Semester Course Catalog Contents

The Getty College of Arts and Sciences Courses................................................................. 5

  Subject - Honors Program (HONR)................................................................................ 5

  Subject - General Arts & Sciences (AASG)..................................................................... 6

  Subject - Transitions Experience (TREX)....................................................................... 7

Department of Art and Design.............................................................................................. 7

  Subject - Art (ART)........................................................................................................... 7

  Subject - Design (DSGN)................................................................................................. 12

Department of Biological and Allied Health Sciences......................................................... 15

  Subject - Biological Sciences (BIOL)............................................................................. 15

  Subject - Clinical Laboratory Science (CLSS)............................................................... 27

  Subject - Geology (GEOL)............................................................................................. 29

Department of Communication and Theatre Arts.............................................................. 29

  Subject - Communication Studies (CACS).................................................................... 29

  Subject - Electronic Media & Broadcasting (CAEM)..................................................... 31

  Subject - Public Relations (CAPR).................................................................................. 34

  Subject - Communication & Theater Arts (CATA)......................................................... 35

  Subject - Arts Administration (TAAD).......................................................................... 36

  Subject - Dance (TADN)................................................................................................. 36

  Subject - International Theater Production (TAIP)......................................................... 39

  Subject - Musical Theater (TAMT)................................................................................ 42

  Subject - Theater (TATH)............................................................................................... 43

Department of Chemistry and Biochemistry ...................................................................... 46

  Subject - Chemistry (CHEM).......................................................................................... 46

Center for Teacher Education.............................................................................................. 53

  Subject - Early Childhood Education (ECED)............................................................... 53

  Subject - Education (EDUC)......................................................................................... 55

  Subject - Middle Childhood Education (MCED)............................................................ 59

Department of English........................................................................................................ 61

  Subject - English (ENGL).............................................................................................. 61

  Subject - ESL Program (ESL)....................................................................................... 71
Department of History, Politics, and Justice ................................................................. 72

Subject - Criminal Justice (CJ) .................................................................................. 72

Subject - Geography (GEOG) .................................................................................... 76

Subject - Geography and History - Sem (GGHS) ..................................................... 79

Subject - Geography for Marketing (GGMK) .......................................................... 79

Subject - Geography and Political Science (GGPS) ................................................. 79

Subject - History (HIST) ........................................................................................... 79

Subject - History, Political Science and Criminal Justice (HSPS) ......................... 86

Subject - Leadership Studies (LEAD) ....................................................................... 90

Subject - Political Science (PLSC) ........................................................................... 90

Department of Human Performance and Sport Sciences ..................................... 96

Subject - Activities (ACTV) ...................................................................................... 96

Subject - Water Activities (AQUA) ......................................................................... 96

Subject - Athletic Training (ATTR) .......................................................................... 96

Subject - Exercise Physiology (EXPH) .................................................................... 100

Subject - Health Education (HLED) ....................................................................... 103

Subject - Physical Education (PHED) ................................................................... 103

Subject - Sport Management (SPMG) .................................................................... 104

Subject - Varsity Sports (VARS) ............................................................................ 106

Department of Mathematics and Statistics ............................................................. 108

Subject - Mathematics (MATH) .............................................................................. 108

Subject - Statistics (STAT) ..................................................................................... 114

Department of Modern Languages .......................................................................... 118

Subject - Arabic (ARAB) ......................................................................................... 118

Subject - Chinese (CHIN) ....................................................................................... 119

Subject - French (FREN) ......................................................................................... 119

Subject - German (GERM) ...................................................................................... 122

Subject - Japanese (JAPN) ...................................................................................... 123

Subject - Modern Languages (MLNG) .................................................................. 123

Subject - Russian (RUSS) ....................................................................................... 124

Subject - Spanish (SPAN) ....................................................................................... 124

Department of Music ............................................................................................... 127
<table>
<thead>
<tr>
<th>Department</th>
<th>Start Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department of Civil Engineering</td>
<td>223</td>
</tr>
<tr>
<td>Department of Technological Studies</td>
<td>194</td>
</tr>
<tr>
<td>Department of Philosophy and Religion</td>
<td>174</td>
</tr>
<tr>
<td>Department of Psychology and Sociology</td>
<td>186</td>
</tr>
<tr>
<td>Department of Nursing</td>
<td>169</td>
</tr>
<tr>
<td>Department of Nursing (NURS)</td>
<td>169</td>
</tr>
<tr>
<td>Institute for Social Research</td>
<td>185</td>
</tr>
<tr>
<td>Institute for Social Research (ISR)</td>
<td>185</td>
</tr>
<tr>
<td>Department of Physics and Astronomy</td>
<td>181</td>
</tr>
<tr>
<td>Department of Physics (PHYS)</td>
<td>181</td>
</tr>
<tr>
<td>Institute for Social Research (ISR)</td>
<td>185</td>
</tr>
<tr>
<td>Department of Psychology and Sociology</td>
<td>186</td>
</tr>
<tr>
<td>Department of Psychology (PSYC)</td>
<td>186</td>
</tr>
<tr>
<td>Department of Sociology (SOC)</td>
<td>191</td>
</tr>
<tr>
<td>Department of Technological Studies</td>
<td>194</td>
</tr>
<tr>
<td>Department of Technological Studies</td>
<td>194</td>
</tr>
<tr>
<td>The James F. Dicke College of Business Courses</td>
<td>201</td>
</tr>
<tr>
<td>The James F. Dicke College of Business Courses</td>
<td>201</td>
</tr>
<tr>
<td>Subject - General Business (ABUS)</td>
<td>201</td>
</tr>
<tr>
<td>Subject - Accounting (ACCT)</td>
<td>201</td>
</tr>
<tr>
<td>Subject - Business Planning (BIZ)</td>
<td>203</td>
</tr>
<tr>
<td>Subject - Forensic Accounting &amp; Auditing (FAAS)</td>
<td>207</td>
</tr>
<tr>
<td>Subject - Finance (FINC)</td>
<td>209</td>
</tr>
<tr>
<td>Subject - International Business/Economics (IBEC)</td>
<td>210</td>
</tr>
<tr>
<td>Subject - Management (MGMT)</td>
<td>213</td>
</tr>
<tr>
<td>Subject - Marketing (MRKT)</td>
<td>215</td>
</tr>
<tr>
<td>Subject - Pharmaceutical Business (PHBU)</td>
<td>217</td>
</tr>
<tr>
<td>Subject - Taxation (TAX)</td>
<td>220</td>
</tr>
<tr>
<td>The Thomas Jefferson Smull College of Engineering Courses</td>
<td>223</td>
</tr>
<tr>
<td>Department of Civil Engineering</td>
<td>223</td>
</tr>
<tr>
<td>Subject - Civil Engineering (CE)</td>
<td>223</td>
</tr>
</tbody>
</table>
Department of Electrical and Computer Engineering and Computer Sciences

Subject - Electrical & Computer Engineering & Computer Sciences (ECCS)

General Engineering Courses

Subject - Engineering (ENGR)

Department of Mechanical Engineering

Subject - Mechanical Engineering (ME)

The Rudolph H. Raabe College of Pharmacy Courses

Department of Pharmaceutical and Biological Sciences

Subject - Pharmaceutical & Bio Sciences (PHBS)

Department of Pharmacy Practice

Subject - Pharmacy Practice (PHPR)
The Getty College of Arts and Sciences Courses

Subject - Honors Program (HONR)

1001 - Honors Transitions Experience
1 Credit
Facilitates the transition from high school to honors-level work through in-depth explorations of the general education and major-related themes discussed in the various college-specific Transitions Experience classes.

