod. & Ops. Mgmt.	4 hrs.
	Arts & Sciences Elect.	8 hrs.
IBEC	Economics Elective	4 hrs.
MGMT	Management Elective	4 hrs.
COMM	Speech Elective	4 hrs.
TOTAL		48 hrs.

#### *Fourth Year*

MGMT 485	Bus. Policy & Strategy	4 hrs.
MGMT 486	Int'l. Mgmt.	4 hrs.
MGMT	Management Electives	8 hrs.
	General Electives	24 hrs.
TOTAL		40 hrs.

## Dual Majors

No course used to satisfy either a specific requirement or a discipline elective may be counted toward a dual major except as a general elective.

## Minor in Business Administration

The minor is available only to non-business majors. (A "C" grade or higher is required in all courses.)

IBEC 202, 203	Microeconomics and Macroeconomics	8 hrs.
ACCT 211, 212	Prin. Acct. 1, 2	8 hrs.
ABUS 312	Business Law 1	4 hrs.
MGMT 333	Mgmt. & Org. Beh.	4 hrs.
MRKT 351	Prin. of Marketing	4 hrs.
FINC 362	Managerial Finance an approved elective	4 hrs.
TOTAL		36 hrs.

## Graduation Requirements

### Bachelor of Science in Business Administration

It is the student's responsibility to assure that all of the graduation requirements for the degree and major(s) sought are satisfied:

1. The general education specific and elective courses in the College of Arts and Sciences.
2. The Business Administration core requirements and electives.
3. The specific major requirements and electives.
4. Satisfactory completion and presentation of a minimum of 182 quarter hours of appropriate course work for the specific major(s).
5. A minimum of 28 hours of required business courses at the 300 or 400 level to be completed at Ohio Northern University with at least 16 of these hours taken in the student's major.

6. A minimum 2.00 grade point average.
7. A letter grade of "C" or better in all but one course specified in (2) and (3) above.

## GENERAL REGULATIONS OF THE COLLEGE OF BUSINESS ADMINISTRATION

1. A student may not register for more than 19 hours of academic course work without the dean's written approval. A normal program consists of 12 to 19 scheduled hours, including physical education. See page 18 for overload charges beyond 19 credit hours.

2. All freshmen in the College of Business Administration are required to take orientation, which is scheduled in the fall quarter.

3. A student indicates his/her major choice by completing a declaration of major form available in the Office of the Dean. Faculty advisors assist the student in the planning of his/her major.

4. Each student enrolled in the College of Business Administration is expected to make consistent progress toward completion of the degree requirements of his/her major(s).

5. CBA majors need to complete ACCT 211 with a C grade or higher before attempting ACCT 212.

6. With the written permission of the instructor and the dean, course prerequisites may be waived.

7. Except where noted in the course descriptions, credit hours earned in repeated courses may be counted only once in the total hours required for graduation.

8. A student not enrolled for one academic year (except on approved academic leave) must meet graduation requirements in the catalog effective for the academic year during which the student reentered.

9. To participate in the internship program, a student must have junior or senior status and a minimum 2.5 GPA for a domestic placement and a 3.0 GPA for an international placement.

## S/U Grade Option

Sophomores, juniors, seniors, and post graduate students in the College of Business Administration are given the opportunity to register for one course per quarter on an S/U option basis, with the following stipulations:

1. The student must be registered full-time in the College of Business Administration.
2. The student must have sophomore, junior, senior, or postgraduate standing.

3. The requested course cannot be in the College of Business Administration except those specified as S/U in course descriptions.

4. The course cannot be a 100-level general education course.

5. The requested course cannot be a cognate. CBA cognates include all required mathematics and speech communication courses.

6. The grade of "S" is to be equated with A, B, C, and the grade of "U" is equated with D or F. S/U grades are not computed in the accumulative grade point average.

7. The student cannot change the grading option after the second week of classes

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## Service and Activities Courses

A combined maximum of 24 hrs. of credit in varsity sports, physical education service courses, applied music, and music performance courses may be counted for graduation. Service and activity courses cannot be used to satisfy College of Arts and Sciences elective requirements. Only three credits in the same varsity sport may be counted toward graduation. Only six credits in the same music performance activity may be counted toward graduation.

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## Classification of Students

For purposes of classification, the minimum requirements for sophomore standing are 45 quarter hrs. of completed academic work; for junior standing 90 quarter hrs.; and for senior standing 135 quarter hrs

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## Academic Standing

A grade point average of 2.00 or higher is required for graduation. If a student's accumulative grade point average falls below 2.00, he/she is placed on academic probation and is not eligible to participate in competitive activities of individuals, teams, or other groups officially designated as representing the University.

Any student on probation whose work for the following quarter continues below 2.00 accumulative grade point average will have his/her record reviewed by the Academic Qualifications and Scholarship Committee of the college and may be recommended to the dean for suspension or dismissal from the college.

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## Prelaw Program

Business students interested in the Prelaw Program will find a complete description on page 33 of this publication.

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## Small Business Institute

The Small Business Institute (SBI) provides intensive business counseling by utilizing small teams of qualified university students in business disciplines under expert faculty guidance. The students meet frequently over the course of a full university term with the small business owner to identify and solve unique business problems.

The SBI program was established by the Small Business Administration in 1972. Approximately 500 business colleges have been carefully chosen throughout the United States to administer this program.

A detailed case report is written and given to the client with suggestions as to how to implement it. SBI teams work on most business-related problems and provide recommendations tailored to the specific needs of the business.

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## Internship Program

The internship program in the College of Business Administration has been designed to help students gain these valuable experiences while still in college. By combining the concepts discussed in the classroom with practical on-the-job experiences, the internship program helps prepare the businessmen and businesswomen of tomorrow.

Academic year internships may be full- or part-time programs lasting 10 weeks. Students usually work in the Ohio Northern University area. Interns may earn as many as 16 quarter hours of credit.

Summer internships take place in a wider area of coverage around Ohio. As with academic-year internships, students may earn up to 16 credit hours.

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## Dual Degree Programs

Information concerning dual degree programs involving the College of Business Administration appears on page 33 of this catalog. Students may receive further details in the office of the dean of the college.

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## International Business Program

The international business program is coordinated by the College's International Experience Committee. Students may participate in

study abroad, work abroad, or student exchange.

Study abroad may take place at virtually any foreign college or university if the academic program is determined to meet certain standards for transfer of credit. Students are encouraged to enroll for a full academic year abroad. In some cases, study may occur during the summer or for a lesser period during the academic year.

Work abroad is available to ONU business students in cooperation with the Council on International Educational Exchange. This option may be combined with study abroad or pursued independently during the summer. A special bonus is that such employment may qualify the student to earn up to 16 credits toward graduation through the internship program.

Formal agreements for the exchange of students between Ohio Northern University and several prominent foreign institutions offer many opportunities for business students. These include Glasgow Caledonian University (Scotland), the University of Science and Technology of Lille (France), the Plekhanov Economic Academy (Russia), Arnhem Business School (Netherlands), Helsinki School of Economics and Business Administration (Finland), Instituto Tecnológico de Monterrey, Campus Queretaro (Mexico), the University of Ulster (United Kingdom) and Universidad Latina de Costa Rica (Costa Rica). Additional study-abroad experiences have taken place at the University of the Andes (Venezuela), Universidad Católica de Valparaíso (Chile), Bond University (Sydney, Australia), and Universidad Iberoamericana (Mexico).

The College also sponsors a summer EuroBusiness Tour designed to satisfy the international experience requirement of International Business and Economics majors. The program is open to all students and provides an opportunity to visit a variety of international corporations and agencies.

The tour itinerary includes visits to several major European cities. Recent tours have included visits to Madrid, Amsterdam, Munich, Vienna, Salzburg, Milan, Venice, Lyon, Geneva, Paris, and London. In each country the students visited companies, agencies and offices where they participated in tours, lectures, interviews and discussions related to their majors. Past hosts for the visits include: BMW, Combe International, Arthur Andersen, United Airlines, World Trade Organization, Lem, S. A., Union Bank of Switzerland, Centre Postal, Frank Muller, S.A., Migros, S.A., Hard Rock Café, British Petroleum, Paris Disneyland, Siemens, House of Versace, United Nations, Boots the Chemist, Ford Motor Company.

Students with a foreign language background are likely to find that they have more opportunity to take advantage of these programs. All business students therefore are strongly advised to continue their foreign language study at ONU. Those who have no prior course work in foreign language are encouraged to incorporate such courses into their undergraduate studies.

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## COLLEGE OF BUSINESS ADMINISTRATION

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### ***Subject - General Business (ABUS)***

#### **000 - ORIENTATION/CAREER DEVELOPMENT AND SEARCH**

##### *1.00 Credit*

Familiarization with the college, requirements of the majors, planning sequences of courses, university catalog and library, career investigation and guidance. Fall Quarter. Graded S/U.

#### **120 - ETHICS IN BUSINESS PRACTICE**

##### *2.00 Credit*

Systematic examination of alternative ethical decision making approaches followed by case analysis and discussion. Provides individual reflection and experience in alternative ethical approaches. Not open to students entering the College of Business prior to Fall Quarter 1998.

#### **190 - SPECIAL TOPICS IN BUSINESS**

##### *1.00 to 4.00 Credits*

Can be repeated as the topic varies.

#### **201 - PERSONAL COMPUTER APPLICATIONS FOR BUSINESS**

##### *4.00 Credits*

Business applications for microcomputers. Introductory level use of software for word processing, file management, spreadsheets, and graphics.

#### **312 - BUSINESS LAW 1**

##### *4.00 Credits*

The legal environment in which businesses must operate. Topics include business ethics, sources of law, methods of dispute resolution, and the basic law regulating contracts, agency, business organizations, the workplace, consumer transactions, purchase and sale of securities, anticompetitive activities, actions affecting the environment, and international business transactions. Prerequisite: Junior standing.

### **313 - BUSINESS LAW 2**

#### *4.00 Credits*

The law as it applies to certain private business transactions. Topics include contracts, sales, commercial paper, secured transactions suretyship, bankruptcy, insurance, property, landlord/tenant, wills, estates, and trusts. Prerequisite: ABUS 312.

### **395 - MULTIMEDIA DESIGN AND DEVELOPMENT**

#### *4.00 Credits*

Techniques of effective oral, written, and visual communications in a multimedia business environment. Topics include but are not limited to information design, interaction design, and presentation design through print, audio, and video media. Prerequisite: ABUS 201.

### **475 - SMALL BUSINESS INSTITUTE**

#### *4.00 Credits*

A team is assigned to work with a small business under supervision of a faculty member. A confidential and professional relationship is maintained between the team and the client business. May be repeated for a maximum of 8 hours. Credit earned can be used only as general elective hours. SBI credit can not be used to satisfy either major or business elective requirements. Restricted enrollment. Prerequisite: Permission of Director. Graded S/U.

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## **Subject - Accounting (ACCT)**

### **211 - PRINCIPLES OF ACCOUNTING 1**

#### *4.00 Credits*

Analysis and recording of business transactions and accumulating data on the results of economic activity, concepts and issues of financial reporting for business entities, including basic theory of the report writing model. Basic financial statement analysis.

### **212 - PRINCIPLES OF ACCOUNTING 2**

#### *4.00 Credits*

Continuation of ACCT 211. Uses of accounting data to support management decision-making and control of business operations, determination of costs and cost behavior. Specialized application areas of accounting. Prerequisite: ACCT 211.

### **292 - SPECIAL TOPICS IN ACCOUNTING**

#### *1.00 to 4.00 Credits*

Can be repeated as the topic varies.

### **301 - INTERMEDIATE ACCOUNTING 1**

#### *4.00 Credits*

Financial accounting functions and basic theory. Preparation of financial statements and actuarial methods. Current assets. Prerequisite: ACCT 212.

### **302 - INTERMEDIATE ACCOUNTING 2**

#### *4.00 Credits*

Preparation of financial statements, operational assets, long term liabilities, leases, and owners' equity. Prerequisite: ACCT 301.

### **303 - INTERMEDIATE ACCOUNTING 3**

#### *4.00 Credits*

Preparation of financial statements. Pensions and post-retirement benefits, accounting changes, deferred income taxes, financial statement analysis, changing prices, special topics and EPS. Prerequisite: ACCT 302.

### **314 - INTERMEDIATE MANAGERIAL ACCOUNTING 1**

#### *4.00 Credits*

Emphasis on accounting information for decision making. Controls for material, labor and overhead cost. Cost-Volume-Profit analysis. Job order and process costing systems. Budgeting procedures. Standard costs and variance analysis. Variable costing and responsibility accounting for management reporting. Cost behavior pattern analysis. Decision models. Prerequisite: ACCT 212.

### **315 - INTERMEDIATE MANAGERIAL ACCOUNTING 2**

#### *4.00 Credits*

Cost allocation: service department cost and joint cost. Process costing in depth and accounting for defective units and scrap. Capital budgeting techniques. Responsibility accounting for management reporting. Prerequisite: ACCT 314.

### **316 - ADVANCED MANAGERIAL ACCOUNTING**

#### *4.00 Credits*

Advanced Corporate Budgeting procedures. An in-depth analysis of product costing techniques including activity based costing, analysis of cost drivers, total quality management. Topics in strategic cost management and current issues and techniques in management accounting. Offered alternate years. Prerequisite: ACCT 315.

### **387 - TAXATION OF INDIVIDUALS**

#### *4.00 Credits*

Federal income tax planning and reporting for individuals. Topics include gross income, personal and business deductions, and tax credits. Prerequisite: ACCT 212.

### **388 - TAXATION OF PROPERTY TRANSACTIONS AND CORPORATIONS**

#### *4.00 Credits*

Federal income tax planning and reporting for complex individual income tax issues, property transactions, and C corporations. Topics include alternative minimum tax, accounting periods, nontaxable exchanges, capital gains and losses, recapture, and corporate organizations, distributions and accumulations. Prerequisite: ACCT 387.

### **389 - TAXATION OF S CORPORATIONS, PARTNERSHIPS, TRUSTS, ESTATES AND GIFTS**

*4.00 Credits*

Federal income tax planning and reporting for S corporations, partnerships, estates, trusts, and tax exempt entities. Federal gift and estate tax planning and reporting. Prerequisite: ACCT 388.

### **392 - ADVANCED FINANCIAL ACCOUNTING**

*4.00 Credits*

Various forms of business combinations and intercompany transactions, transactions denominated in foreign currencies, and government accounting. Offered alternate years. Prerequisite: ACCT 303.

### **402 - ACCOUNTING INFORMATION SYSTEMS**

*4.00 Credits*

The use, evaluation, and design of accounting information systems with emphasis upon the interface of accounting systems and computer technology. Prerequisite: ACCT 302.

### **403 - AUDITING 1**

*4.00 Credits*

Auditing procedures and practices relating to the independent verification of financial records, including assessment of the internal control system, audit evidence, issues of materiality and risk, and audit reports. Prerequisite: ACCT 402.

### **404 - AUDITING 2**

*4.00 Credits*

Statistical sampling in auditing, auditor's professional ethics and legal liability, computer technology in auditing, and current issues and problems in auditing. Prerequisite: ACCT 403.

### **427 - INTERNSHIP IN ACCOUNTING**

*4.00 to 16.00 Credits*

Field experience in accounting. Graded S/U. Can be repeated for a maximum of 16 credit hours. Can be used only as general elective hours. Can not be used to satisfy either accounting or business elective requirements. Consult advisor.

### **435 - INTERNATIONAL FINANCIAL ACCOUNTING**

*4.00 Credits*

Financial accounting from a multinational viewpoint. Includes: financial accounting for international operations, comparative international accounting principles, and international financial reporting. Prerequisite: ACCT 302. (Also listed as IBEC 435.)

### **492 - SPECIAL TOPICS IN ACCOUNTING**

*1.00 to 4.00 Credits*

Can be repeated as the topic varies.

### **499 - INDEPENDENT STUDY IN ACCOUNTING**

*1.00 to 4.00 Credits*

An in-depth exploration of a subject of special interest to both the student and the faculty member. Can be repeated as topic varies. Prerequisite: Junior standing and approval of the instructor. Restricted enrollment. Permission to enroll must be obtained in writing from the faculty-mentor and the Dean of the College prior to registration.

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## **Subject - Finance (FINC)**

### **362 - MANAGERIAL FINANCE**

*4.00 Credits*

The role of financial management in the firm, and the basic tools and concepts of the firm's investment, financing and dividend decisions including working capital management, capital budgeting and capital structure strategies. Prerequisites: MATH 144 and ACCT 212.

### **369 - INTERMEDIATE FINANCIAL MANAGEMENT**

*4.00 Credits*

Advanced concepts and methods employed in financial management. Topics include financial analysis and planning, working capital management, risk analysis and valuation of long-term investments, and capital structure analysis. Case method and personal computer based spreadsheets will be used. Offered alternate years. Prerequisite: FINC 362.

### **421 - INTERNSHIP IN FINANCE**

*4.00 to 16.00 Credits*

Field experience in finance. Graded S/U. Internship experiences can be repeated for a maximum of sixteen credit hours. Can be used only as general elective hours and can not be used to satisfy either finance or business elective requirements. Consult advisor.

### **461 - INVESTMENTS**

*4.00 Credits*

The risk-return trade off and distinctive characteristics of different vehicles of financial investment including equities; debt and derivatives; portfolio management; the functioning and regulation of securities markets; the operation of mutual funds and other investment companies. The Efficient Markets Hypothesis receives special attention. Foundations for corporate as well as personal investment decisions. Computer simulations and applications. Prerequisite: FINC 362.

### **467 - INTERNATIONAL FINANCE**

*4.00 Credits*

The unique financial challenges and opportunities faced by a multinational enterprise. Hedging as a pivotal tool of exchange rate risk management; the long-term and short-term financing opportunities available to a multinational enterprise; international cash management; and multinational capital budgeting. Prerequisites: FINC 362 and IBEC 300. (Also listed as IBEC 467.)

### **494 - SPECIAL TOPICS IN FINANCE**

*1.00 to 4.00 Credits*

Can be repeated as the topic varies.

### **500 - INDEPENDENT STUDY IN FINANCE**

*1.00 to 4.00 Credits*

An in-depth exploration of a subject of special interest to both the student and the faculty member.

Can be repeated as topic varies. Permission to enroll must be obtained in writing from the faculty-mentor and the Dean of the College prior to registration. Restricted enrollment. Prerequisites: Junior standing and approval of faculty member.

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## **Subject - International Business and Economics (IBEC)**

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### **100 - ECONOMICS**

*4.00 Credits*

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. A terminal course for non-business majors. May not be taken following a successful enrollment in IBEC 202 or IBEC 203. (Formerly ECON 100.) (Discipline: Economics)

### **202 - PRINCIPLES OF MICROECONOMICS**

*4.00 Credits*

Economics of the individual firm in the free market economy; competitive and monopolistic markets. How prices ration goods and services to users, and the principles on which the total product is divided among the owners of the factors of production. Actual cases from business. No prerequisite. (Formerly ECON 202.) (Discipline: Economics)

### **203 - PRINCIPLES OF MACROECONOMICS**

*4.00 Credits*

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: IBEC 202. (Formerly ECON 203) (Discipline: Economics)

### **290 - SPECIAL TOPICS IN INTERNATIONAL BUSINESS AND ECONOMICS**

*1.00 to 4.00 Credits*

Can be repeated as the topic varies.

### **300 - THE ENVIRONMENT OF INTERNATIONAL BUSINESS**

*4.00 Credits*

The unique functional and environmental features of international business. Analysis of economic, cultural, legal and political forces affecting international business operations. Examination of organizational responses to the challenges of international business organizations. Prerequisite: IBEC 203. (Formerly ABUS 300)

### **341 - LABOR ECONOMICS**

*4.00 Credits*

Labor as a factor in production; labor mobility; theories of the determination of wages, and bargaining theory; history and methods of labor unions, and government are presented. Offered alternate years. Prerequisite: IBEC 203. (Formerly ECON 341) (Discipline: Economics)

### **352 - MONEY AND BANKING**

*4.00 Credits*

Theories of money and credit; commercial banking practices; reserve banking; monetary and banking laws; money market; money and credit in the world economy. Prerequisite: IBEC 203. (Formerly ECON 352) (Discipline: Economics)

### **383 - INTERMEDIATE MACROECONOMIC THEORY**

*4.00 Credits*

Special problems of pricing, production, and distribution under perfect competition, monopoly, oligopoly, and duopoly in the American economy. Offered alternate years. Prerequisite: IBEC 203. (Formerly ECON 383) (Discipline: Economics)

### **384 - INTERMEDIATE MACROECONOMIC THEORY**

*4.00 Credits*

The principles, measurement, analysis, and control of aggregate economic activity; the role of consumption, investment, and saving in achieving full employment output, economic growth and price stability. Offered alternate years. Prerequisite: IBEC 203. (Formerly ECON 384) (Discipline: Economics)

### **385 - INTERNATIONAL ECONOMICS**

*4.00 Credits*

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: IBEC 203. (Formerly ECON 385) (Discipline: Economics)

### **411 - COMPARATIVE ECONOMIC SYSTEMS**

*4.00 Credits*

Comparative study of capitalism, socialism, communism and mixed economies. Emphasis on the economics of pricing, production, and distribution under different systems. Comparative analysis of selected countries. Offered alternate years. Prerequisite: IBEC 203. (Formerly ECON 411) (Discipline: Economics)

### **423 - ECONOMICS OF THE PUBLIC SECTOR**

*4.00 Credits*

Fiscal institutions and decisions of the Public Sector; the federal budget; public good analysis, public debt issues; evaluation of tax sources for the federal, state, and local government levels; and intergovernmental fiscal relationships. Offered alternate years. Prerequisite: IBEC 203. (Formerly ECON 423) (Discipline: Economics)

## **426 - INTERNSHIP IN INTERNATIONAL BUSINESS AND ECONOMICS**

*4.00 to 16.00 Credits*

Field experience in international business and/or economics. Graded S/U. Internship experiences can be repeated for a maximum of sixteen credit hours. Can be used as general elective hours. Cannot be used to satisfy either international business and economics or business elective requirements. Consult advisor.

## **435 - INTERNATIONAL FINANCIAL ACCOUNTING**

*4.00 Credits*

Financial accounting from a multinational viewpoint. Includes: financial accounting for international operations, comparative international accounting principles, and financial reporting. Prerequisite: ACCT 302. (Also listed as ACCT 435.)

## **442 - ECONOMIC HISTORY OF THE UNITED STATES**

*4.00 Credits*

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. Offered alternate years. Prerequisite: IBEC 203. (Formerly ECON 442) (Discipline: Economics)

## **443 - HISTORY OF ECONOMIC THOUGHT**

*4.00 Credits*

The development of economic thought from Greek and Hebrew writers to modern economists; Adam Smith, Malthus, Ricardo, Marx, Marshall, Keynes, and modern economists. Offered alternate years. Prerequisite: IBEC 203. (Formerly ECON 443) (Discipline: Economics)

## **453 - INTERNATIONAL MARKETING**

*4.00 Credits*

World markets, their respective consumers and environments, and the marketing management required to meet the demand of world markets in a dynamic and everchanging setting. Contrasting marketing in the United States with marketing in foreign countries. Case studies illustrate marketing problems faced by international marketers. Prerequisites: IBEC 300 and MRKT 351. (Also listed as MRKT 453.)

## **467 - INTERNATIONAL FINANCE**

*4.00 Credits*

The unique financial challenges and opportunities faced by a multinational enterprise. Hedging as a pivotal tool of exchange rate risk management; the long-term and short-term financing opportunities available to a multinational enterprise; international cash management; and multinational capital budgeting. Prerequisites: FINC 362 and IBEC 300. (Also listed as FINC 467.)

## **486 - INTERNATIONAL MANAGEMENT**

*4.00 Credits*

The application of management concepts and techniques in a multinational environment. The meaning of culture as it applies to international management. Issues in international human resource management. A focus on relevant business simulations and cases. Prerequisites: FINC 362, IBEC 300, MGMT 333 and MRKT 351. (Also listed as MGMT 486.)

## **490 - SPECIAL TOPICS IN INTERNATIONAL BUSINESS AND ECONOMICS**

*1.00 to 4.00 Credits*

Can be repeated as the topic varies.

## **497 - INDEPENDENT STUDY IN INTERNATIONAL BUSINESS AND ECONOMICS**

*1.00 to 4.00 Credits*

An in-depth exploration of a subject of special interest to both the student and faculty member. Can be repeated as topic varies. Permission must be obtained in writing from the faculty mentor and the Dean of the College prior to registration. Restricted enrollment. Prerequisites: Junior standing and approval of the instructor.

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## **Subject - Management (MGMT) —**

### **240 - MANAGEMENT INFORMATION SYSTEMS**

*4.00 Credits*

The development, design and implementation of management information systems with introduction to the terminology, concepts and trends in computer hardware and software. Prerequisite: ABUS 201.

### **291 - SPECIAL TOPICS IN MANAGEMENT**

*1.00 to 4.00 Credits*

Can be repeated as the topic varies.

### **325 - EMPLOYMENT LAW**

*4.00 Credits*

The legal relationship between employers and employees. Topics include the basic laws regulating labor relations, employment discrimination, workers' compensation and disability payments, occupational safety and health, employment, and unemployment compensation, termination of employment, and retirement. Prerequisite: ABUS 312.

### **333 - MANAGEMENT AND ORGANIZATIONAL BEHAVIOR**

*4.00 Credits*

Modern management concepts with emphasis on the human factors in organizations. Historical foundations of managerial problems, investigation of individual, group and organizational processes including current management issues. (Formerly offered as MGMT 330 and MGMT 335) Prerequisite: Junior standing.

### **334 - CASES AND EXERCISES IN ORGANIZATIONAL BEHAVIOR**

*4.00 Credits*

Experiential and case-based approach to managing organizational behavior. Prerequisite: MGMT 333.

### **363 - HUMAN RESOURCE MANAGEMENT**

*4.00 Credits*

Analysis of the role of human resources in contemporary organizations. Functions performed by the human resource practitioner in the areas of recruitment, training and development, compensation, employee relations, health and safety, and employee separation. The impact of government regulations. Prerequisite: MGMT 333.

### **364 - PRODUCTION AND OPERATIONS MANAGEMENT**

*4.00 Credits*

Major issues and analytical problem solving techniques existing in the field of production and operations management. The design of production systems, operation, coordination and control of production activity in the context of minimum cost attainment. Prerequisites: MATH 146, MGMT 333 and junior standing.

### **400 - CURRENT LABOR RELATIONS**

*4.00 Credits* Managerial and organizational aspects arising out of employer/union relations. The evolution of labor relations, current labor law, negotiation and administration of labor agreements, and labor relations in the public sector as well as in foreign countries. Open to seniors only. Offered alternate years. Prerequisite: MGMT 363.

### **410 - BUSINESS AND SOCIETY**

*4.00 Credits*

The complex and dynamic interrelationships between business and society: the social, cultural, legal, ethical, economic and technological issues, philosophies and points of view which influence business. Issues of corporate responsibility, individual rights and multi-national business. Prerequisite: MGMT 363.

### **425 - INTERNSHIP IN MANAGEMENT**

*4.00 to 16.00 Credits*

Field experience in management. Graded S/U. Internship experiences can be repeated for a maximum of sixteen credit hours. Can be used only as general elective hours and can not be used to satisfy either management or business elective requirements. Consult advisor.

### **474 - SMALL BUSINESS MANAGEMENT**

*4.00 Credits*

The importance of small business, its current status, problems encountered and requirements for successful operations. Emphasis on problem solving techniques for small businesses. Prerequisites: ABUS 312, MGMT 333, MRKT 351, FINC 362 and MATH 146.

### **485 - BUSINESS POLICY AND STRATEGY**

*4.00 Credits*

Integrative capstone course designed to provide students with an awareness of the roles and responsibilities of managers as they formulate and implement direction for their organizations in an ever changing environment. Case study is emphasized. Prerequisites: Senior standing and ABUS 312, MGMT 333, MRKT 351 and FINC 362.

### **486 - INTERNATIONAL MANAGEMENT**

*4.00 Credits*

The application of management concepts and techniques in a multinational environment. The meaning of culture as it applies to international management. Issues in international human resource management. A focus on relevant simulations and cases. Prerequisites: FINC 362, IBEC 300, MGMT 333, and MRKT 351. (Also listed as IBEC 486.)

### **491 - SPECIAL TOPICS IN MANAGEMENT**

*1.00 to 4.00 Credits* Can be repeated as the topic varies.

### **498 - INDEPENDENT STUDY IN MANAGEMENT**

*1.00 to 4.00 Credits*

An in-depth exploration of a subject of special interest to both the student and the faculty member. Can be repeated as topic varies. Restricted enrollment. Permission to enroll must be obtained in writing from the faculty-mentor and the Dean of the College prior to registration. Prerequisite: Junior standing and approval of the instructor.

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## **Subject - Marketing (MRKT)**

### **351 - PRINCIPLES OF MARKETING**

*4.00 Credits*

Product design and planning, promotional activities, pricing strategy, aspects of physical distribution, retailing, market research and buyer behavior. Strategic marketing, planning and control, ethics and international marketing. Prerequisite: Junior standing.

### **370 - RETAILING**

#### *4.00 Credits*

Retail store formats, trading area analysis, store location and design, inventory evaluation and management, pricing strategies, sales promotion, merchandise planning, procurement and selling functions. Prerequisite: MRKT 351.

### **371 - PERSONAL SELLING**

#### *4.00 Credits*

Aspects of the behavioral approach to selling in the context of the marketing concept. Selling techniques which build long term customer relationships. Prospecting, ethics, qualifying, presenting, product demonstrations, handling objections, closing and follow up techniques, and international selling. Prerequisite: MRKT 351.

### **372 - ADVERTISING**

#### *4.00 Credits*

Advertising as an integral part of the marketing process. An overview of agency operation, media strategy, print and electronic media, and copy creation and concepts. Cases are used to illustrate how organizations develop advertising strategies. An advertising plan must be developed for an organization using the principles of the course. Offered alternate years. Prerequisite: MRKT 351.

### **373 - LOGISTICS**

#### *4.00 Credits*

Move-storage activities that are necessary to deliver products to the right place, at the desired time, in the appropriate condition and at the lowest cost. Warehousing, transportation, order processing, inventory and material handling are key topics. Emphasis is given to the development of decision skills which will provide the best minimum total cost service to the customer. Offered alternate years. Prerequisites: MGMT 333 and MRKT 351.

### **376 - BUSINESS TO BUSINESS MARKETING**

#### *4.00 Credits*

Basic business marketing systems as distinguished from consumer marketing. Characteristics of manufacturer's goods, channels of distribution, pricing, vendor and value analysis, commercial buying, advertising, and meeting product specifications. Prerequisite: MRKT 351.

### **420 - INTERNSHIP IN MARKETING**

#### *4.00 TO 16.00 Credits*

Field experience in marketing. Graded S/U. Internship experiences can be repeated for a maximum of sixteen credit hours. Can be used only as general elective hours and can not be used to satisfy either marketing or business elective requirements. Consult advisor.

### **434 - MARKETING RESEARCH**

#### *4.00 Credits*

Research design, data collection methods, sampling techniques, tabulation, analysis and presentation of information concerning problems in marketing. Provides a working knowledge of the concepts and methods of marketing research. Offered alternate years. Prerequisite: MRKT 351.

### **452 - CONSUMER BEHAVIOR**

#### *4.00 Credits*

Determinants of behavior which influence the purchase of goods and services. Consumer characteristics, situation analysis and product attributes are key topics covered in this area of behavior. Sociological, cultural, psychological, economic and communication theories used to create unique marketing mixes for specialized target markets. Offered alternate years. Prerequisite: MRKT 351.

### **453 - INTERNATIONAL MARKETING**

#### *4.00 Credits*

World markets, their respective consumers and environments, and the marketing management required to meet the demand of world markets in a dynamic and everchanging setting. Contrasting marketing in the United States with marketing in foreign countries. Case studies illustrate marketing problems faced by international marketers. Prerequisites: IBEC 300 and MRKT 351. (Also listed as IBEC 453.)

### **455 - ADVANCED MARKETING**

#### *4.00 Credits*

Integrative capstone in marketing which brings together all of the functional areas of marketing and requires development of marketing strategies and their application to problem situations. A group case approach is used. Open to seniors only. Offered alternate years. Prerequisites: MRKT 351, 370 and 434; MGMT 333; and FINC 362.

### **493 - SPECIAL TOPICS IN MARKETING**

#### *1.00 to 4.00 Credits*

Can be repeated as the topic varies.

### **496 - INDEPENDENT STUDY IN MARKETING**

#### *1.00 to 4.00 Credits*

An exploration in depth of a subject of special interest to both the student and the faculty member. Can be repeated as the topic varies. Prerequisites: Junior standing and approval of the instructor. Restricted enrollment. Permission to enroll must be obtained in writing from the faculty-mentor and the Dean of the college prior to registration.



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# THE THOMAS JEFFERSON SMULL COLLEGE OF Engineering

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**Russell A. Primrose, *Dean***

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## Accreditation and Association

The Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET), the only official accrediting agency for engineering curricula, has accredited programs in civil, electrical, and mechanical engineering. The computer engineering program will be eligible for its first ABET accreditation review in 2000. The College is a member of the American Society for Engineering Education and is recognized by the Ohio Board of Registration for Professional Engineers and Surveyors.

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## History and Tradition

In 1871 the first catalog of the University included a course in surveying. A department of Civil Engineering was organized in 1880 with its first graduate in 1882, Electrical Engineering in 1898, and Mechanical Engineering in 1904. The Electrical and Computer Engineering department was organized in 1998. Over 4,000 engineers have graduated from the Thomas Jefferson Smull College of Engineering. All programs continue to meet the highest standards of engineering excellence.

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

The following faculty chairs have been established to enhance the educational tradition of the college.

### **Herbert F. Alter Chair of Engineering Science**

established in 1983 by Mrs. Alter in memory of her late husband, class of 1911 in mechanical engineering. The 1998-99 recipient is Dr. Bruce Johansen, professor of electrical and computer engineering.

**Engineering Alumni Chair** established in 1983 by donations from engineering alumni and friends in celebration of the college's centennial year. The 1998-99 recipient of the chair is Dr. Donald Milks, professor of civil engineering.

**Leroy H. Lytle Distinguished Chair of Mechanical Engineering** established in 1983 from the estate of Leroy H. Lytle, 1923 graduate of ONU. The 1998-99 recipient of the chair is Dr. Bruce Burton, professor of mechanical engineering.

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## Departments

There are three departments in the College of Engineering: **civil engineering, electrical and computer engineering, and mechanical engineering.**

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## Mission Statement

The mission of the college of engineering of Ohio Northern University is to provide the highest quality undergraduate engineering education to our students. By instilling broad problem-solving and design skills while encouraging service to society, ethical behavior, and life-long learning, we will graduate students that are highly regarded throughout their professional careers.

It is our vision to be recognized as a premier undergraduate engineering college.

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## Admission Standards

Early application is advisable. Students interested in engineering are encouraged to obtain advice on program of study from the dean of the college and to request appropriate information and application materials from the Office of Admissions, Ohio Northern University, Ada, OH 45810.

In addition to the general requirements for admission to the University stated in this catalog, high school graduates and non-graduates must have 16 acceptable units of work. Ten of these units are as follows: 4 units in English; 4 units in mathematics (2 units in algebra, 1 unit in geometry, and at least 0.5 units in trigonometry or its equivalent); and 2 units in science (1 unit in physics and preferably 1 unit in chemistry). The college recommends but does not require that applicants have two units of a foreign language.

Students entering the college of engineering must demonstrate a proficiency in mathematics. For students who test low in the math proficiency test or who want to increase their math skills, a math refresher course is offered.

Students who meet the admission standards of the University but are deficient in the mathematics or physics requirements of the college will be required to make up their deficiency.

The college recommends that prospective students make up their high school deficiencies before entering as freshmen. An additional summer quarter or even a fifth year may be necessary for those students who do not meet this requirement before they enter as freshmen.