1231 - Honors Writing Seminar
3 Credits
Introduction to college-level writing skills, including critical reading of challenging texts, advanced argumentation, researching and incorporating outside sources, and writing essays. Meets university first-year writing requirement.

2001 - Hon Extradisciplinary Sem
3 Credits
Topics include but are not limited to: Minds and Computers; Encountering the Other; Innovation, Creativity, and the Entrepreneurial Mindset. Meets university extra-disciplinary seminar requirement. This course may be repeated 2 times.

2011 - Honors General Education Seminar
3 Credits
Topics include but are not limited to: Asian Studies, Corporate Culture, The Study of Human Language, Disease and Society, Energy Systems, Animatronics, Cryptography, and The Big Ideas in Physics. Will be tagged to meet a University General Education Outcome. This course may be repeated 2 times.

2021 - Honors Cultural Understanding Seminar
3 Credits
Topics include but are not limited to: Theories of Human Nature, Prophets in the Ancient Near East, and Sub-Saharan West African Cultures as Portrayed in Film. Will be tagged to meet the "understanding of diverse cultures" University General Education Outcome. This course may be repeated 1 time.

2041 - Honors Great Works Seminar
3 Credits
Reading and writing about significant works of literature. Topics include but are not limited to: Pushing the Boundaries-Exploration and Pioneering in the New World, The American Novel, Medieval Roots-Tolkien's Lord of the Rings, Film Adaptation, and Medicine in Literature.

2261 - Honors Nonverbal Communication Seminar
3 Credits
The multiple facets of communication that involve things other than actual words. How people communicate using the eyes, touch, the environment, time, space, color, smell and other nonverbal
2401 - Honors Professional Ethics
3 Credits
Major ethical theories and their application to professions and topics that arise in the professional setting. The role of institutions in ethical theory, the nature of professions, and responsibilities to clients and the public.

3011 - Honors Advanced Seminar
3 Credits
Topics include but not limited to: History of American Popular Culture, The Witch Hunt 1450-1700. This course may be repeated 1 time.

3801 - Honors Experiential Contract
1 Credit
Work done under supervision of ONU Faculty in conjunction with or following up on experiential learning, including but not limited to: study abroad, internships, co-ops, practicums, and service. This course may be repeated 1 time.

3851 - Honors Research Contract
1 Credit
Research work done under supervision of ONU Faculty. Including but not limited to research done in conjunction with laboratory classes, or following up on research experience for undergraduates. This course may be repeated 1 time.

3991 - Honors Capstone Enhancement Research
1 Credit
Research for the Honors Capstone Enhancement. May be repeated for credit up to a total of 6 hours. This course may be repeated 1 time.

4001 - Honors Capstone Enhancement
1 Credit
Final version of the Honors Capstone Enhancement and oral presentation.

Subject - General Arts & Sciences (AASG)

0961 - Study Skills
1 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. CREDIT EARNED DOES NOT SATISFY GRADUATION REQUIREMENTS FOR ANY PROGRAM OFFERED AT THE UNIVERSITY. Formerly AASG 010.

0971 - Intro to College Reading
2 Credits
Designed to increase reading proficiency by focusing on comprehension, vocabulary, reading speed, and
study skills. Reading ACT score of 18 or below OR enrollment in AASG 0991 required. CREDIT EARNED DOES NOT SATISFY GRADUATION REQUIREMENTS FOR ANY PROGRAM OFFERED AT THE UNIVERSITY. Formerly AASG 005.

0991 - Intro to College Writing
3 Credits
Intensive instruction and practice in college-level writing. English ACT score of 16 or below required. Student must pass writing proficiency to progress to ENGL 1221. CREDIT EARNED DOES NOT SATISFY GRADUATION REQUIREMENTS FOR ANY PROGRAM OFFERED AT THE UNIVERSITY. Formerly ENGL 105. This course must be taken with AASG 0971.

1951 - Publication Activities Pract
1 Credit
Participation in design, photography, writing and producing the Ohio Northern University yearbook. Graded S/U. Formerly AASG 110. This course is repeatable for a total of 12 hours.

3001 - Career Search Strategies
1 Credit
An experiential environment facilitating learning skills that enable development and implementaiton of personalized and successful intern, professional employment and graduate/professional school search strategies. Not open to freshman.

Subject - Transitions Experience (TREX)

1001 - Transitions Experience
3 Credits
Designed to facilitate students' transition from high school to university by introducing the skills and habits of mind necessary for success at this level. Individual sections will be designed around topics that deal with various disciplines. Students will develop critical and creative thinking skills and make connections between their major and the general education program.

Department of Art and Design

Subject - Art (ART)

1101 - Visual Foundations 1
3 Credits
Composition, perception and analysis of visual space through direct observation and the manipulation of elements and principles of design. Offered fall semester.

1111 - Visual Foundations 2
3 Credits
Drawing and design as a means of expression, invention and communication through interaction of
perceptual skills, visual language, subject matter and color organization, phenomena, and interaction. Offered spring semester. Prerequisite(s): ART 1101 Minimum Grade of D

1501 - 3-D Design
3 Credits
The visual language, methods and techniques of three-dimensional design. Emphasis on conceptual thinking skills. Offered spring semester.

1601 - First Year Seminar
1 Credit
Familiarization to areas of art and design research, scholarship, and study within visual experiences and across disciplines. Graded S/U. Offered fall semester.

1651 - Visual Literacy
3 Credits
Analysis into the theories, practices, techniques, language and media of the visual arts and design. Fundamentals of art historical study, styles and periods. Focus on major works from prehistoric world through contemporary issues to cultural and social contexts. Emphasis on identifying relationships between composition, form and content. Offered fall and spring semesters.

1981 - Special Topics in Art
1 to 3 Credits
Topics in art. Enrollment restricted to attendees of the Summer Honors Institute. Graded S/U. May repeat as topic varies. This course may be repeated 3 times.

1991 - Special Topics in Art and Design
1 to 3 Credits
May repeat as topic varies. This course may be repeated 2 times.

2111 - Life Drawing
3 Credits
Composition, proportion, structure and form from direct observation of the human figure. Offered spring semester. Prerequisite(s): ART 1111 Minimum Grade of D.

2201 - Painting 1
3 Credits
Concepts and competencies of oil painting through composition and the creation of form via direct observation. Offered fall semester.

2211 - Painting 2
3 Credits
Creating and controlling visual space and form and their relationship to composition. Offered alternate spring semesters. Prerequisite(s): ART 2201 Minimum Grade of D.

2251 - Watercolor
3 Credits
Concepts, competencies and techniques of aqueous media through composition. Offered alternate
spring semesters. This course may be repeated 2 times.

2401 - Ceramics 1
3 Credits
Composition and methods of forming clay objects using various hand building and wheel throwing techniques, including decorating, glazing and firing. Offered fall semester.

2411 - Ceramics 2
3 Credits
Advanced methods and techniques of forming clay objects; hand building, wheel throwing, glazing and firing. Offered spring semester. Prerequisite(s): ART 2401 Minimum Grade of D.

2501 - Sculpture: Additive & Subtractive
3 Credits
The composition and rendering of sculpture in clay, plaster, wood, and stone. Emphasis on technical skills and the organization of form and space. Offered alternate fall semesters.

2551 - Sculpture: Small Metals
3 Credits
The visual language, concepts, materials and technical skills of small-scale sculpture. Offered alternate spring semesters.

2601 - Art History 1
3 Credits
Western tradition of painting, sculpture and architecture from the Prehistoric era through the Renaissance. Offered fall semester.

2611 - Art History 2
3 Credits
Western tradition of painting, sculpture and architecture from the 16th century to contemporary. Offered spring semester.

2651 - Non-Western Art
3 Credits
Painting, sculpture and architecture beyond the Western tradition such as India, Southeast Asia, Africa, Japan, Korea, the Pacific area and the Americas. Offered alternate spring semesters. This course may be repeated 2 times.

2801 - Book Arts
3 Credits
Extradisciplinary seminar. History of the book structure and reproduction of historic bindings. Offered spring semester.

2861 - The Art of Tea Pots
3 Credits
Extradisciplinary seminar. Study of the impact of Japan's Seven Year War in Korea on the development of Japanese ceramics.
2991 - Special Topics in Art and Design
1 to 3 Credits
May repeat as topic varies. This course may be repeated 2 times.

3301 - Print and Paper 1
3 Credits
Methods, techniques, and materials of the silkscreen print process on handmade paper. Offered alternate spring semesters.

3311 - Print and Paper 2
3 Credits
Methods, techniques, and materials of relief print processes on handmade paper. Offered alternate spring semesters.

3501 - Sculpture: Mold Making & Casting
3 Credits
The composition and methods of plaster molds for reproduction and altering of direct cast ceramics and in lost wax casting of bronze. Emphasis on organizational problems of form and space. Offered alternate spring semesters.

3511 - Sculpture: Installation
3 Credits
Design of sculptural environments and site-specific work. Offered alternate fall semesters.

3991 - Special Topics in Art and Design
1 to 3 Credits
May repeat as topic varies. This course may be repeated 2 times.

4101 - Advanced Illustration
3 Credits
Innovative visual solutions in illustration and the mastery of advanced techniques through creative and professional work habits. Offered spring semester. Prerequisite(s): ART 1111 Minimum Grade of D. This course may be repeated 2 times.

4111 - Advanced Life Drawing
3 Credits
Structure of the human body with the aim of producing drawings of greater structural and visual integrity. Offered spring semester. Prerequisite(s): ART 2111 Minimum Grade of D. This course may be repeated 2 times.

4201 - Advanced Painting
3 Credits
Creating and controlling pictorial space and form and their relationship to concept and composition. Offered spring semester. Prerequisite(s): ART 2211 Minimum Grade of D. This course may be repeated 2 times.
4301 - Advanced Print and Paper
3 Credits
Self-directed study in printmaking and papermaking processes. Offered spring semester. Prerequisite(s): ART 3301 Minimum Grade of D or ART 3311 Minimum Grade of D. This course may be repeated 2 times.

4401 - Advanced Ceramics
3 Credits
Directed study. Offered fall and spring semesters. Prerequisite(s): ART 2411 Minimum Grade of D. This course may be repeated 2 times.

4501 - Advanced Sculpture
3 Credits
Directed study. Offered fall and spring semesters. Prerequisite(s): ART 3501 Minimum Grade of D or ART 3511 Minimum Grade of D. This course may be repeated 2 times.

4691 - Seminar in Art and Design
1 to 3 Credits
May repeat as topic varies.
This course may be repeated 4 times.

4801 - Advanced Book Arts
3 Credits
Relationship between the book, text and image through narrative, pacing, and techniques in illustration, drawing and printmaking. Traditional and non-traditional applications utilized. May repeat to 6 credits. Offered spring semester. Prerequisite(s): ART 2801 Minimum Grade of D. This course may be repeated 2 times.

4901 - Senior Capstone in Art 1
3 Credits
Yearlong investigative project that synthesizes liberal arts and major learning objectives. Offered fall semester.

4911 - Senior Capstone in Art 2
3 Credits
Culmination and presentation of demonstrated knowledge of practices, methods, theories, concepts, and issues. Offered spring semester. Prerequisite(s): ART 4901 Minimum Grade of C.

4921 - Externship
1 to 3 Credits
Supervised field experience in an approved studio, agency, firm, department, museum, university, arts organization, or non-profit. International or domestic study may count toward requirement with department authorization. Approval of department required prior to registration. Formal presentation to department required after completion. Offered fall and spring semesters. This course is repeatable for a total of 11 hours.

4981 - Independent Study in Art
1 to 3 Credits
May repeat as topic varies. Offered fall and spring semesters.

**4991 - Special Topics in Art and Design**

1 to 3 Credits
May repeat as topic varies.
This course may be repeated 2 times.

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**Subject - Design (DSGN)**

**1101 - Photography and Communication**

3 Credits
Communication in the context of image creation; composition and technical skills through aesthetics and style. Methods in concept, image and form development, presentation formats, sequence and narrative. Offered spring semester.

**1201 - Introductory Visual Communication Design**

3 Credits
Basic methods, processes, language, composition and theory of working in two-dimensional communication design. Emphasis on problem analysis, creative concept development, analytical and technical skills. Offered fall semester.

**1301 - Typography**

3 Credits
Examines typographic changes brought about through cultural, political and sociological influences; language theories; and technological development. Integrates lessons from the past with contemporary theory and technology. Lectures based on four language components: letter and word, sentence and meaning, language and structure, text and textuality. Offered fall semester.

**1981 - Special Topics in Design**

1 Credit
Topics in design. Enrollment restricted to attendees of the Summer Honors Institute. Graded S/U. May repeat as topic varies. This course may be repeated 3 times.

**1991 - Special Topics in Design**

1 to 3 Credits
May repeat as topic varies. This course may be repeated 2 times.

**2101 - Advanced Photography and Communication**

3 Credits
Visual language in context of form, content and meaning; aesthetics and style; sequence and narrative. May repeat to 6 credits. Offered spring semester. Prerequisite(s): DSGN 1101 Minimum Grade of D. This course may be repeated 1 time.

**2401 - Narrative Structures**

3 Credits
Design thinking and the exploration of the nature and practice of visual communication as a story-telling
and framing activity in print media. Emphasis on research, concept development and technical skills. Offered spring semester. Prerequisite(s): DSGN 1301 Minimum Grade of D.

2601 - Design Research Methods
3 Credits
Research design, gathering, analysis, application and presentation of information for graphic designers. Emphasis on role of research in problem solving process, from initial client intake, to problem definition, design requirements, screening, selection and refinement, to implementation and postproject evaluation. Offered alternate fall semesters.

2651 - History of Graphic Design
3 Credits
Events, ideas, movements, artifacts and designers that have historical significance and influence on contemporary graphic design and the profession. Exploration of the role of design in society and the nature, influence and impact of changing design methods, materials, technologies, theories and values. Offered alternate fall semesters.

2801 - Design for Social Change
3 Credits
Design thinking and the examination of historical, cultural, political or environmental relationships as it pertains to the ways in which design can improve our world. May repeat as topic varies. Offered alternate spring semesters. This course may be repeated 2 times.

2991 - Special Topics in Design
1 to 3 Credits
May repeat as topic varies. This course may be repeated 2 times.

3401 - Packaging and Identity Design
3 Credits
Investigation of comprehensive applied problems in visual communication addressing design identity, branding programs and consumer-oriented design. Offered fall semester. Prerequisite(s): DSGN 1301 Minimum Grade of D.

3501 - Persuasive Design
3 Credits
Examination of form, content and context that shape persuasive communication including commercial, political and social contexts; persuasive strategies, critical techniques and ethical issues in shaping design. Offered spring semester. Prerequisite(s): DSGN 2401 Minimum Grade of D.