Transfer students from other accredited universities or colleges may be admitted with advance standing if they have an honorable dismissal and are eligible to return to the universities or colleges they previously attended. Transfer students who conceal their previous college attendance will have their admission to the college revoked. The college will not accept from transfer students more than 150 quarter hours or their equivalent. Transfer work must be "C" or better; "C-" is not acceptable.

### Mathematics Refresher

The mathematics refresher is designed to provide mathematical preparation for the engineering program. It is offered during the summer, shortly before regular fall quarter classes begin. This program is recommended for all entering engineering students who would like to increase their math proficiency but is especially important for those likely to have problems with Calculus 1.

It is assumed that entering freshmen are prepared to begin mathematics studies at the level of Calculus 1. A student's competency to begin at this level is ascertained by a combination of ACT/SAT scores, results of a placement test during summer orientation, and other factors. Students scoring at a level below the threshold for Calculus 1 have available two options as follows:

1. Enroll in the Math Refresher Program. After program completion, students are reevaluated in mathematics competency. Those able to now demonstrate sufficient competency may enroll in Calculus 1, and may proceed on a regular schedule. Of course, taking the mathematics refresher does not guarantee success, but the student's potential to do well in the mathematics courses is generally enhanced.
2. Enroll in Pre-Calculus or College Algebra depending on the proficiency evaluation. In these cases, the student's program will probably be extended beyond the normal twelve quarters to graduation.

### Degree Requirements

**Bachelor of Science degree in civil, electrical and computer, or mechanical engineering.**

#### General Education Requirements

The following lists the prescribed general education courses required of all students.

##### English

Writing 110 and 111

### Humanities and Social Sciences

One course selected from RELG 105, 107, 109, 110, 210, 231, 241, 243, 263, 264, 310, 311, 312, 320, 363, 365.

Two humanities courses, one of which must be 200-level or above, selected from ART 100, 310, 320, 330; COMM 105, 291; ENGL 204, 207, 208, 209, 219, 220, 260, 261, 262, 263; FREN 214, 215, 216, 310, 311, 312; GRMN 224, 225, 226, 261, 311, 312, 313, SPAN 244, 245, 246, 250, 341, 342, 353, 356; HIST 110, 111, 214, 215, 305, 355, 365, 382, 383, 384, 451; HSPS 204, 223, 415, 416; MUSC 100, 200, 210, 310; PHIL 100, 102, 237, 238, 310, 320, 325, 331, 340, 341, 343, 345.

Three social science courses, one of which must be 200-level or above, selected from PSYC 100, 212, 215, 226, 311, 312; SOC 105, 240, 243, 247, 250, 261, 348, 361; HSPS 222, 223, 224, 225, 311, 458, 459; GEOG 226; PLSC 105, 206, 207, 241, 245, 347, 366, 388, 430; or IBEC 202, 203, 341, 383, 384, 385.

One additional course selected from any of the above course areas under humanities and social sciences.

### Bachelor of Science in Civil Engineering Curriculum

#### First Year

Calculus 1, 2, 3, (MATH 163-164-165)	13 hours
Physics: Mech. & Lab (PHYS 231-34)	5 hours
Physics: E/M & Lab (PHYS 233-36)	5 hours
Freshman Enrichment (GE 100.01)	1 hour
Fundamentals of Engineering (GE 101)	3 hours
Engineering Problem Solving and CAD (GE 102)	3 hours
Statics (GE 113)	4 hours
Writing 1, 2 (ENGL 110-11)	8 hours
General Education	8 hours
<b>TOTAL</b>	<b>50 hours</b>

#### Second Year

Calculus 4 (MATH 263)	4 hours
Linear Algebra (MATH 272)	4 hours
Differential Equations (MATH 361)	5 hours
Physics: H/L/S & Lab (PHYS 232-35)	5 hours
Chemistry (CHEM 162-3)	8 hours
Lab for CHEM 163 (CHEM 165)	0 hours
Dynamics (GE 214)	4 hours
Circuits 1 (GE 201)	5 hours
Strength of Materials (GE 223)	4 hours
Engineering Material Science (GE 243)	4 hours
Surveying (CE 203)	4 hours
General Education	4 hours
<b>TOTAL</b>	<b>51 hours</b>

#### Third Year

Numerical Methods (CE 313)	4 hours
Environmental Science (CE 321)	4 hours
Geotechnical Engineering (CE 333)	4 hours
Structures 1,2 (CE 341-2)	9 hours

Reinforced Concrete Design (CE 343)	5 hours
Transportation 1,2 (CE 351-2)	8 hours
Fluid Mechanics (CE 362)	4 hours
Hydraulics (CE 363)	4 hours
Statistics for Scientists and Engineers (MATH 380)	4 hours
General Education	4 hours
<b>TOTAL</b>	<b>50 hours</b>

#### *Fourth Year*

Project Management (CE 414)	4 hours
CE Design (CE 410)	1 hour
CE Project (CE 415)	3 hours
Soil Mechanics (CE 434)	4 hours
Foundations (CE 438)	4 hours
Steel Design (CE 444)	5 hours
Transportation 3 (CE 456)	4 hours
Hydrology (CE 464)	4 hours
Environmental Engineering 1 (CE 425)	5 hours
CE Elective	4 hours
Ethics In Professional Life (PHIL 336)	4 hours
General Education	8 hours
<b>TOTAL</b>	<b>50 hours</b>

### **Bachelor of Science in Electrical and Computer Engineering Curriculum**

The Electrical and Computer Engineering Department offers the degree Bachelor of Science in Electrical and Computer Engineering. Within that single degree, a student can take either an Electrical Engineering Major or a Computer Engineering Major. A list of suitable electives for both majors is available from the department office.

#### **Electrical Engineering Major**

##### *First Year*

Calculus 1, 2, 3 (MATH 163-64-65)	13 hours
Physics: Mech. & Lab (PHYS 231-34)	5 hours
Physics: E/M & Lab (PHYS 233-36)	5 hours
Freshman Enrichment (GE 100.02)	1 hour
Fund. of Engineering (GE 101)	3 hours
Engin. Prob. Solving & CAD (GE 102)	3 hours
Statics (GE 113)	4 hours
Writing 1, 2 (ENGL 110-11)	8 hours
Prin. of Microeconomics (IBEC 202)	4 hours
Religion Elective	4 hours
<b>TOTAL</b>	<b>50 hours</b>

##### *Second Year*

Linear Algebra (MATH 272)	4 hours
Discrete Math (MATH 336)	4 hours
Differential Equations (MATH 361)	5 hours
Physics: H/L/S and Lab (PHYS 232-35)	5 hours
Circuits 1, 2 (GE 201-02)	9 hours
Signals and Systems 1 (ECE 203)	4 hours
Ethics in Professional Life (PHIL 336)	4 hours
Programming 1 (ECE 164)	4 hours

Calculus 4 (MATH 263)	4 hours
Dynamics (GE 214)	4 hours
Social Science Elective	4 hours
<b>TOTAL</b>	<b>51 hours</b>

##### *Third Year*

Chemistry 1 (CHEM 162)	4 hours
Chemistry 2 and Lab (CHEM 163-65)	4 hours
Signals and Systems 2 (ECE 301)	4 hours
Filter Design (ECE 323)	4 hours
Digital Electronics (ECE 361)	5 hours
Microprocessors (ECE 362)	4 hours
Analog Electronics 1, 2 (ECE 321-22)	8 hours
Electromagnetics (ECE 331)	5 hours
Energy Conversion (ECE 332)	4 hours
Power Systems (ECE 333)	4 hours
Humanities Elective	4 hours
<b>TOTAL</b>	<b>50 hours</b>

##### *Fourth Year*

Statistics for Engineers (MATH 380)	4 hours
Senior Design Seminar (ECE 404)	1 hour
Senior Design (ECE 405)	4 hours
Engineering Tech. Comm. (ECE 406)	3 hours
Digital Signal Processing (ECE 411)	4 hours
Engineering Methods (ECE 472)	4 hours
Control Systems 1, 2 (ECE 444-45)	8 hours
Commun. Systems 1, 2 (ECE 458-59)	8 hours
Technical Elective	4 hours
ECE Elective	3 hours
Humanities/Social Sciences	8 hours
<b>TOTAL</b>	<b>51 hours</b>

#### **Computer Engineering Major**

##### *First Year*

Calculus 1, 2, 3 (MATH 163-64-65)	13 hours
Physics: Mech. & Lab (PHYS 231-34)	5 hours
Physics: E/M & Lab (PHYS 233-36)	5 hours
Freshman Enrichment (GE 100.02)	1 hour
Fund. of Engineering (GE 101)	3 hours
Engin. Prob. Solving & CAD (GE 102)	3 hours
Statics (GE 113)	4 hours
Writing 1, 2 (ENGL 110-11)	8 hours
Prin. of Microeconomics (IBEC 202)	4 hours
Religion Elective	4 hours
<b>TOTAL</b>	<b>50 hours</b>

##### *Second Year*

Linear Algebra (MATH 272)	4 hours
Discrete Math (MATH 336)	4 hours
Differential Equations (MATH 361)	5 hours
Physics: H/L/S and Lab (PHYS 232-35)	5 hours
Circuits 1, 2 (GE 201-02)	9 hours
Signals and Systems 1 (ECE 203)	4 hours
Ethics in Professional Life (PHIL 336)	4 hours
Programming 1, 2, 3 (ECE 164-65-6)	12 hours
Assm Lang & Comp Org (ECE 264)	4 hours
<b>TOTAL</b>	<b>51 hours</b>

<i>Third Year</i>	
Chemistry 1 (CHEM 162)	4 hours
Chemistry 2 and Lab (CHEM 163-65)	4 hours
Signals and Systems 2 (ECE 301)	4 hours
Filter Design (ECE 323)	4 hours
Digital Electronics (ECE 361)	5 hours
Microprocessors (ECE 362)	4 hours
Adv. Digital Electronics (ECE 363)	4 hours
Data Structures (ECE 268)	4 hours
Computer Architecture (ECE 365)	4 hours
Operating Systems (ECE 466)	4 hours
Dynamics (GE 214)	4 hours
Social Science Elective	4 hours
<b>TOTAL</b>	<b>49 hours</b>

<i>Fourth Year</i>	
Statistics for Engineers (MATH 380)	4 hours
Senior Design Seminar (ECE 404)	1 hour
Senior Design (ECE 405)	4 hours
Engineering Tech. Comm. (ECE 406)	3 hours
Digital Signal Processing (ECE 411)	4 hours
Engineering Methods (ECE 472)	4 hours
Compilers (ECE 468)	4 hours
Networks and Data Comm. (ECE 366)	4 hours
Software Engineering (ECE 464)	4 hours
Computer Device Lab (ECE 467)	4 hours
Software Elective	4 hours
Humanities/Social Sciences	12 hours
<b>TOTAL</b>	<b>52 hours</b>

**Bachelor of Science in Mechanical Engineering Curriculum**

<i>First Year</i>	
Calculus 1, 2, 3 (MATH 163-164-165)	13 hours
Physics: Mech. & Lab (PHYS 231-34)	5 hours
Physics: E/M & Lab (PHYS 233-36)	5 hours
Freshman Enrichment (GE 100.03)	1 hour
Fundamentals of Engineering (GE 101)	3 hours
Engineering Problem Solving and CAD (GE 102)	3 hours
Statics (GE 113)	4 hours
Writing 1, 2 (ENGL 110-11)	8 hours
Principles of Microeconomics (IBEC 202)	4 hours
General Education	4 hours
<b>TOTAL</b>	<b>50 hours</b>

<i>Second Year</i>	
Calculus 4 (MATH 263)	4 hours
Linear Algebra (MATH 272)	4 hours
Differential Equations (MATH 361)	5 hours
Physics: H/L/S & Lab (PHYS 232-35)	5 hours
Chemistry (CHEM 162-63)	8 hours
Lab for CHEM 163 (CHEM 165)	0 hours
Dynamics (GE 214)	4 hours
Circuits 1 (GE 201)	5 hours
Circuits 2 (GE 202)	4 hours
Strength of Materials (GE 223)	4 hours

Engineering Material Science (GE 243)	4 hours
Computer Applications and Design (ME 202)	4 hours
<b>TOTAL</b>	<b>51 hours</b>

<i>Third Year</i>	
Process of Mech. Design (ME 311)	4 hours
Adv. Strength of Materials (ME 319)	4 hours
Manufacturing Processes (ME 341)	4 hours
Mechanisms (ME 352)	5 hours
Thermodynamics (ME 362)	4 hours
Thermodynamics of Fluids (ME 363)	5 hours
Numerical Methods (ME 371)	4 hours
Engineering Analysis (ME 382)	4 hours
Finite Element Analysis (ME 383)	4 hours
Public Speaking (COMM 211)	4 hours
General Education	4 hours
Statistics for Scientists and Engineers (MATH 380)	4 hours
<b>TOTAL</b>	<b>50 hours</b>

<i>Fourth Year</i>	
Capstone 1, 2, 3, (ME 411-2-3)	4 hours
Mechanical Design of Components (ME 417)	4 hours
Fluid Mechanics (ME 464)	5 hours
Heat Transfer 1, 2 (ME 467-8)	9 hours
Technical Elective	4 hours
Control Systems (ME 419)	5 hours
Vibration Analysis (ME 418)	4 hours
Ethics in Prof. Life (PHIL 336)	4 hours
General Education	12 hours
<b>TOTAL</b>	<b>51 hours</b>

- \* A student must receive a passing grade in courses that are listed for graduation.
- \*\* Students need to take the courses listed for their class level for the 1999-00 academic year. They are subject to change in subsequent years.

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## Graduation Requirements

A student qualifies for graduation by meeting specific course requirements as listed in the catalog year by year for the specific program at specific levels and by earning a minimum number of academic hours as defined by their particular program (approximately 200 academic hours). In addition, a student must attain at least a 2.00 accumulative grade point average in all courses and at least a 2.00 accumulative grade point average in all engineering courses.

All degree candidates are required to spend their senior year in academic residence.

At commencement engineering students receive the bachelor of science degree in either civil, electrical and computer, or mechanical engineering.

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## General Regulations

Each department in the college lists quarter by quarter the standard course load for a student. The normal maximum load is that which is listed by the department for that quarter at that level or 19 hours, whichever is largest. The dean, upon recommendation of the student's advisor, may permit a student to enroll for extra hours at an additional charge. See page 18 for overload charges beyond 19 credit hours. The normal requirement is an accumulative average of at least 3.00/4.00. Except where noted, credit hours earned in repeated courses can be counted only one time among the total hours required for graduation.

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## S/U Grade Option

Students in the College of Engineering are not permitted to register for courses on an S/U (satisfactory/unsatisfactory) option basis if the course is offered on a graded basis.

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## Classification of Students

For purposes of classification, the minimum requirements for sophomore standing are 49 quarter hours of completed academic work; for junior standing, 98 quarter hours; and for senior standing, 147 quarter hours.

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## Academic Standing

A student is in good academic standing when the accumulative grade point average is equal to or greater than 2.00. When the accumulative grade point average falls below 2.00, a student is placed on probation. Normally, one quarter is given to raise the accumulative average to 2.00 or above. The status of probation may occur for two successive quarters if conditions and evidence indicate that the student is improving academically. Students on probation cannot participate in competitive activities of individuals, teams, or other groups officially designated as representing the University.

Any student on probation whose quarter grade point average for the following quarter is below a 2.00 will have his/her record reviewed by the Committee on Academic Qualifications of the college and may be recommended to the dean for academic actions which may include suspension or dismissal. Unless otherwise indicated, suspension is for a period of three regular academic quarters. Students who have been suspended must petition the academic dean for lifting of the suspension.

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## Registration as a Professional Engineer

Registration as a Professional Engineer by the state, necessary for professional practice, requires licensing examinations and four years of experience after completing the bachelor of science degree. The dean gives full information to students in their senior year. Students may also write the Secretary of the State Board of Registration for Professional Engineers and Surveyors, 77 South High Street, 16th Floor, Columbus, OH 43266-0314.

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## Engineering Graduates and Law School

Graduating seniors of the Thomas Jefferson Smull College of Engineering who wish to enter the Pettit College of Law at Ohio Northern University are admitted if they (1) maintain an undergraduate grade point average of at least 3.2; (2) score at or above the 65th percentile on the LSAT; and (3) pass the character and fitness review by the Law School Admissions Committee.

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## Dual Degree Programs

Information concerning dual degree programs involving the College of Engineering appears on page 33 of this catalog. Students pursuing such a program are required to take advanced mathematics in the first year. Students may receive further details in the office of the dean of the college.

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## Cooperative Education Program

Cooperative education is a plan of educational development designed to integrate classroom study with planned and supervised work experiences. Engineering co-op students normally are employed in semiprofessional capacities in research, development, manufacturing, and engineering departments of industrial companies, consulting firms, and in federal and state agencies. The program also includes the opportunity for the students to work for an international firm in an international environment. The international co-op component is modified to include courses in the appropriate language and culture and a six-month overseas assignment during the junior year. The employment sessions begin in the summer following the sophomore year and include a contracted four to six terms of co-op ex-

perience. This five-year program is optional and currently available for civil, electrical and computer, and mechanical engineering students.

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## Interdisciplinary Programs

In addition to the regular degree programs in civil, electrical and computer, and mechanical engineering, several interdisciplinary programs have been developed. They are a Business Administration Minor or Option, a Computer Science Minor, a Bio-Medical Option, a Bio-Medical Sciences Minor, and an Environmental Option, among others. The Business Administration Option may be taken with any of the college of engineering degree programs. The Computer Science Minor is available to all except the ECE Computer Engineering major; the Bio-Medical Option is designed to be taken with either major of the electrical and computer engineering program; the Bio-Medical Sciences Minor is designed to be taken with the mechanical engineering program; and the Environmental Option complements the civil and mechanical engineering programs.