3551 - Advertising Design 1
3 Credits
Form and content that shape communication branding strategies in advertising design. Examination of concept development, the psychology of effective visual messages and the creative, intelligent, emotional and persuasive writing/images of ad campaigns. Offered alternate spring semesters. Prerequisite(s): DSGN 2401 Minimum Grade of D.
3561 - Advertising Design 2
3 Credits
Design thinking of integrated communications into media, three-dimensional artifacts and campaigns as an extension of brand experience and strategic solutions. Offered alternate spring semesters. Prerequisite(s): DSGN 3551 Minimum Grade of D.

3701 - Visual Interface Design
3 Credits
Communication design of visual interfaces and the analytical behavioral, cognitive and linguistic dimensions of designing for dynamic information environments. May repeat to 6 credits. Offered fall semester. Prerequisite(s): DSGN 1301 Minimum Grade of D. This course is repeatable for a total of 3 hours.

3751 - Interactive Design and Identity
3 Credits
Design thinking and processes in the context of e-commerce, branding and identity, usability and hierarchical form. May repeat to 6 credits. Offered spring semester. Prerequisite(s): DSGN 1301 Minimum Grade of D. This course is repeatable for a total of 3 hours.

3991 - Special Topics in Design
1 to 3 Credits
May repeat as topic varies. This course may be repeated 2 times.

4201 - Advanced Visual Communication Design
3 Credits
Design thinking and processes in the context of transformation design; interdisciplinary design issues addressed as a means of participation, response, adaptation and innovation beyond traditional design solutions to create fundamental change. May repeat as topic varies. Offered spring semester. Prerequisite(s): DSGN 3501 Minimum Grade of D. This course may be repeated 2 times.

4601 - Professional Practices in Design
3 Credits
In-house design and project management issues with emphasis on collaborative communication problem-solving, designer/client relationships, research strategies, legal issues, production methods and ethics in design. May repeat to 6 credits. Offered fall semester. This course is repeatable for a total of 3 hours.

4691 - Seminar in Design
1 to 3 Credits
May repeat as topic varies. This course may be repeated 4 times.

4901 - Senior Capstone in Design 1
3 Credits
Yearlong investigative project that synthesizes liberal arts and departments learning objectives. Offered fall semester.

4911 - Senior Capstone in Design 2
3 Credits
Culmination and presentation of demonstrated knowledge of practices, methods, theories, concepts, and issues. Offered spring semester. Prerequisite(s): DSGN 4901 Minimum Grade of C.

4921 - Internship
1 to 3 Credits
Supervised field experience in an approved commercial studio, agency, firm, department, museum, gallery, arts organization, or non-profit. Approval of department required prior to registration. Formal presentation to department required after completion. Offered fall and spring semesters. This course is repeatable for a total of 11 hours.

4981 - Independent Study in Design
1 to 3 Credits
May repeat as topic varies.

4991 - Special Topics in Design
1 to 3 Credits
May repeat as topic varies. This course may be repeated 2 times.

Department of Biological and Allied Health Sciences

Subject - Biological Sciences (BIOL)

1031 - Life and Earth Sciences for Early and Middle Childhood Education Majors
3 Credits
Diversity, evolution, ecology, cell biology, inheritance and earth science as they affect and have affected life on earth. For early childhood and middle childhood majors only. A Nature Center use fee is charged. DOES NOT SATISFY ANY REQUIREMENTS FOR THE MAJOR IN BIOLOGY, CLINICAL LABORATORY SCIENCE, MOLECULAR BIOLOGY. Formerly BIOL 103. Offered fall semester.

1101 - Principles and Concepts of Human Biology
3 Credits
This course is designed to take the basic principles of cell structure and function and incorporate them into a working knowledge of the organ systems of the human body by using hands-on experiments and laboratory exercises to reinforce concepts presented in lecture. Formerly BIOL 110. Open to NURS and PHBU only. Offered fall semester.

1201 - Introductory Biology
4 Credits
An introduction to the concepts underlying the structure and function of cells including their organization, chemical foundations, metabolism, and the principles and mechanisms of heredity and gene expression. Laboratory activities emphasize the scientific method in exploring these topics. For NON-MAJORS.

1311 - Biology 1: Cells and Molecules
4 Credits
An introduction to the concepts underlying the structure and function of cells including their
organization, chemical foundations, metabolism, and the principles and mechanisms of heredity and gene expression. Laboratory activities emphasize the scientific method in exploring these topics. Offered fall and spring semesters.

### 1321 - Biology 2: Organismal Biology

**Credits**: 4

Comprehensive integrated study of plant and animal anatomy and physiology focusing on the major systems. Corresponding inquiry-based laboratories complement the lecture. Offered fall and spring semesters. Prerequisite(s): BIOL 1311 Minimum Grade of D.

### 1341 - Human Anatomy and Histology

**Credits**: 4

Basic anatomy of human tissues and organ systems at the gross and microscopic levels. Offered spring semester. Prerequisite(s): BIOL 1311 Minimum Grade of D. Corequisite(s): BIOL 1361.

### 1361 - Lab for Human Anatomy and Histology

**Credits**: 0

Lab for BIOL 1341. Human systems studied using cat dissection, radiographs, anatomical models and histological slides. Offered spring semester. Prerequisite(s): BIOL 1311 Minimum Grade of D. Corequisite(s): BIOL 1341.

### 1911 - Summer Honors Institute - Special Topics

**Credit**: 1

Topics in Biological and Allied Health Sciences field. Enrollment is restricted to attendees of the Summer Honors Institute. May be repeated as the topic varies. Graded S/U.

### 1951 - Biology Orientation

**Credit**: 1

Presentations and discussions relating to adjustment and requirements of academic life within the University, College and the Department of Biological & Allied Health Sciences. Graded S/U. Offered fall semester.

### 2001 - Biology 3: Diversity of Life

**Credits**: 4

Investigations of ecological and evolutionary processes, biodiversity, phylogenetic relationships, and paleogeography. Offered fall and spring semesters. Prerequisite(s): BIOL 1321 Minimum Grade of D.

### 2011 - Environmental Issues

**Credits**: 3

The interaction of humans and their surroundings with an emphasis on the problems arising from increasing human population, pollution, and resource use. Offered fall and spring semesters.

### 2041 - Systematic Plant Survey

**Credits**: 3

The phylogeny, classification, morphology, and development of selected plant and algal taxa. A Nature
Center use fee is charged. Offered alternate fall semesters. Prerequisite(s): BIOL 2001 Minimum Grade of D.

2101 - Genetics  
4 Credits  
Cytogenetics, Mendelian, molecular, and population genetics. Molecular genetics has an emphasis on biotechnology. Labs are paper and computer based. Emphasis on human genetics. Offered fall semester. Prerequisite(s): BIOL 1311 Minimum Grade of D and BIOL 1321 Minimum Grade of D.

2131 - Natural History  
2 Credits  
The recognition, identification, and understanding of local biotic communities and their inhabitants. Field study is emphasized. A Nature Center use fee and lab fee are charged. Offered spring semester.

2151 - Microbiology for Nurses  
3 Credits  
The characteristics and control of microorganisms related to human infectious disease. Enrollment restricted to Nursing majors. Offered spring semester. Prerequisite(s): BIOL 2311 Minimum Grade of D or BIOL 231 Minimum Grade of D. Corequisite(s): BIOL 2231.

2171 - Molecular Biology  
3 Credits  
Structure and function of DNA, RNA and Proteins. Transcription, gene regulation, mobile DNA, and molecular evolution. On each topic prokaryotes and eukaryotes are compared. Lab is focused on molecular techniques. A lab fee is charged. Offered fall and spring semesters.

2191 - Forensic Biology 1  
4 Credits  
Introduction and Investigating the Crime Scene, Identifying and Processing Physical Evidence including, Hair and Fibers, Glass, Fingerprints, Questioned Documents, Firearms, Inorganic substances: Determination of Trace Metals from Gunshot Residue, Arson, Drugs of Abuse, Toxicology, Biological Fluids and Introduction to Forensic DNA Typing, Explosives and Detection of Weapons of Mass Destruction will be covered. Introduction to theory and practice of forensic chemical analysis from spot tests through instrumentation including practical application of this instrumentation. A laboratory fee is charged. High school biology, chemistry and physics are required. Offered fall semester.

2231 - Invertebrate Zoology  
3 Credits  
The diversity, ecology, evolution, morphology and developmental biology of invertebrate animals. Emphasis on major phyla. A lab fee is charged. Offered spring semester. Prerequisite(s): BIOL 2001 Minimum Grade of D.

2291 - Forensic Biology 2  
4 Credits  
This course is a continuation of the Forensic Biology 2191 course. Topics will include the practice of forensic sciences including an emphasis on forensic toxicological methods and includes Legal Aspects of Forensic Science, Admissibility Standards for Forensic Evidence in the Courts, including aspects of
Federal Rules of Evidence, Frye and Daubert Hearings. Ethical considerations of past and present issues. In addition, the introduction to the practice of quality assurance and quality control in the laboratory. A lab fee is charged. Offered fall semester. Prerequisite(s): BIOL 2191 Minimum Grade of D or BIOL 219 Minimum Grade of D.

2311 - Anatomy and Physiology 1
3 Credits
Cells, tissues, skin, nervous, endocrine, skeletal, muscular, and cardiovascular systems. CREDIT CANNOT BE RECEIVED FOR BOTH BIOL 2311 AND BIOL 3241. Offered fall and spring semesters. Prerequisite(s): BIOL 1101 Minimum Grade of D or BIOL 110 Minimum Grade of D or BIOL 1321 Minimum Grade of D or BIOL 1341 Minimum Grade of D or BIOL 124 Minimum Grade of D.

2321 - Anatomy and Physiology 2
3 Credits
Continuation of BIOL 2311. Blood, lymphatic, respiratory, digestive, excretory, and reproductive systems. CREDIT CANNOT BE RECEIVED FOR BOTH BIOL 2321 AND BIOL 3251. Offered fall and spring semesters. Prerequisite(s): BIOL 2311 Minimum Grade of D or BIOL 231 Minimum Grade of D.

2381 - Emergency Medical Technician Training
1 Credit
Ohio Department of Public Safety certified training program. Successful completion of course requirements, and National Registry of Emergency Medical Technicians examination provides national EMT_Basic certification. Open to all students only with permission of the instructor. DOES NOT COUNT TOWARD THE MAJOR IN BIOLOGY. Offered fall semester.

2401 - OSHA 40 Hour Safety Training
2 Credits
Response operations for the remediation incidents involving hazardous materials. Provided by arrangement with the Rhodes State College in Lima. DOES NOT COUNT AS A BIOLOGY COURSE. Offered fall semester.

2451 - OSHA Refresher
1 Credit
Complies with requirements regarding annual follow-up training for hazardous waste site workers who have previously completed BIOL 240 (OSHA Safety Training). Taught at the Rhodes State College in Lima. May be repeated three times for credit. Graded S/U. DOES NOT COUNT AS A BIOLOGY COURSE. Offered fall semester. This course may be repeated 3 times.

2511 - Ecology
4 Credits
Study of the theory and application of how organisms interact with their biotic and abiotic environment. Considers organismal-, population-, community-, and ecosystem-level ecology. Offered fall semester. Prerequisite(s): BIOL 2001 Minimum Grade of D.

2531 - Nutrition for Nurses
3 Credits
The maintenance of health through conventional dietary strategies, energy factors associated with body weight and the pathology of various body systems with corresponding medical nutrition therapies.
Enrollment is restricted to Nursing majors. Offered spring semester. Prerequisite(s): BIOL 2311 Minimum Grade of D or BIOL 231 Minimum Grade of D and BIOL 2321 Minimum Grade of D or BIOL 232 Minimum Grade of D.

2551 - Epidemiology
3 Credits
A broad overview of the field of epidemiology, with heavy emphasis on infectious diseases. Students will explore the relationship between behavior and health or disease, learn to identify patterns of disease transmission, and learn how to design an effective epidemiological study and how to evaluate and interpret the results of published studies. Offered spring semester. Prerequisite(s): BIOL 2001 Minimum Grade of D.

2591 - Forensic Crime Scene Investigation
4 Credits
The techniques of crime scene investigation and reconstruction will emphasize recognition and search, collection and preservation of physical evidence. Exercises will require acquisition of skills to sketch, note take and photograph crime scenes and evidence. Emphasis will be on the goal of crime scene reconstruction. Practical techniques for fingerprint evidence recovery, cast and impressions along with bloodstain evidence and crime scene photography will be practiced. A laboratory fee is charged. Offered spring semester. Prerequisite(s): BIOL 2291 Minimum Grade of D or BIOL 239 Minimum Grade of D.

2631 - Biogeography
4 Credits
Current and historic distribution of plants and animals related to major geological and evolutionary concepts. A Nature Center use fee is charged. Offered alternate spring semesters. Prerequisite(s): BIOL 2001 Minimum Grade of D.

2691 - Forensic Computer Analysis
4 Credits
History of Computer crime, investigations of pre-search and on-scene activities, data analysis and file recovery on devices such as computer and cell phones. Actual in class secured network simulations. Hands-on activities utilizing FBI approved software. A laboratory fee is charged. Formerly BIOL 229. Offered spring semester. Prerequisite(s): BIOL 2191 Minimum Grade of D or BIOL 219 Minimum Grade of D.

2751 - Medicinal Herbs
1 Credit
Students will identify locally growing medicinal herbs, learn current and historical medicinal uses for herbs from many locales and practice hands-on techniques for preparation of herbal remedies. Students will participate in a Service Learning Project to establish a medicinal herb garden on campus, develop an educational pamphlet to serve as a self guided tour of the garden, develop web pages as an educational tool for the herb garden website and deliver a class presentation on one herb. Offered spring semester.

2901 - Special Topics in Biological Sciences
1 to 3 Credits
Grading system at the discretion of the instructor. May be repeated for credit as the topic varies.
Formerly BIOL 290. Offered fall and spring semesters.

3011 - Developmental Anatomy
3 Credits
Development of the embryo through the first 8 weeks, as well as germ cell formation, fertilization, conception, and implantation events. Comparative embryological development presented, with focus on human development. Offered spring semester. Prerequisite(s): BIOL 2001 Minimum Grade of D.

3021 - Human Anatomy
4 Credits
Human body systems using x-rays, MRIs, skeletal material, and cadaver dissection. A lab fee is charged. Offered fall semester. Prerequisite(s): ( BIOL 2001 Minimum Grade of D)

3031 - Histology
4 Credits
Human cells, tissues, organs, and systems studied at the microscopic level. Offered fall semester.