This is accomplished by proper planning and judicious use of social science and technical electives. Further, it is accomplished without a sacrifice in the engineering content of the three degree programs. In order to avoid scheduling conflicts, it is essential that the student follow the program as designated. A copy of each of the interdisciplinary programs may be obtained from the respective departmental offices. Any student may select one of the programs as an adjunct to the engineering degree program with the approval of the appropriate chair and the dean. In order for the student to continue on the program the accumulative average must be at least 2.50. Additional hours in the minor or option are required for graduation. Pursuit of an option or minor may involve several quarters where loads exceed 19 quarter hours and/or summer sessions. In such cases, a course overload fee is required for academic work in excess of 19 hours. (See page 18.) A minimum of 28 hours in the minor or option is required for graduation. The diploma does not indicate the minor or option; however, the transcript does show the appropriate program designation.

Courses required for the **Business Administration Option** are two courses in economics, two courses in accounting, one course in business law, and two business electives.

The **Computer Science Minor** requirements are determined by the Department of Computer Science.

The **Bio-Medical Option** requires a three-course sequence in introductory biology, zool-

ogy, and anatomy; a two course intermediate level sequence in anatomy/physiology; and two technical electives (200 level or higher) chosen from a specific list of possibilities. (Please refer to the Electrical and Computer Engineering department office for the list of possible electives).

The **Bio-Medical Sciences Minor** requirements are determined by the Department of Biological Sciences.

The **Environmental Option** includes two courses in the biological sciences, two in chemistry and five courses in civil engineering which focus on various aspects of the environment.

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## GENERAL ENGINEERING COURSES

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### *Subject - General Engineering (GE)*

#### **100 - FRESHMAN ENRICHMENT**

*1.00 Credit*

The practices, methods, and procedures which are common to problems and designs encountered in engineering. To form a strong bond between the student and department and provide a forum for freshman advising. Graded S/U.

#### **101 - FUNDAMENTALS OF ENGINEERING (3+0)**

*3.00 Credits*

Emphasis on the engineering profession. Includes computer skills, professionalism, ethics, applications of math and physics to engineering projects emphasizing working in teams.

#### **102 - ENGINEERING PROBLEM SOLVING AND CAD (2+2)**

*3.00 Credits*

Includes mechanical drawing techniques done by hand and using CAD. Teams work to complete a design project from proposal to presentation. Prerequisite: GE 101.

#### **113 - STATICS (4+0)**

*4.00 Credits*

Fundamental principles of statics with vector methods. Emphasis on free body diagrams and equations of equilibrium. Topics include resultants of force systems, centroids, centers of gravity, moments of inertia, equilibrium, shear and moment diagrams, loads, trusses, and internal forces. Prerequisites: MATH 163 and PHYS 231. (Formerly GE 311)

### **180 - SPECIAL TOPICS**

*.00 to 4.00 Credits*

Selected topics of current interest in general engineering. Prerequisite: Permission of instructor.

### **190 - INDEPENDENT STUDY**

*.00 to 4.00 Credits* Individual study of topic of particular interest to the student in general engineering. Prerequisite: Permission of instructor.

### **201 - CIRCUITS 1 (4+2)**

*5.00 Credits*

DC Circuit Analysis. Ohm's Law. Kirchoff's Laws. Dependent Sources. Nodal and Loop Analysis. Op-Amps. Network Theorems. Single-time constant circuits. P-Spice. Circuit Tutor. Prerequisite: MATH 164.

### **202 - CIRCUITS 2 (3+2)**

*4.00 Credits*

Network Theorems (AC Applications). Power. Three-Phase Circuits. Mutual Inductance. P-Spice. Circuit Tutor. Prerequisite: GE 201.

### **214 - DYNAMICS (4+0)**

*4.00 Credits*

Fundamental principles of mechanics with vector methods as applied to dynamics. Topics include: kinematics, absolute and relative motion, force, mass and acceleration, work and energy, and impulse and momentum. Prerequisites: MATH 164 and GE 113. (Formerly GE 312.)

### **223 - STRENGTH OF MATERIALS (4+0)**

*4.00 Credits*

Elastic analysis of deformable bodies using concepts of stress and strain. Topics include members subjected to tension, compression, torsion, and flexural loading. Development and application of Mohr's circle, determinate and indeterminate beam deflection, column stability, dynamic loading, and energy methods. Material properties, pressure vessels, and composite beams. Prerequisite: GE 113. (Formerly GE 313)

### **243 - ENGINEERING MATERIAL SCIENCE (3+2)**

*4.00 Credits*

Fundamental chemical, physical and microstructural characteristics of materials and how these relate to their mechanical behavior. Evaluation of these properties for material selection. Metallurgical aspects including equilibrium diagrams. Includes laboratory experiments in Mechanics of Materials and Material Science. (Formerly GE 402 with GE 403)

### **250 - ORIENTATION FOR CO-OP STUDENTS (1+0)**

*.00 Credit*

An introduction to the co-op program. Includes an introduction to industry, the industrial work environment, resume writing, interviewing and job search techniques. Designed to prepare the sophomore engineering student for the industrial experience. Prerequisite: Sophomore standing. (Formerly GE 300)

### **280 - SPECIAL TOPICS**

*1.00 to 4.00 Credits*

Selected topics of current interest in general engineering. Prerequisite: Permission of instructor.

### **290 - INDEPENDENT STUDY**

*1.00 to 4.00 Credits*

Individual study of topic of particular interest to the student in general engineering. Prerequisite: Permission of instructor.

### **350 - PROFESSIONAL PRACTICE**

*1.00 Credit*

Employment in a semi-professional capacity in a research, development, manufacturing, or engineering department of an industrial company, a consulting firm or a governmental agency. A student report on the assignment and an employer's evaluation are required. May be repeated up to a total of six hours. Prerequisites: Junior standing, successful completion of GE 250, and CUM GPA of 2.5 minimum. Mechanical Engineering

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## **DEPARTMENT OF CIVIL ENGINEERING**

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Professors Milks, Shah, Smalley (*Chair*); Associate Professor Ward; Assistant Professor Bazlamit

The mission of the civil engineering department is to provide a program of quality undergraduate education by which students are prepared for professional careers in civil engineering.

Implementation of the mission is through departmental goals. By these goals, we seek the following:

- To provide a curriculum taught by a faculty distinguished by excellence in undergraduate teaching and active in the profession which prepares students for entry-level professional employment or advanced studies at the graduate level.

•To provide for areas of concentration, options, minors, and an opportunity for work experience through a cooperative education program.

•To provide for the development of the whole person through effective communication skills, higher level thinking skills, and a sensitivity for the social and humanistic implications of civil engineering projects.

The civil engineering curriculum combines a strong background in the fundamentals of engineering, science, and mathematics with a basic knowledge of civil engineering principles in the environmental, geotechnical, structural, transportation, and water resources areas. Classroom and laboratory activities are integrated to form a comprehensive experience of theory and practice. Problem solving and design concepts are emphasized.

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## **Subject - Civil Engineering (CE)** —

### **203 - SURVEYING (2+4)**

*4.00 Credits*

Fundamentals of plane surveying including use of level, transit and tape, traversing theory and practice, horizontal and vertical curves, and topographic mapping. Prerequisite: MATH 163. (Formerly CE 301)

### **313 - NUMERICAL METHODS (4+0)**

*4.00 Credits*

Principles of numerical methods used in solving civil engineering problems. Topics include finite differences, finite elements, linear programming and optimization. Prerequisite: MATH 361. (Formerly CE 411)

### **321 - ENVIRONMENTAL SCIENCE (4+0)**

*4.00 Credits*

Sources and characteristics of pollutants, their effects on the environment, humans, and animals. Emphasis placed on interdisciplinary approach to reduce and treat wastes. Prerequisite: Junior Standing.

### **323 - SOLID AND HAZARDOUS WASTE MANAGEMENT (4+0)**

*4.00 Credits*

Sources and characteristics of solid and hazardous wastes; collection, transportation, and disposal. Selection of disposal sites and conceptual design of disposal facilities. Prerequisite: CHEM 163 and CE 321. (Formerly CE 474 and 475)

### **333 - GEOTECHNICAL ENGINEERING (3+2)**

*4.00 Credits*

Principles of geologic processes and properties of earth materials as pertinent to civil engineering. Terrain and site investigation techniques. Physical and structural geology and geomorphology to the extent to which they influence the location, design, construction, and maintenance of engineering works. Prerequisite: CE 362. (Formerly CE 453)

### **341 - STRUCTURES 1 (4+2)**

*5.00 Credits*

Analysis of determinant beams, trusses and frames. Topics include deflections, displacements, principle of superposition, moving loads, influence lines, cables and arches. Prerequisite: GE 223. (Formerly CE 412)

### **342 - STRUCTURES 2 (4+0)**

*4.00 Credits*

Fundamentals of statically indeterminate structures using classical, approximate, and computer solutions. Prerequisite: CE 341. (Formerly CE 413)

### **343 - REINFORCED CONCRETE DESIGN (4+2)**

*5.00 Credits*

Strength design of beams, columns, slabs, and footings using reinforced concrete. Application of ACI code and specifications to design including serviceability. Laboratory on concrete testing. Prerequisite: CE 342. (Formerly CE 525, 526)

### **351 - TRANSPORTATION 1 (4+0)**

*4.00 Credits*

Principles of transportation systems; city and regional planning, land use, and urban development as pertinent to transportation planning. Topics to include transportation demand and supply; trip generation, distribution, route assignment, and modal choice. Prerequisite: CE 203.

### **352 - TRANSPORTATION 2 (4+0)**

*4.00 Credits*

Principles of traffic engineering, capacity, and level of service. Emphasis on intersection analysis and design. Prerequisite: CE 351.

### **362 - FLUID MECHANICS (3+2)**

*4.00 Credits*

Principles of the mechanics of fluids. Topics to include engineering properties of fluids, fluid statics, fluid dynamics by momentum and energy principles, boundary layer theory, steady flow in pipes and compressible flow. Prerequisite: GE 214. (Formerly CE 422)

**363 - HYDRAULICS (3+2)***4.00 Credits*

Hydraulic analysis of piping systems to include friction losses and minor losses. Topics include pump design, hydraulics of wells, water hammer, hydraulic structures, flow measurement, and dimensional analysis and similitude. Design of a water distribution system is included as a term project. Prerequisite: CE 362. (Formerly CE 423)

**371 - URBAN PLANNING***4.00 Credits*

Principles of city and regional planning; land use, zoning, subdivision regulations, metropolitan problems and urban development. Topics will cover applications in the transportation planning and the environmental areas. Prerequisite: Junior standing.

**380 - SPECIAL TOPICS***1.00 to 4.00 Credits*

Selected topics of current interest in civil engineering. Prerequisite: Permission of instructor.

**390 - INDEPENDENT STUDY***1.00 to 4.00 Credits*

Individual study of topic of particular interest to the student in civil engineering. Prerequisite: Permission of instructor.

**410 - CE DESIGN SEMINAR***1.00 Credit*

Engineering design process; selection of senior design project; oral and written presentation of project proposal. Prerequisite: CE senior standing.

**414 - PROJECT MANAGEMENT (3+2)***4.00 Credits*

Principles of organization, management, and control of civil engineering projects. Topics include present and emerging legal and technical issues, critical path methods, and engineering economics. Prerequisite: Senior standing.

**415 - CIVIL ENGINEERING DESIGN PROJECT (0+6)***3.00 Credits*

Capstone design project, under the specific guidance of a civil engineering faculty member. Prerequisite: CE 410. (Formerly CE 512)

**425 - ENVIRONMENTAL ENGINEERING 1 (4+2)***5.00 Credits*

Physical, chemical, and biological processes in water and wastewater treatment systems related to land and air pollution. Prerequisite: CE 363. (Formerly CE 516)

**426 - ENVIRONMENTAL ENGINEERING 2 (4+0)***4.00 Credits*

Advances in waste treatment, removal of specific constituents. Effects and overview of the available types of unit operations and processes. Prerequisite: CE 425. (Formerly CE 518)

**434 - SOIL MECHANICS (3+2)***4.00 Credits*

Physical properties of soils as effecting design and construction, mechanics of soil masses, compaction, settlements, consolidation, and laboratory soil tests. Prerequisites: CE 333 and GE 223. (Formerly CE 351.)

**438 - FOUNDATIONS (4+0)***4.00 Credits*

Analysis of stress conditions imposed on the supporting soil by foundations. Design of foundations, retaining structures, and slopes. Prerequisites: CE 343 and CE 434. (Formerly CE 532)

**444 - STEEL DESIGN (4+2)***5.00 Credits*

Design of beams, columns, composite beams, girders, and connections using structural steel. Loads and material properties. Application of AISC code and specifications to design. Prerequisite: CE 342. (Formerly CE 547/548)

**446 - STRUCTURAL DESIGN (4+0)***4.00 Credits*

Design of structural projects. Prerequisites: CE 343 and 444.

**456 - TRANSPORTATION 3 (3+2)***4.00 Credits*

Design of transportation facilities with particular emphasis on highway design and pavements. Prerequisite: CE 352. (Formerly CE 435)

**464 - HYDROLOGY (3+2)***4.00 Credits*

Topics include estimates of population, water usage and wastewater generation, the hydrologic cycle, precipitation and streamflow data measurement and analysis, runoff prediction, hydrographs, flood routing, open channel flow and sanitary sewer design. A design term project is required. Prerequisite: CE 362. (Formerly CE 514)

**466 - WATER RESOURCES (3+2)***4.00 Credits*

Topics include properties of confined and unconfined aquifers, steady and unsteady groundwater hydraulics, aquifer pumping tests and mathematical groundwater modeling. Prerequisite: CE 464.

## **480 - SPECIAL TOPICS**

*1.00 to 4.00 Credits*

Selected topics of current interest in civil engineering. Prerequisite: Permission of instructor.

## **490 - INDEPENDENT STUDY**

*1.00 to 4.00 Credits*

Individual study of topic of particular interest to the student in civil engineering. Prerequisite: Permission of instructor.

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# **DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING**

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Professors Carmean, Grismore, Johansen, Thede (Chair); Associate Professors Herr, Hudak

The mission of the department is to provide excellence in an undergraduate electrical and computer engineering program which is grounded in fundamentals and structured to provide breadth of coverage. We will graduate students who can effectively contribute to their society through industry and the public sector, or who can distinguish themselves in graduate study.

In order to fulfill this mission, the department has established the following objectives:

- To maintain a faculty of high academic credentials who place an emphasis on the teaching function.
- To provide students with the tools and motivation for lifelong learning.
- To develop professional self-confidence in our students.
- To maintain a curriculum that is rich in laboratory and design experiences, and that responds to emerging technology and research in the field.

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## **Subject - Electrical and Computer Engineering (ECE)**

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### **164 - PROGRAMMING 1 (4+0)**

*4.00 Credits*

Basic programming techniques; simple data types, expressions, functions, conditionals, iteration, recursion, structured data types, etc. The use of high-level programming languages with a focus on simple algorithm development. (Formerly CS 134) (Also listed as CS 164)

### **165 - PROGRAMMING 2 (4+0)**

*4.00 Credits*

Advanced programming topics; memory management, object-oriented programming, algorithm analysis, etc. Principles of software engineering with illustrations based on examples from central areas of computing science. Prerequisite: ECE 164. (Formerly CS 135) (Also listed as CS 165)

### **166 - PROGRAMMING 3 (4+0)**

*4.00 Credits*

Continuation of topics from Programming 2 (ECE 165). System Life Cycle, library construction, recursion, abstract data types (stacks, queues, trees), searching and sorting. Prerequisite: ECE 165. (Formerly CS 136) (Also listed as CS 166)

### **203 - SIGNALS AND SYSTEMS 1 (4+0)**

*4.00 Credits*

Linear time domain analysis techniques including impulse response and the superposition integral. Frequency domain analysis including LaPlace transform and Fourier series. Prerequisites: MATH 361 and GE 202. (Formerly EE 203)

### **264 - ASSEMBLY LANGUAGE AND COMPUTER ORGANIZATION (4+0)**

*4.00 Credits*

Introduction to computer structure and machine language, assembly language programming, macros, program segmentation and linkage. Prerequisite: ECE 166. (Formerly CS 234) (Also listed as CS 264)

### **268 - DATA STRUCTURES (4+0)**

*4.00 Credits*

Emphasis on data abstraction as a primary tool in software construction. Use of modern programming language abstraction features to implement classical data structures; linear structures (lists, stacks, queues), tree structures (BTrees, AVLTrees, Splay Trees), hash tables and graphs. Introduction to space and time complexity analysis. Prerequisites: MATH 336 and ECE 166. (Formerly CS 248 and 338) (Also listed as CS 268)

### **301 - SIGNALS AND SYSTEMS 2 (4+0)**

*4.00 Credits*

Continuous frequency domain analysis using the Fourier transform. Analysis of multiple input/output systems using state variables. Discrete time analysis using the Z-Transform. Prerequisite: ECE 203. (Formerly EE 301)

**321 - ANALOG ELECTRONICS 1 (3+3)***4.00 Credits*

Analysis and design of analog electronic circuits using semiconductor diodes, transistors and integrated circuits. Computer techniques will be combined with laboratory work for several projects during the quarter. Prerequisite: ECE 203. (Formerly EE 321)

**322 - ANALOG ELECTRONICS 2 (3+3)***4.00 Credits*

Continuation of Analog Electronics 1 (ECE 321). Prerequisite: ECE 321. (Formerly EE 322)

**323 - FILTER DESIGN (3+2)***4.00 Credits*

Analysis and design of electronic filters including Butterworth and Chebyshev lowpass, highpass, bandpass and bandstop examples. Filters will be designed using several computer applications and evaluated via computer and laboratory measurements. Prerequisites: ECE 301 and 164. (Formerly EE 323)

**331 - ELECTROMAGNETICS (5+0)***5.00 Credits*

An axiomatic approach to static electric fields, static magnetic fields and time varying fields leading to Maxwell's equations. Fundamentals of analysis and design in electromagnetism with engineering application to transmission lines. Prerequisites: MATH 263 and PHYS 233. (Formerly EE 331)

**332 - ENERGY CONVERSION (3+3)***4.00 Credits*

Analysis and design of electrical energy conversion systems emphasizing electromechanical devices, system representation, system analysis and system design. Prerequisites: GE 202 and ECE 331. (Formerly EE 332)

**333 - POWER SYSTEMS (3+3)***4.00 Credits*

Continuation of ECE 332 including load flow and fault studies. Prerequisite: ECE 332. (Formerly EE 333)

**361 - DIGITAL ELECTRONICS (4+3)***5.00 Credits*

Combinational logic and synchronous sequential system analysis and design. Definition and characterization of logic gates at the transistor level; Karnaugh maps; Moore and Mealy structures; state diagrams and state tables, application of ABEL and XACT software design tools. Characterization and synthesis with PLD and FPGA devices. Design projects. Integrated laboratory experimental activities. Prerequisites: MATH 336 and GE 202.