3051 - Environmental Toxicology
3 Credits
Effects of both man-made and natural toxic agents in plant and animal systems. Offered fall semester. Prerequisite(s): ( BIOL 1311 Minimum Grade of D and BIOL 1321 Minimum Grade of D and BIOL 2001 Minimum Grade of D and ( CHEM 1721 Minimum Grade of D or CHEM 1821 Minimum Grade of D) and ( CHEM 173 Minimum Grade of D or CHEM 183 Minimum Grade of D) and ( CHEM 100 Minimum Grade of D and CHEM 114 Minimum Grade of D and CHEM 115 Minimum Grade of D) or ( CHEM 172 Minimum Grade of D and CHEM 114 Minimum Grade of D and CHEM 115 Minimum Grade of D) or ( CHEM 172 Minimum Grade of D and CHEM 115 Minimum Grade of D).

3091 - Integrated Plant Anatomy and Physiology
4 Credits
Principles of vascular plant morphology, anatomy, and ultrastructure are integrated with the basic physiological processes of growth, development, transport, and response to the environment. Formerly BIOL 308 and BIOL 310. Offered alternate spring semesters. Prerequisite(s): BIOL 2001 Minimum Grade of D.

3111 - Microbiology
4 Credits
Students will be expected to master the basic principles of microbiology. Although students will focus their studies on the different groups of bacteria and viruses, a brief survey of fungi, algae, and protozoans will also be performed. The significance of microbes will be discussed in terms of their medical, environmental, economical, and research importance as students practice laboratory techniques for culturing, identifying, and manipulating them. Offered spring semester. Prerequisite(s): BIOL 2001 Minimum Grade of D.

3131 - Medical Microbiology
4 Credits
Microbial cell biology, antimicrobial chemotherapy, interactions of microorganisms with humans and other organisms, microbial diversity. Offered fall and spring semesters. Prerequisite(s): BIOL 1321
Minimum Grade of D or BIOL 1341 Minimum Grade of D or BIOL 2001 Minimum Grade of D or CHEM 173 Minimum Grade of D.

3151 - Medical Terminology
1 Credit
Students will master the vocabulary of the medical field as it pertains to the ten major body systems. Additionally, students will review medical terminology associated with the following specific related disciplines: pharmacology, optometry, otorhinolaryngology, emergency medicine, gerontology, radiology, oncology, physical therapy, occupational therapy, rehabilitation services, surgery, psychiatry, alternative medicine, and pediatrics. Offered fall semester. Prerequisite(s): BIOL 1321 Minimum Grade of D.

3191 - Forensic Microscopy
3 Credits
Introduction to fundamentals of light and optics, to advanced microscopical analysis including forensic sample analysis utilizing bright field, dark field, polarizing, fluorescent and phase contrast microscopy. Laboratory application to forensic science for identification of hairs, fibers and trace evidence. A laboratory fee is charged. Offered fall semester. Prerequisite(s): BIOL 2291 Minimum Grade of D or BIOL 239 Minimum Grade of D.

3221 - Bioscience Laboratory
1 Credit
Methods used in drug development; routine histological techniques, and in vitro and in vivo drug screening. In vivo models of selected diseases are presented. Experimental data analysis in microbiology, molecular biology and cell biology. A lab fee is charged. Formerly BIOL 322 and BIOL 323. Offered fall semester. Prerequisite(s): (BIOL 1341 Minimum Grade of D) and (BIOL 1361 Minimum Grade of D) and (BIOL 3111 Minimum Grade of D or BIOL 3131 Minimum Grade of D).

3241 - Medical Physiology 1
4 Credits
The first in a sequence of two courses that provides an in-depth survey of human physiology systems. The course includes didactic lectures, group discussion/scenario problem solving, and laboratories that present comparisons across various vertebrate and invertebrate species. The laboratories closely follow the content presented in lectures and incorporate some classical experiments pertaining to neural, skeletal muscle, and gastrointestinal physiology. Students will also work in teams to conduct literature reviews, design research proposals, and present these designs in podium presentations. Offered fall semester. Prerequisite(s): (BIOL 2001 Minimum Grade of D and (CHEM 1721 Minimum Grade of D or CHEM 1821 Minimum Grade of D) and (CHEM 173 Minimum Grade of D or CHEM 183 Minimum Grade of D) and (CHEM 100 Minimum Grade of D and CHEM 114 Minimum Grade of D and CHEM 115 Minimum Grade of D) or (CHEM 172 Minimum Grade of D and CHEM 114 Minimum Grade of D and CHEM 115 Minimum Grade of D) or (CHEM 171 Minimum Grade of D and CHEM 114 Minimum Grade of D and CHEM 115 Minimum Grade of D) or (CHEM 172 Minimum Grade of D and CHEM 115 Minimum Grade of D).

3251 - Medical Physiology 2
4 Credits
The second in a sequence of two courses that provides an in-depth survey of human physiology systems. The course includes didactic lectures, group discussion/scenario problem solving, and laboratories that incorporate some classical experiments pertaining to cardiovascular, respiratory, renal, endocrine and
reproductive physiology. Students will work in teams to collect, analyze and interpret data pertaining to the approved research protocols submitted in Medical Physiology I, and will present their findings in oral (poster) and written formats. Offered spring semester.

3291 - Forensic Physical Methods
4 Credits
Introduction to advanced examination of firearms evidence, gunshot residue analysis, tool mark identification, vehicle lamp examination, serial number restoration and forensic shooting reconstruction and advanced fingerprint identification and latent prints with practical application of the Cogent CAFIS software and interpretation. An introduction to ACE-V application of the paradigm of analysis, comparison, evaluation and verification. A laboratory fee is charged. Offered fall semester.

3311 - Physiology 1
4 Credits
The first in a sequence of two courses that provides an in-depth survey of human physiology systems. The course includes didactic lectures, pharmacy connections and practical applications of physiological principles through scenario analyses. Major themes covered in this course include: transport across the plasma membrane, the somatic and autonomic nervous systems, smooth and skeletal muscle physiology, and the gastrointestinal system. Restricted to Pharmacy majors. Offered fall semester. Prerequisite(s): ( BIOL 1341 Minimum Grade of D and ( CHEM 1721 Minimum Grade of D or CHEM 1821 Minimum Grade of D) and ( CHEM 173 Minimum Grade of D or CHEM 183 Minimum Grade of D) and ( CHEM 100 Minimum Grade of D and CHEM 114 Minimum Grade of D and CHEM 115 Minimum Grade of D) or ( CHEM 172 Minimum Grade of D and CHEM 114 Minimum Grade of D) or ( CHEM 171 Minimum Grade of D and CHEM 114 Minimum Grade of D) or ( CHEM 172 Minimum Grade of D and CHEM 115 Minimum Grade of D).

3321 - Physiology 2
4 Credits
The second in a sequence of two courses that provides an in-depth survey of human physiology systems. The course includes didactic lectures, pharmacy connections and practical applications of physiological principles through scenario analyses. Offered spring semester. Prerequisite(s): BIOL 3311 Minimum Grade of D.

3401 - Professional Experience Co-op
4 Credits
Experience in a biologically or environmentally-related occupation with a governmental, consulting or industrial entity. Junior status and approval of the Department Chair is required. Graded S/U. Offered fall semester.

3431 - Histological Techniques
3 Credits
Principles and procedures used in the preparation of biological specimens for microscopic study. Techniques include tissue spreads and smears, and paraffin and frozen sections using routine and histochemical stains. Offered alternate spring semesters. Prerequisite(s): ( BIOL 1311 Minimum Grade of D) and BIOL 1321 Minimum Grade of D)

3511 - Cell Biology
3 Credits
Students will be expected to integrate lecture and laboratory data regarding cell structure and function to develop an understanding of eukaryotic cells as dynamic entities. Offered spring semester.

Prerequisite(s): ( BIOL 2101 Minimum Grade of D or BIOL 210 Minimum Grade of D and ( CHEM 1721 Minimum Grade of D or CHEM 1821 Minimum Grade of D) and ( CHEM 173 Minimum Grade of D or CHEM 183 Minimum Grade of D) and ( CHEM 100 Minimum Grade of D and CHEM 114 Minimum Grade of D and CHEM 115 Minimum Grade of D) or ( CHEM 172 Minimum Grade of D and CHEM 114 Minimum Grade of D) or ( CHEM 171 Minimum Grade of D and CHEM 114 Minimum Grade of D) and CHEM 115 Minimum Grade of D) or ( CHEM 172 Minimum Grade of D and CHEM 115 Minimum Grade of D).

3521 - Integrated Cell and Molecular Biology Laboratory
2 Credits
Execution of advanced research techniques in molecular/cellular biology utilizing plant and animal model systems with added emphasis on data analysis and interpretation. Offered fall and spring semesters. Corequisite(s): BIOL 2171 and BIOL 3511.

3541 - Bioinformatics
4 Credits
Introduction to the use of data mining using the extensive NCBI-based applications for the field of genomic and proteomics analysis. Computer-based laboratory and homework exercises using NCBI databases and other public domain sequence sources to explore genetic diseases, antibiotic resistance, protein function, the relationship between RNA sequence and protein structure prediction, and molecular phylogenetics with a slant to evolution theory. A laboratory fee is charged. Offered fall semester.

3571 - Forensics DNA Analysis
4 Credits
Review of the historical methods of forensic DNA analysis and including multiple techniques for the extraction, quantification and analysis of genomic STR, mitochondrial DNA and Y-STR analysis. Laboratory will include sample collection methods, storage and characterization of various crime scene samples and performance of human DNA quantification, autosomal DNA analysis, mitoytpying and Y-STR typing. Includes the statistical interpretation of forensic DNA evidence, DNA databases, and Quality Assurance. A laboratory fee is charged. Instructor permission required. Offered spring semester. Prerequisite(s): ( BIOL 2291 Minimum Grade of D and BIOL 2171 Minimum Grade of D or BIOL 217 Minimum Grade of D). Corequisite(s): CHEM 3111 and CHEM 3151.

3601 - North American Mammals
3 Credits
Natural history, behavior, ecology and systematics of North American orders and most North American families. A weekend field trip is required. Offered alternate fall semesters. Prerequisite(s): ( BIOL 1321 Minimum Grade of D).

3611 - Entomology
3 Credits
Morphology, physiology, ecology, evolution and taxonomy of insects. Laboratory emphasizes field collection, identification and curation of insects. A weekend field trip is required. A Nature Center use fee is charged. BIOL 2231 recommended. Offered alternate fall semesters. Prerequisite(s): ( BIOL 2001 Minimum Grade of D and BIOL 2231 Minimum Grade of D or BIOL 223 Minimum Grade of D).
3621 - Parasitology  
3 Credits
Taxonomy, pathology, ecology, and evolution of major human and veterinary protozoan and metazoan parasites, including their distribution, life cycles, prevention and control. BIOL 2231 recommended. Offered alternate fall semesters. Prerequisite(s): ( BIOL 2001 Minimum Grade of D and BIOL 2231 Minimum Grade of D or BIOL 223 Minimum Grade of D).

3631 - Ornithology  
3 Credits
Study of taxonomy, ecology, natural history, and behavior of birds, with emphasis on North American taxa. A weekend field trip is required. A Nature Center use fee is charged. Instructor permission required. Offered spring semester. Prerequisite(s): ( BIOL 1311 Minimum Grade of D and BIOL 1321 Minimum Grade of D and BIOL 2001 Minimum Grade of D).

3641 - Herpetology  
2 Credits
Amphibians and reptiles emphasizing species native and introduced to Ohio and neighboring states. A weekend field trip is required. A Nature Center usage fee is charged. Offered alternate spring semesters. Prerequisite(s): ( BIOL 2001 Minimum Grade of D).

3651 - Forensic Entomology  
3 Credits
Application of insects to legal proceedings, especially medico-criminal. The collection and identification of larval and adult insects from carrion models and their use in determining post-mortem interval is emphasized. Recent developments in the field of forensic entomology, including molecular and laboratory techniques, are examined. A lab fee is charged. Offered alternate fall semesters. Prerequisite(s): ( BIOL 2001 Minimum Grade of D and BIOL 2291 Minimum Grade of D).

3661 - Environmental Research Methods  
3 Credits
The study of the design, execution, analysis, and communication of original research in environmentally-oriented fields. Offered fall semester. Prerequisite(s): ( BIOL 1311 Minimum Grade of D and BIOL 1321 Minimum Grade of D and BIOL 2001 Minimum Grade of D). Corequisite(s): BIOL 3671 and BIOL 3681 and BIOL 3691 and BIOL 3701.

3671 - Field Botany  
3 Credits
Identification of native aquatic and terrestrial flora with an emphasis on the use of keys, principles of classification, field work, ecological concepts, and herbarium methods. University defensive driving certification required. A Nature Center use fee is charged. Offered fall semester. Prerequisite(s): ( BIOL 2001 Minimum Grade of D and BIOL 2131 Minimum Grade of D or BIOL 213 Minimum Grade of D). Corequisite(s): BIOL 3661 and BIOL 3681 and BIOL 3691 and BIOL 3701.

3681 - Ichthyology  
3 Credits
Fish biology, particularly Ohio freshwater teleosts, emphasizing field exercises, techniques and
systematics. University defensive driving certification required. A Nature Center use fee is charged. Offered fall semester. Corequisite(s): BIOL 3661 and BIOL 3671 and BIOL 3691 and BIOL 3701.

3691 - Field Invertebrate Biology
3 Credits
Field investigations of aquatic and terrestrial invertebrates emphasizing the diversity, ecology, conservation, and methods for their study. University defensive driving certification required. A Nature Center use fee is charged. Offered fall semester. Corequisite(s): BIOL 3661 and BIOL 3671 and BIOL 3681 and BIOL 3701.

3701 - Marine Biology
3 Credits
Organisms and their habitats emphasizing southeastern and Gulf coastal and offshore environments. A two-week field trip to a selected marine environment is required. University defensive driving certification required. Additional fee is charged. Permission of the instructor required. Offered fall semester. Corequisite(s): BIOL 3661 and BIOL 3671 and BIOL 3681 and BIOL 3691.

3711 - Advanced Marine Biology
3 Credits
Ecological, physical and chemical aspects of marine systems. A two-week field trip to a selected marine environment is required. An additional fee is charged. Permission of the instructor required. Offered spring semester.

3721 - Topics in Marine Biology
1 to 3 Credits
Ecological, physical and chemical aspects of marine systems. A two-week field trip to a selected marine environment is required. An additional fee is charged. Permission of the instructor required. Formerly BIOL 372. Offered alternate spring semesters.

3831 - Animal Behavior
3 Credits
Invertebrates and vertebrates, stressing observational and descriptive techniques. Offered alternate years. A lab fee is charged. Offered alternate spring semesters. Prerequisite(s): ( BIOL 2001 Minimum Grade of D).