**362 - MICROPROCESSORS (3+3)***4.00 Credits*

Microprocessors and embedded microprocessor system design. Microprocessor structure, registers, RAM and ROM addressing. Machine cycles and timing relationships. Input and output ports and addressing. Assembly level programming. Microcontroller structure, instruction set and programming. Use of development systems and design simulators. Embedded microcontroller design projects. Integrated laboratory experimental activities. Prerequisite: ECE 361. (Formerly EE 312 and 316)

**363 - ADVANCED DIGITAL ELECTRONICS (3+3)***4.00 Credits*

Digital system design using VHDL. Highly project oriented. Top down design methodology. Design projects carried out at behavioral, data flow, and structural levels of abstraction. Use of industry standard CAE tools. Prerequisite: ECE 362. (Formerly EE 419)

**365 - COMPUTER ARCHITECTURE (4+0)***4.00 Credits*

Aspects of computer hardware; computer arithmetic, microarchitecture design (both datapath and control unit), instruction sets, storage hierarchies. Introduction to system organization. Current families of microprocessors illustrating design tradeoffs. Prerequisites: ECE 264 and ECE 361. (Formerly CS 236 and CS 336) (Also listed as CS 365)

**366 - NETWORKS AND DATA COMMUNICATION (4+0)***4.00 Credits*

WAN and LAN design and use. Network software, including the ISO/OSI standard. Network hardware, including the Ethernet and Token Ring network protocols. Prerequisite: ECE 365. (Formerly CS 346) (Also listed as CS 366)

**380 - SPECIAL TOPICS***.00 to 4.00 Credits*

Selected topics in electrical or computer engineering of current interest. Prerequisite: Permission of instructor. (Formerly EE 380)

**390 - INDEPENDENT STUDY***.00 to 4.00 Credits*

Individual study of topic, in electrical or computer engineering, of particular interest to the ECE student. Prerequisite: Permission of instructor. (Formerly EE 390)

**404 - SENIOR DESIGN SEMINAR (1+0)***1.00 Credit*

Characteristics of engineering design projects. Topics include research, project planning, reliability, safety, economics, design methodology, and liability. Formal project proposals and plans are written. Prerequisite: Senior standing. (Formerly EE 404)

**405 - SENIOR DESIGN (4+0)***4.00 Credits*

A comprehensive project relevant to electrical or computer engineering. Application of the engineering design principles studied in ECE 404. Students are expected to spend a minimum of 12 hours per week directed exclusively to project activities. Prerequisite: ECE 404. (Formerly EE 405)

**406 - ENGINEERING TECHNICAL COMMUNICATION (3+0)***3.00 Credits*

The presentation of technical information in both written and oral formats. Students will use projects of ECE 405 as sources of material for presentations. Prerequisite: ECE 405. (Formerly EE 406)

**411 - DIGITAL SIGNAL PROCESSING (3+2)***4.00 Credits*

Analysis and design of discrete time systems including FIR and IIR digital filters. Discrete time systems will be evaluated using several computer applications as well as dedicated hardware systems. Prerequisite: ECE 323. (Formerly EE 411)

**416 - ADVANCED TOPICS IN DSP (2+2)***3.00 Credits*

Application of digital signal processing to speech and image data using a variety of computer tools and hardware systems. Projects requiring the design of processing systems for speech and/or image data will be required. Prerequisite: ECE 411. (Formerly EE 416)

**423 - ELECTRONIC MATERIALS AND DEVICES (2+3)***3.00 Credits*

Properties of solid state materials as they relate to practical devices and device characteristics. Semiconductor, dielectric and magnetic properties and devices are studied. Prerequisites: MATH 361 and PHYS 233. (Formerly EE 423)

**433 - ADVANCED TOPICS IN ENERGY CONVERSION (3+0)***3.00 Credits*

Analysis and design of commercial and industrial power systems. Prerequisite: ECE 332. (Formerly EE 433)

**444 - CONTROL SYSTEMS 1 (3+3)***4.00 Credits*

Classical feedback control systems. Modeling and transfer function formulation of PID controllers. Second-order system. Routh stability criteria. Steady-state error analysis. Computer simulation. Integrated laboratory experience. Prerequisites: ECE 301 and ECE 332. (Formerly EE 444)

**445 - CONTROL SYSTEMS 2 (3+3)***4.00 Credits*

Root-Locus. Frequency response. Nyquist stability analysis. Phase and gain margins. Nichols charts. Compensation. Computer simulation. Integrated laboratory. Prerequisite: ECE 444. (Formerly EE 445)

**446 - ADVANCED TOPICS IN CONTROL SYSTEMS (3+0)***3.00 Credits*

Selected advanced topics in Control Systems. Prerequisite: ECE 445. (Formerly EE 446)

**458 - COMMUNICATION SYSTEMS 1 (3+3)***4.00 Credits*

Analysis and design of Analog Communication Circuits. Prerequisites: ECE 301 and 322. (Formerly EE 458)

**459 - COMMUNICATION SYSTEMS 2 (3+3)***4.00 Credits*

Performance measures for analog systems with noise. Analysis and design of Digital Communications Systems using statistical methods. Prerequisite: ECE 458. (Formerly EE 459)

**464 - SOFTWARE ENGINEERING (4+0)***4.00 Credits*

The methodologies used to design, create, evaluate and maintain software systems including coverage of several modern methodologies with emphasis on one. A project written in a modern software development environment will be developed. Prerequisites: CS 228 or ECE 268. (Formerly CS 434) (Also listed as CS 464)

**466 - OPERATING SYSTEMS (4+0)***4.00 Credits*

Operating system principles; multiprogramming, virtual memory, client-server models for operating systems. Prerequisite: ECE 268. (Formerly CS 436) (Also listed as CS 466)

**467 - COMPUTER DEVICE LABORATORY (3+3)***4.00 Credits*

Synchronous and asynchronous bus design. Motherboard implementation issues, clock skew, power dissipation. Device interfacing and device operation. Prerequisite: ECE 365. (Also listed as CS 467)

## **468 - COMPILERS (4+0)**

### *4.00 Credits*

Scanning; parsing, type checking for strongly typed languages; symbol table generation and maintenance; code generation for simple instruction sets. Prerequisite: ECE 268. (Formerly CS 438) (Also listed as CS 468)

## **472 - ENGINEERING METHODS (4+0)**

### *4.00 Credits*

Decision making based on criteria of economic factors including present worth, final worth, internal rate of return, cost benefit ratio, depreciation, taxes and others. Prerequisite: ECE senior standing. (Formerly EE 472)

## **480 - SPECIAL TOPICS .**

### *00 to 4.00 Credits*

Selected topics in electrical or computer engineering of current interest. Prerequisite: Permission of instructor. (Formerly EE 480)

## **490 - INDEPENDENT STUDY .**

### *00 to 4.00 Credits*

Individual study of a topic in electrical or computer engineering of particular interest to the ECE student. Prerequisite: Permission of instructor. (Formerly EE 490)

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# **DEPARTMENT OF MECHANICAL ENGINEERING**

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Professors Burton, Maier (*Chair*), Rider; Associate Professor Marquart; Assistant Professor Laird

## **Vision Statement**

To be a premier undergraduate mechanical engineering department preparing graduates for post-graduate studies and successful life-long careers in the service of society.

## **Mission Statement**

The mission of the mechanical engineering department shall be the continuous pursuit of excellence by providing quality mechanical engineering education founded in science and mathematics. Graduates shall have the abilities to work logically, accurately, and efficiently, and to continue to enhance their careers through life-long learning. They will be inspired with a desire to contribute positively to humanity and the environment. The students will be provided with the best teaching methods, facilities, and state-of-the-art technologies available.

A description of the general educational objectives is available in the department office.

Mechanical engineering is very broad in scope and most versatile in the engineering profession. It utilizes a combination of human, material, and economic resources to translate ideas and theories into realistic solutions to satisfy the needs of society. Technical activities include the generation of energy, the conversion of energy from one form to another, and the conservation of energy. Another activity is the control of various processes. Other activities are the design, manufacture, testing, and evaluation of various mechanical components and systems.

Studies in the humanities and social sciences serve to not only meet the objectives of a broad education, but also to meet the objectives of the engineering profession. Therefore, studies in the humanities and social sciences must be planned to reflect a rationale or fulfill an objective appropriate to the engineering profession and the university's educational objectives.

Engineering sciences provide a bridge between mathematics and the basic sciences on the one hand and engineering practice on the other. Such subjects include mechanics, thermodynamics, electrical and electronic circuits, materials science, and computer science.

Fundamental elements of the design process are the establishment of objectives and criteria, innovation and creation, research, synthesis, analysis, construction, testing, and evaluation. This culminates in a required comprehensive design experience which is satisfied by a yearlong senior capstone project. Engineering sciences and engineering design subjects are developed and integrated throughout the curriculum and consistent with the objectives of the program. A description of how this is done is available in the department office.

The mechanical engineering program contains a significant laboratory component which is closely correlated to the lectures. They provide the opportunity for individual as well as group projects and limited undergraduate research. Computers are integrated throughout the mechanical engineering curriculum. IBM-compatible, Macintosh, and UNIX workstations microcomputers are incorporated into the laboratories along with data acquisition equipment.

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## **Subject - Mechanical Engineering (ME)**

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### **202 - COMPUTER APPLICATIONS AND DESIGN (3+2)**

*4.00 Credits*

The techniques involved in designing, implementing and testing computer programs and data acquisition systems. Computer programming in the FORTRAN language will be taught, as well as computer graphics fundamentals. An introduction to the instruments and software used in data acquisition, including pressure transducers, thermocouples, strain gages, etc. will be included. Prerequisite: GE 102.

### **311 - PROCESS OF MECHANICAL DESIGN (4+0)**

*4.00 Credits*

Project management and DOE are stressed. QFD, DFMA, FMEA, FTA, and other tools developed. Design teams work on project. Prerequisite: GE 223. (Formerly ME 414)

### **319 - ADVANCED STRENGTH OF MATERIALS (4+0)**

*4.00 Credits*

Mechanics of materials such as composites, linear elastic fracture mechanics, behavior of plastic materials, and initially-curved beams. Prerequisite: GE 223. (Formerly ME 321)

### **341 - MANUFACTURING PROCESSES (3+2)**

*4.00 Credits*

Contemporary material processing including molding, machining, hot and cold working. These processing methods using basic machining tools and operations, casting and molding equipment, and metal forming. Laboratory work includes operating basic process machines, CNC operation, process control exercises, and metrology. Prerequisite: GE 243. (Formerly ME 403)

### **352 - MECHANISMS (4+3)**

*5.00 Credits*

Kinematics and kinetics of mechanisms, analysis and synthesis of linkages, cams, gears, and robots. Prerequisites: MATH 272 and GE 214. (Formerly ME 405 and 406)

### **362 - THERMODYNAMICS (4+0)**

*4.00 Credits*

Fundamentals of classical thermodynamics. Heat transfer, work and properties of pure substances. The First and Second Laws of Thermodynamics. Irreversibility factors of energy and work. Analysis and design of refrigeration cycles, heat pump cycles and various power cycles. Prerequisites: CHEM 163 and PHYS 232. (Formerly ME 415)

### **363 - THERMODYNAMICS OF FLUIDS (4+2)**

*5.00 Credits*

Applications of the fundamentals of thermodynamics and the development of fluid mechanics principles. Investigation of heat pump, refrigeration and various power systems. The principles of static fluids will be developed, including buoyancy and incompressible, inviscid flow. Nonreacting and reacting gas mixtures and combustion will be addressed. Prerequisite: ME 362.

### **371 - NUMERICAL METHODS (4+0)**

*4.00 Credits*

Numerical methods applicable to problems arising in engineering practice; exact and approximate solutions investigated; finite methods used for linear and nonlinear equation solution; ordinary and partial differential equations treated. Fortran 77 programs designed. Prerequisites: MATH 272 and 361; ME 202. (Formerly ME 424)

### **380 - SPECIAL TOPICS**

*1.00 to 5.00 Credits*

Selected topics of current interest in mechanical engineering. Prerequisite: Junior status.

### **382 - ENGINEERING ANALYSIS (4+0)**

*4.00 Credits*

Solution of open-faced engineering problems (engineering design) using professional method. Emphasis placed on learning to deal with new situations in terms of fundamental mathematics, science, and engineering principles. Prerequisites: MATH 361 and GE 214. (Formerly ME 435)

### **383 - FINITE ELEMENT ANALYSIS (3+2)**

*4.00 Credits*

The finite element method techniques are studied. These techniques are used to solve engineering continuum problems, both "by hand" and using the general purpose FEA package, ANSYS, on the Silicon Graphics Workstations. Applications to engineering design of static and dynamic structures, as well as thermal systems. Prerequisites: GE 223 and ME 371. (Formerly ME 445)

### **390 - INDEPENDENT STUDY**

*1.00 to 5.00 Credits*

Individual study of topic of particular interest to the student in mechanical engineering.

### **411 - CAPSTONE 1 (0+3)**

*1.00 Credit*

Initiation of capstone design project as a team effort. Prerequisite: ME 311.

**412 - CAPSTONE 2 (0+3)**

1.00 Credit

Continuation of capstone design project as a team effort. Prerequisite: ME 411.

**413 - CAPSTONE 3 (0+6)**

2.00 Credits

Completion of capstone design project as a team effort. Prerequisite: ME 412.

**417 - MECHANICAL DESIGN OF COMPONENTS (4+0)**

4.00 Credits

Design and selection of various machine elements. Design teams work on a project. Prerequisite: ME 319. (Formerly ME 313)

**418 - VIBRATION ANALYSIS**

4.00 Credits

Fundamentals of linear vibration includes damped and undamped systems, single and multi-degree of freedom systems, and free or forced vibration. Prerequisites: MATH 361 and GE 214. (Formerly ME 315 and ME 541)

**419 - CONTROL SYSTEMS (4+2)**

5.00 Credits

Modeling, analysis and design of linear feedback control systems. Laplace transforms, transfer functions and frequency response. Introduction to digital controls and logic. Laboratory work in digital logic design, and performance studies of real systems. Prerequisite: Math 361 and ME 202. (Formerly ME 316 and ME 542)

**429 - APPLICATIONS IN CONTROL SYSTEMS (3+2)**

4.00 Credits

Applications in control systems concentrating on PLCs and ladder logic. Advanced control theory explored. Laboratory work concentrates on PLC applications. Prerequisite: ME 419.

**442 - MANUFACTURING SYSTEMS (3+2)**

4.00 Credits

The problems associated with manufacturing and solutions to some of these problems. Includes planning for system change and the application of computer integrated manufacturing. Prerequisite: ME 341.

**462 - COMPUTATIONAL FLUID DYNAMICS (3+2)**

4.00 Credits

The theory and methods of computational fluid dynamics, including grid generation, flow solution and postprocessing analysis. Implicit and explicit methods are studied, as well as direct and iterative solution techniques, and stability criteria. Students develop their own computer programs, as well as working with established computer codes. Prerequisites: ME 371 and 464.

**464 - FLUID MECHANICS (4+2)**

5.00 Credits

Fundamentals of incompressible and compressible, viscous and inviscid flows. Application to external and internal flow configurations in the fields of fluid mechanics and aerodynamics. Introduction to computational fluid dynamics. Analysis and design of piping systems, pump design and selection. Concurrent laboratory experience with flow and property measurement, pumps and piping systems. Prerequisites: MATH 361 and ME 363. (Formerly ME 534)

**467 - HEAT TRANSFER 1 (4+0)**

4.00 Credits

Heat conduction in steady and nonsteady state in one and two dimensions; thermal radiation concepts and heat exchangers. Graphical, numerical and electrical analog methods of solutions. Prerequisites: MATH 361 and PHYS 232. (Formerly ME 521)

**468 - HEAT TRANSFER 2 (4+2)**

5.00 Credits

Fundamentals of free and forced convection. Analytical and empirical convection correlations for internal and external theory to design. Laboratory reinforced study of conduction, flows. Condensation and boiling theories and their effects on heat transfer. Heat exchanger design and analysis. Thermal radiation through absorbing, emitting media. Application of theory to design. Laboratory reinforced study of conduction, convection, radiation and design. Prerequisite: ME 467.

**480 - SPECIAL TOPICS**

1.00 to 5.00 Credits

Selected topics of current interest in mechanical engineering. Prerequisite: Junior or senior status.

**490 - INDEPENDENT STUDY**

1.00 to 5.00 Credits

Individual study of a topic of a particular interest to a student in mechanical engineering. Prerequisite: junior or senior status.



# THE RUDOLPH H. RAABE COLLEGE OF Pharmacy

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## Thomas A. Gossel, Dean

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The Raabe College of Pharmacy at Ohio Northern University endeavors today to meet the high standards of education demanded by the health professions. The college occupies a modern building designed and equipped to provide the facilities required for programs in the health sciences.

Throughout its more than 114-year history, the Ohio Northern University College of Pharmacy has played an important role in pharmaceutical education. Its position in Ohio is particularly significant. Over 6,650 pharmacists have been graduated by this institution and its graduates are particularly active in local, state, and national health-related organizations.

**The Pharmacy Alumni Endowed Chair** was established in 1984 through the generosity of pharmacy alumni and friends in celebration of the centennial of the college.

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## Accreditation and Affiliations

The Raabe College of Pharmacy's Baccalaureate in Pharmacy and Doctor of Pharmacy programs are accredited by the American Council on Pharmaceutical Education (ACPE). Both pharmacy degrees are recognized by the Board of Pharmacy of the State of Ohio as meeting the educational requirement for licensure examination. The College of Pharmacy is a member of the American Association of Colleges of Pharmacy, and the Council of Ohio Colleges of Pharmacy.

### Departments

Department of Pharmacy Practice (PHPR)  
Department of Pharmaceutical and Biomedical Sciences (PHBS)

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## Mission Statement

The mission of the College of Pharmacy is to prepare students to enter the practice of pharmacy so that they may contribute effectively to their profession. The college is responsible for generating and disseminating new knowledge about drugs and pharmaceutical care systems.

Context of statement: The college is responsible for educating well-rounded individuals with

the ability to adapt to the changing profession. The educational process should include the scientific fundamentals necessary to adapt to future careers in the changing profession, the values necessary to serve society, the development of problem-solving and communication skills, and practice experience.

The faculty accept their role in teaching, conducting basic and applied research and providing service to the profession.

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## Admission Standards

Persons seeking admission to the College must provide the necessary information and meet the general requirements for admission to the University as listed in that section of this catalog. Students who qualify under those standards are reviewed for final approval for admission by the dean of the college or his designate.

**High School Graduates.** It is recommended that high school graduates should have completed the college preparatory course including four units of English, four units of mathematics (algebra I and II, plane geometry, trigonometry or precalculus, or calculus) and four units of science (biology, chemistry, and physics) and six units of history, social studies, languages or any combination thereof. Priority may be granted to students with additional credits. Students found to be deficient in these areas may be required to pursue remedial work prior to being scheduled in the regular course of study.

**Transfer Students.** A student desiring to transfer from another accredited college or university must present authenticated academic transcripts from all institutions attended. Credit will be allowed for any course in which a grade of C or better was received provided such work is parallel to the requirements for graduation from this institution (grades of C- are not transferable).

Grades of P (passing) or S (satisfactory) are accepted when the academic institution certifies their equivalence to a C or better. Approval for admission and advanced placement will be determined upon review of the student's previous record. Students entitled to advanced standing may enter at the time approved by the dean of the College of Pharmacy.

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## Doctor of Pharmacy Admission Requirements

Continuing students will be admitted on a competitive basis after completing the fourth year in the pharmacy program. Postgraduate candidates must be admitted to the university before being admitted to the Doctor of Pharmacy program. Effective Fall 1997, entering students may select the Doctor of Pharmacy program upon registration. The following requirements are approved by the faculty for internal candidates' admission to the Doctor of Pharmacy program:

1. The internal applicant must complete all required courses through the end of the P-4 year with a C or better.
2. Normally, only students with a cumulative grade point average of 2.5 or above will be considered.
3. Each internal applicant must submit a letter of application to the Doctor of Pharmacy program. The letter must include evidence that the student holds a valid pharmacy intern license.

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## Doctor of Pharmacy (Non-Traditional) Admission Requirements

Applicants seeking admission to the non-traditional doctor of pharmacy program must meet the following criteria:

1. Hold a baccalaureate degree in pharmacy from an accredited U.S. college of pharmacy.
2. Have a minimum of two years of practical experience as a pharmacist.
3. Hold a current, valid pharmacist license.
4. Have no disciplinary actions taken against the pharmacist's license by any State Board of Pharmacy.

Each applicant must submit an application form accompanied by a photocopy of a current valid pharmacist license, three letters of recommendation, and current resumé. Non-ONU graduates or those having completed academic work at another institution must also include an official transcript.

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## Bachelor of Science in Pharmacy Degree Requirements

The Bachelor of Science in Pharmacy degree is a five-year curriculum that provides a foundation in the basic sciences of pharmacy as well as a comprehensive understanding of the

practice of pharmacy.

The program of study leading to the degree of Bachelor of Science in Pharmacy requires a minimum of 255 quarter hours of study, and is a combination of general education courses, basic sciences, professional pharmacy courses, and electives. The 255 quarter hours are divided according to the following:\*

General education courses	48 quarter hours
Basic science courses	70 quarter hours
Professional courses	135 quarter hours
Electives	2 quarter hours

\*for P-1 students entering Fall 1999

**General Education Requirements.** The liberal studies component of the pharmacy degree curriculum consists of 48 quarter hours and intends to contribute significantly to the student's becoming an educated professional and a responsible citizen. These foundation courses provide the background for advanced education and are listed under the common discipline areas of communication competence, culture and society, aesthetic sensibility, and human values.

### *Communication Competence*

- Writing 110
- Writing 111
- Public Speaking 211 or
- Interpersonal Communication 225

### *Culture and Society*

- Great Works of Literature 204
- Western Civilization 110 or 111
- Psychology 100
- Sociology 105
- Economics 100
- One course in non-Western culture

### *Aesthetic Sensibility*

- Art 100 or Music 100 or Theatre 105

### *Human Values*

- Religions East and West 107 or Religion 105
- Ethics 238 or Ethics in Professional Life 336

**Basic Science Requirements.\*** Basic sciences are needed in the pharmacy curriculum to provide not only the background required for professional pharmacy courses but also to contribute to developing a scientific literacy necessary to function in an increasingly complex and technical world.

- Introductory Chemistry 171, 172, 173
- Organic Chemistry 251, 252, 253 (with laboratories)
- General Biology 121
- Introduction to Zoology 122
- Introduction to Human Anatomy and Histology 124

Physiology 331, 332, 333  
 Biosciences Laboratory 322, 323  
 Microbiology 313  
 Calculus for Life Sciences 1 154  
 Biostatistics 1 156  
 Biostatistics 2 256  
 Physics 120

*\*for P-1 students entering Fall 1999*

**Professional Pharmacy Requirements.\***

Courses in pharmaceutical and biomedical sciences, and pharmacy practice are designed to prepare students to meet the intellectual standards that are expected of the modern pharmacist, including the high ethical behavior that American society envisions.

*Pharmaceutical and Biomedical Sciences*

Biochemistry 341, 342  
 Immunology 375  
 Pharmaceutical Sciences Modules 431, 432  
 Biomedical Sciences Modules 443, 444

*Pharmacy Practice*

The Profession of Pharmacy 1, 2, 3 101, 102, 103  
 The Profession of Pharmacy 4, 5, 6 201, 202, 203  
 The Profession of Pharmacy 7, 8, 9 301, 302, 303  
 The Profession of Pharmacy 10, 11 401, 402  
 Cardiovascular System Module 441  
 Infectious Disease Module 442  
 Central Nervous System Module 543  
 Endocrine System Module 544  
 Oncology Module 545  
 Pharmaceutical Administration Module 550  
 The Profession of Pharmacy 12 570  
*\*for P-1 students entering Fall 1999*

*Electives*

Elective course hours for the pharmacy program may be selected from courses in Arts and Sciences, Business Administration, and the College of Pharmacy. Students may plan elective courses for personal enrichment or to satisfy a minor or a second major.

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## Bachelor of Science in Pharmacy Degree Curriculum

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***For P-1, P-2, P-3, P-4, P-5 students entering Fall 1999***

*First Year*

Introductory Chemistry 1, 2, 3 171, 172, 173	15 hours
General Biology 121	4 hours
Introduction to Zoology 122	4 hours
Introduction to Human Anatomy and Histology 124	4 hours
Calculus for Life Sciences 1 154	4 hours
Biostatistics 1 156	4 hours
The Profession of Pharmacy 1, 2, 3 101, 102, 103	3 hours
General Education/Electives	16 hours
<b>TOTAL</b>	<b>54 hours</b>

*Second Year*

The Profession of Pharmacy 4, 5, 6 201, 202, 203	6 hours
Organic Chemistry 1, 2, 3 251, 252, 253 (with laboratories)	12 hours
Physics 120	4 hours
Biostatistics 2 256	4 hours
General Education/Electives	26 hours
<b>TOTAL</b>	<b>52 hours</b>

*Third Year*

The Profession of Pharmacy 7, 8, 9 301, 302, 303	6 hours
Biochemistry 1, 2 341, 342	8 hours
Microbiology 313	4 hours
Immunology 375	4 hours
Physiology 1, 2, 3 331, 332, 333	9 hours
Biosciences Laboratory 1, 2 322, 323	2 hours
General Education/Electives	8 hours
<b>TOTAL</b>	<b>41 hours</b>

*Fourth Year*

Pharmaceutical Sciences Modules 1, 2 431, 432	16 hours
Biomedical Sciences Modules 1, 2 443, 444	16 hours
The Profession of Pharmacy 10, 11 401, 402	4 hours
Cardiovascular System Module 441	9 hours
Infectious Disease Module 442	9 hours
<b>TOTAL</b>	<b>54 hours</b>

*Fifth Year*

Central Nervous System Module 543	9 hours
Endocrine System Module 544	9 hours
Oncology Module 545	9 hours
Pharmaceutical Admin. Module 550	9 hours
The Profession of Pharmacy 12 570	18 hours
<b>TOTAL</b>	<b>54 hours</b>

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## Doctor of Pharmacy Degree Requirements

The Doctor of Pharmacy degree is an advanced professional program that provides a foundation in the basic sciences of pharmacy as well as a comprehensive understanding of health care settings. Specifically, the graduate will have training in clinical skills which will allow entry into advanced practice settings. The program of study leading to the degree of Doctor of Pharmacy is a combination of general education courses, basic sciences, professional pharmacy courses and electives. All of the requirements for general education, basic science, professional pharmacy courses and electives as listed in the Bachelor of Science Requirement section also apply to the Doctor of Pharmacy program.

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## Doctor of Pharmacy Degree Curriculum

### Doctor of Pharmacy Degree Requirements\*

General education courses	48 hours
Basic science courses	70 hours
Professional courses	180 hours
Electives	26 hours

\*for P-6 students entering Fall 1999 -see below

#### First Year

Same as P-1s in the B.S.Pharm. curriculum	
General Education/Electives	16 hours
TOTAL	54 hours

#### Second Year

Same as P-1s in the B.S.Pharm. curriculum	
General Education/Electives	28 hours
TOTAL	54 hours

#### Third Year

Same as P-1s in the B.S.Pharm. curriculum	
General Education/Electives	21 hours
TOTAL	54 hours

#### Fourth Year

Same as P-1s in the B.S.Pharm. curriculum	
TOTAL	54 hours

#### Fifth Year

Central Nervous System Module 543	9 hours
Endocrine System Module 544	9 hours
Oncology Module 545	9 hours
Pharmaceutical Admin. Module 550	9 hours
Capstone 546	9 hours
Electives	9 hours
TOTAL	54 hours

#### Sixth Year

Clerkship Rotations 650	54 hours
TOTAL	54 hours

### Current P-6s 1999 Only

The following must be completed during the next year.

Clerkships in Pharmacy Practice 650  
(11 rotations) 66 hours

Many students are able to use summer sessions in order to accelerate completion of the program.

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## Doctor of Pharmacy (Non-Traditional) Degree Requirements

The non-traditional doctor of pharmacy degree has been developed to meet the needs of pharmacists who are unable to return to campus as full-time students. The program of study is comprised of 32 quarter hours of didactic course work and 36 hours of clerkships (6) for a total of 68 quarter hours. A pharmacist, enrolled in the program, will have a maximum of three years to complete the didactic courses and a maximum of five years to complete the program.

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## Non-Traditional Doctor of Pharmacy Degree Curriculum

Orientation to Doctor of Pharmacy 701	0 hours
Biostatistics 710	3 hours
Drug Literature Evaluation 720	3 hours
Pharmacokinetics 730	5 hours
Physical Assessment 740	3 hours
Pathophysiology and Therapeutics	
Cardiology 750	3 hours
Renal 755	2 hours
Infectious Disease 760	3 hours
Central Nervous System/ Psychiatric 765	2 hours
Respiratory 770	2 hours
Endocrine 775	2 hours
GI Tract/Nutrition 780	2 hours
Oncology 785	1 hour
Dermatology/Ophthalmic 790	1 hour
Clerkship in Pharmacy Practice 800	36 hours
TOTAL	68 hours

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## Requirements for Graduation

Each candidate for a Bachelor of Science in Pharmacy degree must:

1. be of good moral character.
2. have completed the required curriculum of 255 quarter hours.
3. have earned a cumulative grade point average

- of 2.00 in all course work.
4. have successfully completed (based on the General Administrative and Academic Regulations) the B.S. Pharm. curriculum as outlined on page 201.
  5. satisfy a minimum residency requirement as established by the dean of the college.
  6. be recommended for the degree by a majority vote of the faculty of the university.
  7. meet such other qualifications as the faculty of the college may determine.

*Each candidate for a Doctor of Pharmacy degree must:*

1. be of good moral character.
2. have completed the required curriculum of 324 credit hours. \*
3. have earned a cumulative grade point average of at least 2.00 in all course work.
4. have successfully completed (based on the General Administrative and Academic Regulations) the Pharm. D. curriculum as outlined on page 202.
5. satisfy a minimum residency requirement as established by the dean of the college.
6. be recommended for the degree by a majority vote of the faculty of the university.
7. meet other such qualifications as the faculty of the college may determine.

\*1998 P-5s scheduled to graduate in May 2000 need 352 credit hours.

*Each candidate for a Doctor of Pharmacy (non-traditional) degree must:*

1. be of good moral character.
2. have completed the required curriculum of 68 quarter hours.
3. have earned a cumulative grade point average of 2.00 in all required courses. Previous cumulative grade point average from prior degree will not be included.
4. be recommended for the degree by a majority vote of the faculty of the university.

## General Administrative and Academic Regulations

General administrative and academic regulations for the College of Pharmacy are established by the dean and faculty of the college to assist students as they select courses and attempt to fulfill graduation requirements. Additional regulations may be adopted during the academic year or changes may be made to the following:

1. Students who wish to register for more than 19 hours of academic studies in a single quarter need the written permission of the dean of the

College of Pharmacy.

2. A pharmacy student may take no more than eight quarter hours in any summer term with a maximum of twenty quarter hours, total, for all three summer terms.
3. A prerequisite for The Profession of Pharmacy 12 (PHPR 570) and the clinical clerkship rotations is a certificate of registration as an Ohio pharmacy intern. The Ohio Board of Pharmacy may deny the issuance of the certificate if an individual has been convicted of a felony, has been convicted of violating any state or federal pharmacy or drug law, is not of good moral character and habits, is addicted to or abusing liquor or drugs, has been disciplined by the Ohio Board of Pharmacy pursuant to section 4729.16 of the revised code, or has been disciplined by any board of pharmacy (OAC 4929-5-04).
4. Students registered for The Profession of Pharmacy 12 (PHPR 570) who wish to register for any additional required or elective courses need the written permission of all the instructors, the department chair (of PHPR), and the dean of the College of Pharmacy prior to registering for the additional courses.
5. Students should not expect to register for courses that have conflicting time schedules. On rare occasions a student may be allowed to do so. The student will need the written permission of both the faculty members and the dean of the College of Pharmacy. Permission is never given to allow a student to recover from a bad grade, whether the need for a time conflict is created directly or indirectly.
6. Students are encouraged to register for activity courses in art, music, theatre, and health and physical education. There is no maximum number of activity course credits that may be used for fulfilling elective graduation requirements.
7. A. Beginning 9-1-95, all grades earned in required BSPC, PHPR and PHBS courses will be averaged with all subsequent grades in those courses for the calculation of the student's cumulative grade point average (GPA).  
B. Beginning 9-1-95, students will have a maximum of three (3) opportunities (two repeat attempts) to earn a "C" or better grade in the following courses:
  1. all required PHBS and PHPR courses through the P-3 year.
  2. required BIOL, CHEM, and MATH courses (or their equivalents)
 Failure to attain a "C" or better letter grade after the second repeat attempt (third time total) will result in the student's dismissal (see "Academic Standing," page 205) from the pharmacy program.  
C. Beginning 6-1-97, all pharmacy students must have a cumulative GPA of 2.00 or higher and a letter grade of "C" or better in all required MATH, CHEM, BIOL and pharmacy courses prior to en-

tering the P-4 year. Those students not meeting this requirement will maintain the class rank of P-3 and may not take any P-4 level coursework until all stated requirements are met.

8. Except where noted, credit hours earned in repeated courses can be counted only one time among the total hours required for graduation.
9. A student earning an "F" in any module may not progress beyond that quarter until that module is repeated with an earned grade of "C" or better. A student earning two "F"s will be dismissed from the College of Pharmacy.
10. A student earning a "D" in any module will be allowed to progress and not be required to repeat the module unless a concurrent or subsequent "D" or "F" is earned in another module. An exception to this rule is the Capstone Module (BSPC 546) wherein the student must earn a grade of "C" or better. Students who received a second "D" during the first module of a quarter are permitted to take the subsequent module. These student are subject to regulation #11 of this section (follows).
11. A student earning a second "D" in any professional module must repeat not only that course, but the course in which he/she received the other "D." A student earning three "D"s or two "D"s and one "F" will be dismissed from the College of Pharmacy.

### **Academic Policies for the Non-Traditional Doctor of Pharmacy Degree Program**

The standard University guidelines are applicable to all non-traditional students with the following additions.

1. A pharmacist will have a maximum of three years to complete the didactic courses and a maximum of five years to complete the program.
2. Pharmacists must maintain a cumulative grade point average (GPA) of 2.00. The GPA will be calculated only from courses taken while enrolled in the non-traditional Doctor of Pharmacy program.
3. Pharmacists must maintain a current valid pharmacist's license, without disciplinary sanctions from any Board of Pharmacy, throughout the time enrolled in the program.
4. Non-traditional Doctor of Pharmacy courses may be taken only while enrolled in the non-traditional Doctor of Pharmacy program.
5. Credit earned while enrolled in the non-traditional Doctor of Pharmacy program cannot be transferred into the entry-level Doctor of Pharmacy program.

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## **S/U Grade Option**

Students may utilize the S/U grade option only as noted in the College of Pharmacy catalog course descriptions. Otherwise, students are not permitted to register for courses on an S/U basis if the course is offered on a graded basis.

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## **Classification of Students**

Students may be advanced to the following classifications upon meeting the stated requirements.

### Beginning Fall 1999

P-2: a minimum of 54 (50 B.S. Pharm.) quarter hours of credit, completion of Chemistry 171, 172, and 173; Biology 121, 122 and 124; Math 154 and 156; The Profession of Pharmacy 101, 102, and 103.

P-3: a minimum of 108 (100 B.S. Pharm.) quarter hours of credit, completion of Organic Chemistry with laboratory; Physics 120; Biostatistics 256; The Profession of Pharmacy 201, 202 and 203.

P-4: a minimum of 162 (150 B.S. Pharm.) quarter hours of credit, completion of Biochemistry 341 and 342; Immunology 375; Microbiology 313; Physiology 331, 332 and 333; Bioscience Laboratory 322 and 323; The Profession of Pharmacy 301, 302 and 303. A cumulative GPA of 2.00 or higher and a letter grade of "C" or better in all required chemistry, biology, mathematics, physics and pharmacy courses.

P-5: a minimum of 216 (201 B.S. Pharm.) quarter hours of credit. A cumulative GPA of 2.00 or higher and have successfully completed Biomedical Science and Patient Care (BSPC) 441, 442; PHBS 432, 444; and PHPR 401, 402 modules.

P-6: a minimum of 270 quarter hours of credit. A cumulative GPA of 2.00 or higher and have successfully completed Biomedical Science and Patient Care (BSPC) 543, 544, 545; PHPR 550 modules and received a letter grade of "C" or better in BSPC 546.

Other information relative to the requirements for reclassification of standing may be obtained in the office of Pharmacy Student Services of the College of Pharmacy.

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## Academic Standing

A student who fails to maintain the prescribed standards of scholarship will be subject to one of the following actions, namely: 1) probation, 2) continued probation, 3) suspension from the college, or 4) dismissal from the college.

Following the first quarter that a student's accumulative grade point average (GPA) falls below 2.00, the student will be placed on probation. If a student on probation fails to obtain good academic standing (accumulative GPA 2.00 or higher) after the following quarter, the student will be placed on continued probation. If good academic standing is not achieved by the end of the following quarter the student should expect to be suspended. Any student with a quarterly GPA of less than 1.00 may be placed on probation or suspended. When a student is on probation, the college may impose special conditions for continued enrollment. Students on probation cannot participate in competitive activities of individuals, teams, or other groups officially designated as representing the University.

When action is taken to suspend a student, the suspension will be for a specified period of time after which the student will be eligible to apply for readmission. Readmission is not automatic. If readmission is granted, the faculty will establish specific conditions of academic performance expected of the student. A quarterly GPA of less than 2.00 in any of the first three quarters after readmission may lead to dismissal. Dismissal is a terminal action and the student is not eligible to apply for readmission to the College of Pharmacy at any time thereafter.

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## Dual Degree Programs

Information concerning undergraduate dual degree programs involving the College of Pharmacy appears on page 33 of this catalog. Students may receive further details in the Office of Pharmacy Student Services.

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## Student Services

The College of Pharmacy provides specialized services to students and alumni through the staff of the Office of Pharmacy Student Services, including college admissions, academic advising, personal counseling, career counseling, and job placement. The staff of the office also coordinates professional organization functions, student group activities, and serves as the focus for special project planning and implementation.

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## Student Conduct

Students enrolled in the College of Pharmacy are expected to uphold high professional standards. The abuse or possession of narcotics, stimulants, or hallucinogens without the supervision of his/her own physician is unacceptable conduct and can subject the student to dismissal. A student who has been convicted of a felony or who has violated any state or federal pharmacy or drug law can be dismissed from the college.

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## Special Notice

Because of rapid developments in the health professions, the curriculum and academic standards of the College of Pharmacy are constantly being reviewed by the faculty. The faculty of the college reserves the right, without advance notice, to change the content, duration and sequence of any course included in the curriculum, or to increase or decrease the number of credit hours leading to the degree. The faculty also reserves the right without advance notice to change the academic standards of the college.

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### ***Subject - Biomedical Science and Patient Care (BSPC)***

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#### **441 - BIOMEDICAL SCIENCE AND PATIENT CARE MODULE 1: CARDIOVASCULAR SYSTEM** *9.00 Credits*

Cardiovascular disease states and the therapeutic agents used in the diagnosis, treatment, and prevention of such diseases. An emphasis is placed on an understanding of the pharmacological rationale for the therapeutic treatment of cardiovascular disease. Individual agents are explained based on pharmacology and chemical properties and how these characteristics influence the therapeutic utility of these agents in the treatment of cardiovascular disease. Prerequisites: PHBS 432, PHBS 444 and PHPR 402.

#### **442 - BIOMEDICAL SCIENCE AND PATIENT CARE MODULE 2: INFECTIOUS DISEASE** *9.00 Credits*

An interdisciplinary course which focuses on the study of antibiotics and other chemicals used in the prophylaxis and treatment of infectious diseases. An introduction to antibacterial agents, antifungal agents, antiviral agents and antiparasitic agents will be covered. Individual drugs are discussed in terms of basic chemistry, mechanism of action, structure-activity relationships, modes of resistance, microbial susceptibility, therapeutic applications, pharmacokinetic properties, drug interactions and adverse effects. In-depth analysis of the pathophysiology of

disease and treatment related to infectious disease will be covered in a standard medically related systems approach. Students will be required to compare findings of current literature to standard text material, focus on problem solving/decision making based on case examples, calculate a drug dose and make necessary adjustments for unique disease states or special patient circumstances, and select an appropriate regimen of choice based on cost effectiveness and ethical consideration. An introduction to investigational modes of therapy will also be covered for selected infectious diseases. Prerequisites: PHBS 432, PHBS 444 and PHPR 402.

### **543 - BIOMEDICAL SCIENCE AND PATIENT CARE MODULE 3: THE CENTRAL NERVOUS SYSTEM AND SPECIAL SENSES**

#### *9.00 Credits*

An integrated approach to the study of disease states primarily affecting the central nervous system and special senses, and the therapeutic agents used in the diagnosis, treatment, and prevention of such diseases. An emphasis is placed on an understanding of the pathophysiology of the disorders and the pharmacological rationale for their treatment. Individual agents are explained based on pharmacodynamic, pharmacokinetic and chemical properties and how these characteristics influence the therapeutic utility of these agents. The course format includes case studies and student reports as well as traditional lecture and discussion sessions. Prerequisites: BSPC 441 and 442.

### **544 - BIOMEDICAL SCIENCE AND PATIENT CARE MODULE 4: THE ENDOCRINE AND MUSCULOSKELETAL SYSTEM**

#### *9.00 Credits*

An integrated approach to the study of endocrine and musculoskeletal disorders, including the rational use of pharmacological agents to treat them. The course will include a comprehensive discussion of drug design and structure activity relationships integrated with the therapeutic and toxicologic actions of the drugs. The basic concepts and principles of the pharmacodynamic and pharmacokinetic properties of the drugs used in these disease states will also be discussed as they pertain to the endocrine and musculoskeletal systems. Prerequisites: BSPC 441 and 442.

### **545 - BIOMEDICAL SCIENCE AND PATIENT CARE MODULE 5: ONCOLOGY AND GASTROINTESTINAL SYSTEM**

#### *9.00 Credits*

The oncology and gastrointestinal components of this module are integrated approaches to the study of neoplastic and gastrointestinal diseases and the therapeutic agents used in the diagnosis, treatment, and prevention of such diseases. Emphasis is placed on an understanding of the pharmacological rationale for the therapeutic treatment of cancer and gastrointestinal disease. Individual diagnostic, therapeutic

and preventive agents are characterized by their pharmacological and chemical properties. How these properties influence the therapeutic utility of these agents in the treatment of neoplastic and gastrointestinal diseases is thoroughly examined. Prerequisites: BSPC 543 and 544.

### **546 - BIOMEDICAL SCIENCE AND PATIENT CARE MODULE 6: CAPSTONE IN PHARMACY PRACTICE**

#### *9.00 Credits*

The capstone module is one in which the student utilizes accumulated pharmaceutical education and applies learned principles to organize and synthesize relevant information to describe, optimize and critique drug therapy in unique and classic diseases. This information is presented by the student in written and oral, formal and informal formats. Activities include case presentations, reviews of "the literature", literature critiques and other formats that allow the student to demonstrate proficiency in effective, safe, and "patient specific" application of drug therapy. Students work in small groups when possible to demonstrate interpersonal skills. This course will culminate in an encompassing final exam which is a prerequisite for clinical rotations. Prerequisites include admission to the Pharm.D. program and successful completion of BSPC 543, 544, 545 and PHPR 550 modules.

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## **DEPARTMENT OF PHARMACEUTICAL & BIOMEDICAL SCIENCES**

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Professors Bhattacharya, Faulkner (*Chair*), Gossel, Milks, L.Smith; Associate Professors Christoff, Kinder, Knecht, Rao, E. Smith, Sprague

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### ***Subject - Pharmaceutical and Biomedical Sciences (PHBS)*** ———

*First number in parentheses is lecture hours per week, second number is laboratory hours per week.*

### **200 - SPIRITUALITY AND HEALTH**

#### *2.00 Credits*

Implications of spiritual outlook and practice on patient compliance, coping skills and other aspects of health care. Prerequisite: Permission of instructor.

### **210 - PHARMACEUTICAL SCIENCE TECHNIQUES**

#### *2.00 Credits*

Laboratory techniques employed in research in the pharmaceutical sciences. Preparation for graduate studies in any of the related sciences. Prerequisites: P-2 status and permission of the instructor.

### **302 - MEDICAL TERMINOLOGY (3+0)**

#### *3.00 Credits*

Medical terminology specifically, and scientific terminology in general. Emphasis on root words and affixes which have general and frequent occurrence in the communication of medicine, pharmacy, biology, chemistry, and related areas.

### **310 - DRUG ABUSE EDUCATION (2+0)**

#### *2.00 Credits*

Development of skills in educating community groups regarding drugs and drug abuse. Emphasis on the development, mastery and delivery of concept-oriented lectures, and the effective use of learning materials in providing drug abuse education to various community groups, especially middle school and high school students. Background information, presentation techniques and approaches, and various current topics relating to substance abuse are presented and discussed. Corequisite: BIOL 124.

### **311 - SPECIAL TOPICS IN DRUG ABUSE EDUCATION (1+0)**

#### *1.00 Credit*

Community service-oriented presentation of drug abuse education talks to various community groups, including middle school and high school students. Opportunity to further develop skills in conveying health information to the public, focusing on issues relating to drug abuse and chemical dependency. Can be repeated indefinitely. Corequisite: PHBS 310.

### **330 - ALTERNATIVE HEALTH CARE**

#### *3.00 Credits*

Selected principles and practices of alternative (complementary) health care, including homeopathy, herbals, energy and touch therapies. Emphasis on implications for pharmacists. Prerequisite: Permission of the instructor.

### **341 - BIOCHEMISTRY 1 (4+0)**

#### *4.00 Credits*

The chemistry of living organisms with emphasis on the human system. Topics include acid-base balance, buffers, chemistry of amino acids, proteins, enzymes, carbohydrates, lipids, vitamins, nucleic acids and porphyrins. Prerequisite: A "C" or better in CHEM 251, CHEM 252, and CHEM 253.

### **342 - BIOCHEMISTRY 2 (4+0)**

#### *4.00 Credits*

The major metabolic processes that are essential for human life, including biochemical energetics, the electron transport system, Kreb's cycle, the metabolism of carbohydrates, lipids and amino acids, and the biosynthesis of purines, pyrimidines, nucleic acids and proteins. Biochemical genetics and genetic disorders are also covered. Prerequisite: PHBS 341.

### **350 - BASIC NUTRITION (3+0)**

#### *3.00 Credits*

Basic principles of nutrition for pharmacy and nonpharmacy students. Topics include a description of essential nutrients, methods of evaluating individual dietary adequacy, and dietary methods for weight control.

### **351 - DIAGNOSTIC TESTS (3+0)**

#### *3.00 Credits*

The use of biochemical tests as agents for the diagnosis of human disease states. The theory, methodology, utility, significance, and reliability of such tests are discussed. Prerequisite: PHBS 342 or permission of instructor.

### **370 - SEMINAR IN BIOMEDICAL AND PHARMACEUTICAL SCIENCES**

#### *1.00 Credit*

Student-presented seminars which review research topics of interest in pharmaceutical and biomedical sciences or which review specific papers in the scientific literature. Preparation for graduate study in the pharmaceutical and biomedical sciences. Prerequisite: Permission of the instructor.

### **375 - IMMUNOLOGY (3+0)**

#### *4.00 Credits*

Modern immunology and immunotherapy. The principles of basic and clinical immunology, historical background, host defense mechanisms, types of immune responses, nature of antigens and antibodies, antigen-antibody interactions leading to immunological disease, and transplantation and cancer immunology. The use of immunobiologicals currently available in the USA for prevention and treatment of most common infections and immunologic diseases. The role of biotechnology as a source of immunobiologicals will be discussed. Prerequisite: BIOL 331 and PHBS 341. Corequisite: BIOL 332.

### **381 - NATURAL PRODUCTS 1 (4+0)**

#### *4.00 Credits*

Medicinal constituents found in terrestrial and marine plant origin. Brief history and sources of selected major plant constituents, the chemical, biological properties and category of uses are presented. Prerequisites: One year of biology and one year of organic chemistry.

### **382 - NATURAL PRODUCTS 2 (2+0)**

#### *2.00 Credits*

A continuation of Natural Products I dealing specifically with natural products found in both terrestrial and marine animals. Emphasis is on biomedicinals such as hormones and enzymes, and on the biotoxins elaborated from these animals. Prerequisite: PHBS 381.

### **431 - PHARMACEUTICAL SCIENCES MODULE 1**

*8.00 Credits*

The physical pharmacy, pharmaceutical and biopharmaceutical aspects of a variety of drug delivery systems, predominantly peroral solution and solid dosage forms. The time-course of drug substances in various body compartments (pharmacokinetics) will be treated in a quantitative manner, and delivery system formulation factors which may affect drug pharmacokinetics (biopharmaceutics) will be discussed. Laboratory exercises introduce the basic pharmaceutical concepts and techniques necessary to prepare extemporaneous dosage forms, including solution, capsules, lotions and suspensions. The chemical, physical and biological properties of the ingredients used and their relationship to the final product will be discussed in order to facilitate preparation of elegant, stable, safe and effective products. Prerequisite: P-4 standing.

### **432 - PHARMACEUTICAL SCIENCES MODULE 2**

*8.00 Credits*

A continuation of Pharmaceutical Sciences 1. The pharmaceutical, biopharmaceutical and pharmacokinetic aspects of a variety of drug delivery systems, predominantly suspensions, emulsions, aerosols, semisolids, transdermal, and controlled release dosage forms. Novel and experimental drug delivery systems also will be examined. The bioavailability and bio-and generic equivalence of peroral products. The basic principles, equipment and techniques involved in the preparation and administration of parenteral sterile dosage forms will be discussed. Laboratory exercises introduce the basic pharmaceutical concepts and techniques necessary to prepare extemporaneous dosage forms, including ointments, suppositories, and parenteral sterile dosage forms. The chemical, physical and biological properties of the ingredients used and their relationship to the final product will be discussed in order to facilitate preparation of elegant, stable, safe and effective products. Prerequisites: P-4 standing, PHBS 431, PHBS 443 and PPHR 401.

### **441 - MEDICINAL PLANT PROPAGATION AND CULTIVATION (2+3)**

*3.00 Credits*

The economic, geographic, commercial, and biological aspects of plants as sources of drugs, spices and various natural chemical products. Common poisonous plants and potentially harmful toxic constituents of plant foodstuffs are discussed. Field trips and cultivation of medicinal plants. Required research of literature, writing and presentation of reports. Prerequisite: Permission of instructor.

### **443 - BIOMEDICAL SCIENCES MODULE 1**

*8.00 Credits*

An interdisciplinary focus on the mechanisms by which diseases, drugs and chemicals alter normal biochemical and physiological processes. The sciences of pathophysiology, pharmacology, toxicology, and medicinal chemistry are integrated to provide an in-depth understanding of these mechanisms. The course progresses from factors affecting sub-cellular mechanisms to those of whole organ systems. Includes small group recitation and student-presented seminar sections in order to introduce the basic and clinical scientific literature and provide activities which illustrate the pharmacotherapeutic applications of the material. Prerequisite: P-4 status.

### **444 - BIOMEDICAL SCIENCES MODULE 2**

*8.00 Credits*

Continuation of PBS 443. Prerequisites: PHBS 431 and 443, and PPHR 401.

### **502 - PRINCIPLES AND PRACTICE OF PUBLIC HEALTH (3+0)**

*3.00 Credits*

Individual and community aspects of public hygiene, including infections, epidemiology, prophylaxis, and discussion of major illnesses (nutritional, mental, environmental and occupational).

### **511 - VETERINARY PHARMACY (2+0)**

*2.00 Credits*

The various pathological conditions peculiar to animals and the pharmaceuticals used in the treatment thereof. Prerequisite: Permission of instructor.

### **530 - MANUFACTURING PHARMACY (1+6)**

*3.00 Credits*

The formulation and fabrication by mechanized methods of a variety of pharmaceutical dosage forms. Graded S/U. Prerequisite: Permission of the instructor.

### **545 - DRUGS OF ABUSE (2+0)**

*2.00 Credits*

Major issues regarding drug abuse, with special emphasis on the specific agents of abuse, their sources, common distribution modes, patterns of substance abuse, pharmacological effects and mechanisms, toxicologic concerns, treatment modalities and approaches to drug abuse education. Prerequisite: Permission of the instructor.

**546 - INTRODUCTION TO GERIATRIC PHARMACOLOGY (2+0)**

*2.00 Credits*

Principles dealing with age-related physical and mental changes; pharmacokinetics, drug interactions, disease states and drug therapy, misuse and abuse of medication in the elderly. Prerequisite: Permission of instructor.

**562 - SURVEY OF RESEARCH AREAS IN THE PHARMACEUTICAL SCIENCES 1 (1+0)**

*1.00 Credit*

The research areas in the pharmaceutical, biomedical and pharmacy administration areas, and opportunities in these areas are defined. Team taught by pharmacy faculty and designed for Pharmacy and Arts and Sciences Sciences students interested in research careers. Graded S/U. Prerequisites: P-2 or sophomore standing.

**563 - SURVEY OF RESEARCH AREAS IN THE PHARMACEUTICAL SCIENCES 2 (1+0)**

*1.00 Credit*

Continuation of PHBS 562 with emphasis on the particular research interests of the faculty and presentations by outside speakers from academia, government, and industry. Graded S/U. Prerequisites: P-2 or sophomore standing.

**564 - SURVEY OF RESEARCH AREAS IN THE PHARMACEUTICAL SCIENCES 3 (1+0)**

*1.00 Credit*

Continuation of PHBS 563 with emphasis on the particular research interests of the faculty and presentations by outside speakers from academia, government and industry. Graded S/U. Prerequisite: P-2 or sophomore standing.

**565 - RESEARCH IN THE PHARMACEUTICAL AND BIOMEDICAL SCIENCES (0+2)**

*2.00 Credits*

For students who intend to pursue graduate study in pharmacology, toxicology or related biomedical areas. Participation in all aspects of the design, implementation, model preparation, instrumentation, and reporting of specific research problems. Can be repeated for a maximum of 12 hours.

**571 - SEMINAR IN PSYCHOPHARMACOLOGY (2+0)**

*2.00 Credits*

Presentations of papers and discussions of topics of interest. Current papers in mental illness. Psychedelic drug effects and pharmacological research are discussed. Prerequisites: PHBS 482 and P-5 standing.

**572 - SEMINAR IN TOXICOLOGY (2+0)**

*2.00 Credits*

Presentation of papers and discussion of topics. Current events and relevant topics in clinical, occupational industrial, and environmental toxicology are discussed. Prerequisite: Permission of the instructor.

**573 - SEMINAR IN PEDIATRIC PHARMACOLOGY (2+0)**

*2.00 Credits*

Common pediatric medical disorders and their management with special reference to the pharmacologic basis of pediatric medicine. Prerequisite: Permission of instructor.

**575 - SEMINAR IN PROBLEMS OF DRUG ABUSE (2+0)**

*2.00 Credits*

Adverse effects of illicit drugs, particularly the long-term consequences of drug abuse. The problems of drug abuse from pharmacologic and biomedical aspects are discussed. This course may be repeated an indefinite number of times. Prerequisites: PHBS 481, 482 and 483.

**590 - SPECIAL TOPICS IN PHARMACEUTICAL AND BIOMEDICAL SCIENCES**

*1.00 to 3.00 Credits*

Can be repeated as the subject varies. Prerequisite: Permission of the instructor.

**594 - SEMINAR IN PHARMACEUTICAL AND BIOMEDICAL SCIENCES**

*1.00 to 3.00 Credits*

Can be repeated as the subject varies. Prerequisite: Permission of the instructor.

**597 - INDEPENDENT STUDY-PHARMACEUTICAL AND BIOMEDICAL SCIENCES**

*1.00 to 3.00 Credits*

Can be repeated as the subject varies. Prerequisite: Permission of department chairman and accumulative grade point average of 2.50.

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## DEPARTMENT OF PHARMACY PRACTICE

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Professors K. Kier, Previte; Associate Professors Allison, Broedel-Zaugg, Jones, Lucas (part-time), Reiselman, L. Savino, Shoemaker; Assistant Professors Kisor, Partelano, Stanovich (Chair), Sullivan, J. Turner; Clinical Professor Blumer (shared); Associate Clinical Professors Cubick (shared), Gibbs (shared); Hulisz (shared), Reed (shared); Assistant Clinical Professors Ballentine (shared), Brown (shared), Halula (shared), Krinsky (shared), Laughlin (shared); Letting (shared), O'Connell (shared), P. Smith (shared), Sutherland (shared), Sweeney (shared), Waller (shared); Instructor T. Kier; Assistant Instructor M. Turner

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### ***Subject - Pharmacy Practice (PHPR)***

#### **101 - THE PROFESSION OF PHARMACY 1**

*1.00 Credit*

The profession of pharmacy, the delivery of patient care, and the operation of the University and College of Pharmacy. Traditional classroom presentations will be reinforced through structured experiential rotations in a variety of health care and community service sites.

#### **102 - THE PROFESSION OF PHARMACY 2**

*1.00 Credit*

Continuation of PHPR 101. Prerequisite: PHPR 101.

#### **103 - THE PROFESSION OF PHARMACY 3**

*1.00 Credit*

Continuation of PHPR 102. Prerequisite: PHPR 102.

#### **201 - THE PROFESSION OF PHARMACY 4**

*2.00 Credits*

Continuation of professional development and understanding of pharmacy services and patient care delivery. Addresses issues relevant to the preparation for pharmacy internship and advanced pharmacy course work. Prerequisite: PHPR 103.

#### **202 - THE PROFESSION OF PHARMACY 5**

*2.00 Credits*

Continuation of PHPR 201. Prerequisite: PHPR 201.

#### **203 - THE PROFESSION OF PHARMACY 6**

*2.00 Credits*

Continuation of PHPR 202. Prerequisite: PHPR 202.

#### **230 - ETHICS IN PROFESSIONAL PRACTICE (2+0)**

*2.00 Credits*

Guided discussions show that there are ethical problems in life and that there are better and worse ways of dealing with those problems.

#### **241 - CONTEMPORARY PHARMACY PRACTICE**

*2.00 Credits*

Multiple practice settings including retail, institutional, manufacturing, distribution, association, government and how each is implementing a pharmaceutical care mission. May be repeated for up to 6 credit hours.

#### **301 - THE PROFESSION OF PHARMACY 7**

*2.00 Credits*

Continued professional development, understanding, and reinforcement of pharmacy services and patient care delivery. The functional practice of pharmacy, including product (medication and information) distribution systems and evaluation both of their quality and impact on professional, legal, patient care. Prerequisite: PHPR 203.

#### **302 - THE PROFESSION OF PHARMACY 8**

*2.00 Credits*

Continuation of PHPR 301. Prerequisite: PHPR 301.

#### **303 - THE PROFESSION OF PHARMACY 9**

*2.00 Credits*

Sixty documented experiential contact-hours providing skills development pharmaceutical patient care. Credit given upon successful completion of a comprehensive final examination. Prerequisite: Valid pharmacy internship license, PHPR 302.

#### **331 - INTRODUCTION TO OTC PRODUCTS**

*3.00 Credits*

Development of appropriate counseling and guidance to patients who desire to conduct self-medication or self-therapy with non-prescription drug products/devices. Prerequisite: PHPR 302.

**401 - THE PROFESSION OF PHARMACY 10***2.00 Credits*

Preparation for subsequent therapeutic oriented modules. Various aspects of physical assessment will be covered as they pertain to the delivery of "pharmaceutical care". Development and enhancement of analytical and communication skills such as the analysis of data to data to prepare a drug therapy assessment and derive a drug therapy problem list. Prerequisite: PHR 303.

**402 - THE PROFESSION OF PHARMACY 11***2.00 Credits*

Development of skills to provide information regarding medications used in the prevention and treatment of diseases and medical conditions, including emergency medical care. Prerequisite: PHR 401.

**478 - OUTPATIENT PHARMACY SERVICE (0+3)***1.00 Credit*

A laboratory to serve the needs of the Health Center through the operation of the Student Health Pharmacy. Specific components include: the dispensing of prescriptions, patient counseling and patient profile maintenance. For students with limited or no internship experience. Prerequisites: Valid Ohio intern license. May be repeated for up to four credit hours.

**550 - PHARMACY ADMINISTRATION MODULE***9.00 Credits*

An interdisciplinary approach to the practice of pharmacy as it fits into the contemporary healthcare system and the business environment. Includes theoretical concepts as well as practical methodology techniques to assess the external and internal economic, social, philosophical, ethical, and legal influences on the practice. Planning, evaluating, and decision making through financial report analysis and case study is stressed. Prerequisites: BSPC 543 and 544.

**570 - PROFESSION OF PHARMACY 12***18.00 Credits*

Multi-dimensional experiences in hospital and community-based contemporary pharmacy practice. Students will apply principles learned during the didactic curriculum within actual patient care/dispensing environments. Length of time committed to specific rotations may be flexible, permitting students to enhance experience(s) in specific areas of interest. All experiences are off-campus. Required transportation and housing to be arranged by the student. Prerequisites: P-5 standing, valid Ohio Intern License and updated immunizations, as required by teaching site and/or state and federal regulatory agencies. Students must have successfully completed BSPC 543, 544 and 545 and PHR 550 modules.

**590 - SPECIAL TOPICS IN PHARMACY PRACTICE***1.00 to 16.00 Credits*

Can be repeated as the topic varies. Prerequisite: Permission of the instructor.

**594 - SEMINAR IN PHARMACY PRACTICE***1.00 to 3.00 Credits*

Can be repeated as the topic varies. Prerequisite: Permission of the instructor.

**597 - INDEPENDENT STUDY-PHARMACY PRACTICE***1.00 to 16.00 Credits*

Can be repeated as the topic varies. Prerequisites: Permission of department chairman and 2.50 accumulative grade point average.

**650 - CLERKSHIP IN PHARMACY PRACTICE (0+40)***6.00 Credits*

Full-time experiential program emphasizing delivery of as well as a means of integrating facts and principles pharmaceutical care in primary, secondary and tertiary patient care settings. This education process will occur in both institutional and ambulatory settings, and will serve as practice in providing pharmaceutical care as well as a means of integrating facts and principles received from antecedent courses. At each practice setting, the student is expected to become a functioning component of the ongoing pharmaceutical care services through faculty instruction, self-learning, and by observing the modeling of attendant faculty members. Prerequisites: BSPC 543,544,545, 546, and PHR 550. Students must register for the course eleven times for a total of 66 credits. Sections include but are not limited to: 01-General Medicine; 02-Ambulatory Care; 03-Intensive Care; 04-Geriatrics; 07-Administrative Practice; 08-Nutrition; 09-Home Health Care; 10-Drug Information; 11-Infectious Disease; 12-Cardiology; 13-Surgical Care; 14-Pediatrics; 15-Pharmacokinetic Services; 16-Psychiatry; 17-Gastroenterology; 18-Oncology; 19-Pulmonary Medicine; 20-Research; 21-Education; 22-Emergency; Medicine; 23-Long Term Care; 24-Managed Care; 25-Pharmaceutical Industry; 26-Organ Transplant Medicine; 27-Internal Medicine; 28-Preventive Medicine; 29-Neurology; 30-AIDS Education; 31-OB/GYN; 32-Poison Control.

### **701 - ORIENTATION TO DOCTOR OF PHARMACY (NON-TRADITIONAL)**

*.00 Credit*

Orientation to the non-traditional Doctor of Pharmacy program and completion of a prior learning assessment (PLA) portfolio (documentation of the pharmacist's experience and accomplishments). The portfolio is a requirement for continuation in the program. Prerequisite: Admission to the non-traditional Doctor of Pharmacy program.

### **705 - DRUG INFORMATION SKILLS DEVELOPMENT**

*3.00 Credits*

The principles of drug information. Retrieval and evaluation of medical information and development of written and verbal communication skills. Special functions of drug information centers such as preparing monographs for pharmacy and therapeutic committees, reporting adverse drug reactions, and participating in drug usage evaluation. Elective credit hours do not fulfill any graduation requirement. Prerequisite: Admission to NTPD program.

### **710 - BIOSTATISTICS**

*3.00 Credits*

Basic statistical procedures and more advanced statistical methods used in the pharmaceutical and medical sciences. Application of statistical methods in the development of research design and in the evaluation of clinical studies. Prerequisite: PHPR 701.

### **715 - SPECIAL TOPICS IN PHARMACY PRACTICE**

*1.00 to 3.00 Credits*

Internet based course which will be clinically or disease oriented. Can be repeated as the topic varies. Prerequisites: PHPR 701, 710, 720 and 730. DOES NOT COUNT TOWARD 68 HOUR REQUIREMENT FOR GRADUATION.

### **720 - DRUG LITERATURE EVALUATION**

*3.00 Credits*

Drug information sources (including the primary scientific literature). Processes used to make authoritative judgements based on information provided from principles of research methodology. Application of epidemiologic methods to the characteristics and events of drug use. Prerequisite: PHPR 710.

### **725 - INDEPENDENT STUDY IN PHARMACY PRACTICE**

*3.00 Credits*

Internet based course for independent research efforts. Can be repeated as the topic varies. Prerequisite: PHPR 701. DOES NOT COUNT TOWARD 68 HOUR REQUIREMENT FOR GRADUATION.

### **730 - PHARMACOKINETICS**

*5.00 Credits*

Use of mathematical and computer modeling to explore the derivation of the principles. The specific pharmacokinetic parameters of a group of drugs is discussed by investigating pharmacokinetic research literature. The application of these concepts to dosing patients is emphasized and specific case studies are included. Prerequisite: PHPR 701.

### **740 - PHYSICAL ASSESSMENT**

*3.00 Credits*

Preparation for clerkship in pharmacy practice. Experiences in various aspects of physical assessment. Prerequisite: PHPR 701.

### **750 - PATHOPHYSIOLOGY AND THERAPEUTICS: CARDIOLOGY**

*3.00 Credits*

Physiology and pathophysiology of the cardiovascular disease process covered in a standard medically related systems approach and in depth treatment of available therapeutic modalities. Discussion will also include findings of current literature and comparison to standard text material; focus on problem solving/decision making based on case examples; drug dosing; treatments of choice and investigational modes of therapy. Prerequisites: PHPR 720 and 730.

### **755 - PATHOPHYSIOLOGY AND THERAPEUTICS: RENAL**

*2.00 Credits*

Physiology and pathophysiology of the renal disease process covered in standard medically related systems approach and in depth treatment of available therapeutic modalities. Discussion will also include findings of current literature and comparison to standard text material; focus on problem solving/decision making based on case examples; drug dosing; treatments of choice and investigational modes of therapy. Prerequisites: PHPR 720 and 730.

## **760 - PATHOPHYSIOLOGY AND THERAPEUTICS: INFECTIOUS DISEASE**

### *3.00 Credits*

Physiology and pathophysiology of the infectious disease process in a standard medically related systems approach and in depth treatment of available therapeutic modalities. Discussion will also include findings of current literature and comparison to standard text material; focus on problem solving/decision making based on case examples; drug dosing; treatments of choice and investigational modes of therapy. Prerequisites: PPHR 720 and 730.

## **765 - PATHOPHYSIOLOGY AND THERAPEUTICS: CENTRAL NERVOUS SYSTEM/ PSYCHIATRIC DISEASES**

### *2.00 Credit*

Physiology and pathophysiology of the central nervous system and psychiatric diseases process covered in a standard medically related systems approach and in depth treatment of available therapeutics modalities. Findings of current literature and comparison to standard test material; focus on problem solving/decision making based on case examples; drug dosing; treatments of choice and investigational modes of therapy. Prerequisites: PPHR 720 and 730.

## **770 - PATHOPHYSIOLOGY AND THERAPEUTICS: RESPIRATORY**

### *2.00 Credit*

Physiology and pathophysiology of the respiratory process covered in a standard medically related systems approach and in depth treatment of available therapeutic modalities. Findings of current literature and comparison to standard text material; focus on problem/solving decision making based on case examples; drug dosing; treatments of choice and investigational modes of therapy. Prerequisites: PPHR 720 and 730.

## **775 - PATHOPHYSIOLOGY AND THERAPEUTICS: ENDOCRINE**

### *2.00 Credit*

Physiology and pathophysiology of the endocrine system disease process covered in a standard medically related systems approach and in depth treatment of available therapeutic modalities. Findings of current literature and comparison to standard test material; focus on problem solving/decision making based on case examples; drug dosing; treatments of choice and investigational modes of therapy. Prerequisites: PPHR 720 and 730.

## **780 - PATHOPHYSIOLOGY AND THERAPEUTICS: GI TRACT/NUTRITION**

### *2.00 Credit*

Physiology and pathophysiology of the gastrointestinal tract disease process and nutritional support covered in a standard medically related systems approach and in depth treatment of available therapeutic modalities. Findings of current literature and comparison to standard text material; focus on problem solving/decision making based on case examples; drug dosing; treatments of choice and investigational modes of therapy. Prerequisites: PPHR 720 and 730.

## **785 - PATHOPHYSIOLOGY AND THERAPEUTICS: ONCOLOGY**

### *1.00 Credit*

Physiology and pathophysiology of the cancer disease process covered in a standard medically related systems approach and in depth treatment of available therapeutic modalities. Findings of current literature and comparison to standard text material; focus on problem solving/decision making based on case examples; drug dosing; treatment of choice and investigational modes of therapy. Prerequisites: PPHR 720 and 730.

## **790 - PATHOPHYSIOLOGY AND THERAPEUTICS: DERMATOLOGY/OPHTHALMIC**

### *1.00 Credit*

Physiology and pathophysiology of disease processes, including dermatology, soft tissue, and ophthalmic, covered in standard medically related systems approach and in depth treatment of available therapeutic modalities. Findings of current literature and comparison to standard text examples; drug dosing; treatments of choice and investigational modes of therapy. prerequisites: PPHR 720 and 730.

## **800 - CLERKSHIP IN PHARMACY PRACTICE**

### *6.00 Credits*

Experiential program emphasizing delivery of pharmaceutical care in primary, secondary and tertiary care settings. At each practice setting, the pharmacist is expected to become a functioning component of the ongoing pharmaceutical care services through faculty instruction and self-learning. Sections include but are not limited to: 01-General Medicine; 02-Ambulatory Care; 03-Intensive Care; 04-Geriatrics; 07-Administrative Practice; 08-Nutrition; 09-Home Health Care; 10-Drug Information; 11-Infectious Disease; 12-Cardiology; 13-Surgical Care; 14-Pediatrics; 15-Pharmacokinetic Services; 16-Psychiatry; 17-Gastroenterology; 18-Oncology; 19-Pulmonary Medicine; 20-Research; 21-Education; 22-Emergency Medicine; 23-Long Term Care; 24-Managed Care; 25-Pharmaceutical Industry; 26-Organ Transplant; 27-Internal Medicine; 28-Preventive Medicine; 29-Neurology; 30-AIDS Education; 31-OB/GYN; 32-Poison Control. Prerequisites: PPHR 701,710, 720, 730,740, 750,755,760,765,770,775,780,785 and 790.