3971 - Self-Directed Studies in the Biological Sciences
1 to 3 Credits
Investigation of specialty fields within the biological sciences by utilizing interactive and/or multimedia programs. A maximum of 3 hours may be counted toward the major. Cannot be used as a general education class. Graded S/U. Formerly BIOL 397. Offered fall and spring semesters.

4231 - Topics in Ecology and Biogeography
1 to 3 Credits
Current literature on selected topics. Permission of instructor. May be repeated for credit as the topics vary. Formerly BIOL 423. Offered spring semester.

4511 - Advanced Topics in Cell Biology
2 Credits
Current literature on selected cell biology. May be repeated for credit as the topics vary. Formerly BIOL 451. Offered fall semester. Prerequisite(s): ( BIOL 3511 Minimum Grade of D or BIOL 351 Minimum Grade of D) and ( CHEM 3111 Minimum Grade of D or CHEM 311 Minimum Grade of D) or ( PHBS 3411 Minimum Grade of D or PHBS 341 Minimum Grade of D).

4621 - Biological Fluids
3 Credits
Lecture/laboratory coverage of various human body fluids, including urine, sweat, seminal fluid, amniotic fluid, cerebrospinal fluid, and serous fluids, the physical and biochemical methods used to analyze them, and correlations of results with states of health and disease. A lab fee is charged. Minimum grade of C for CLS majors. Instructor permission required. Offered fall semester.

4631 - Clinical Immunology
3 Credits
Lecture/laboratory coverage of the structure and function of the human immune system and methods used to diagnose, prognose, and monitor its response in health and disease states. A lab fee is charged. Minimum grade of C for CLS majors. Instructor permission required. Offered summers.

4641 - Hematology and Hemostasis
5 Credits
Lecture/laboratory coverage of human blood ontogeny, kinetics, pathophysiology, and methods used to diagnose, prognose, and monitor diseases of the blood, blood forming tissues, and disorders of ASBIOL BIOL hemostasis. A lab fee is charged. Minimum grade of C for CLS majors. Instructor permission required. Offered fall semester.

4671 - Diagnostic Microbiology
5 Credits
Lecture/laboratory coverage of microbes of medical interest, emphasizing application of conventional methods and emerging technologies to isolate, identify, and detect antimicrobial susceptibility of bacteria, viruses, fungi, and parasites associated with human disease. A lab fee is charged. Minimum grade of C for CLS majors. Instructor permission required. Offered summers.

4811 - Internship Program
12 Credits
Experience enables the student to experience working with scientists in a professional work-place. Seniors only. Graded S/U. Major Field Test (ETS) is required. A special fee is assessed. Offered spring semester.

4821 - Internship in Environmental Studies
12 Credits
Experience working with scientists in a professional workplace. Major Field Test (ETS) is required. A special fee is assessed. ENVR majors. Formerly BIOL 482. Offered spring semester.

4831 - Forensic Biology Internship
4 Credits
Capstone experience for Forensic Biology major or Biology Major/Molecular Biology Major with Criminal Justice Option. Experiential program designed in which the student works in a forensic testing laboratory or laboratory approved by the Director of the Forensic Biology Major and the Biology
Department Internship Committee. ETS Major Field Test in Biology or ABC Forensic Science Aptitude Test is required with a special fee being assessed. Formerly BIOL 483. Completion of three years of Forensic Biology Program or senior status and internship site acceptance required. Offered spring semester. Prerequisite(s): BIOL 3571 Minimum Grade of D or BIOL 357 Minimum Grade of D.

4841 - Experiential Biology
4 Credits
Summer off-campus field and laboratory experiences. Only available during summer terms. 400 hours of experiential experience required. Requires junior status and permission of instructor.

4901 - Special Topics in Biological Sciences
1 to 4 Credits
Disciplines such as mammalogy and plant taxonomy. May be repeated for credit as topic varies. Formerly BIOL 490. Offered alternate fall and spring semesters.

4921 - Capstone Experience
1 Credit
Offered fall and spring semesters.

4941 - Capstone Seminar
1 Credit
Library research topic to support a research proposal. Written Paper, Oral Presentation and the Major Field Test in Biology (ETS) are required. A special fee is assessed. Offered fall and spring semesters. Prerequisite(s): (BIOL 4921 Minimum Grade of D).

4971 - Independent Research in Biology
1 to 3 Credits
For students interested in mentored research project with the proposed topic approved by the department and chair. The completed research will involve a scientific paper. Graded S/U only. Enrollment restricted to BIOL, Mbio, ENVIR, FRBI and CLS majors. Offered fall and spring semesters.

Subject - Clinical Laboratory Science (CLSS)

4601 - Foundations of Clinical Laboratory Science
3 Credits
Lecture/laboratory coverage of the professional practices, including safety, regulatory issues, phlebotomy and specimen collection, handling, and processing, quality assurance, professionalism and ethics. Lab fee charged. Admission to CLS program required. Offered summers.

4611 - Professional Practice and Development
3 Credits
Web-based, interactive coverage of clinical laboratory management including organizational structure, laboratory operations, leadership, team building, legal issues, interpersonal and interdisciplinary communication, resources management, career development and education methodology. Admission to the CLS Program required. Offered fall semester.
4651 - Blood Banking and Transfusion Science
4 Credits
Lecture/laboratory coverage of blood groups biochemistry, genetics, and immunology, and discipline specific practices including donor selection, component preparation, detection and identification of antibodies, and compatibility testing. Lab fee charged. Instructor permission required. Offered fall semester.

4661 - Clinical Chemistry
4 Credits
Lecture/laboratory coverage of analytical principles, techniques, and applications of tests to diagnose, assess, and manage health and disease states. Lab fee charged. Instructor permission required. Offered summers.

4681 - Clinical Laboratory Practicum
2 Credits
Practical experience emphasizing policies and procedures governing operations including safety, specimen collection and phlebotomy, resource management, communications and information systems. Lab fee charged. Graded S/U. Offered spring semester.

4691 - Clinical Hematology Practicum
4 Credits
Practical experience emphasizing application of knowledge and skills to perform a wide variety of testing in a clinical setting, and further develop discipline-specific competency. Enrollment restricted to CLS majors. Lab fee is charged. Offered spring semester.

4701 - Blood Bank Practicum
4 Credits
Practical experience emphasizing application of knowledge and skills to perform a wide variety of testing in a clinical setting, implement therapy protocols, and further develop discipline-specific competency. Lab fee charged. Enrollment restricted to CLS majors. Offered spring semester. Prerequisite(s): (CLSS 4651 Minimum Grade of C).

4711 - Clinical Chemistry Practicum
4 Credits
Practical experience emphasizing application of knowledge and skills to perform a wide variety of testing in a clinical setting, implement therapy protocols, and further develop discipline-specific competency. Lab fee charged. Enrollment restricted to CLS majors. Offered spring semester. Prerequisite(s): (CLSS 4661 Minimum Grade of C).

4721 - Clinical Microbiology Practicum
4 Credits
Practical experience emphasizing application of knowledge and skills in a clinical setting to perform a wide variety of testing and to further develop discipline-specific competency. Lab fee charged. Enrollment is restricted to CLS majors. Offered spring semester.

4731 - Immunology and Infectious Diseases Practicum
2 Credits
Practical experience emphasizing application of knowledge and skills in a clinical setting to perform a
wide variety of testing and to further develop discipline-specific competency. Lab fee charged. Enrollment is restricted to CLS majors. Offered spring semester.

4741 - Case Studies in Clinical Laboratory Science
1 Credit
Exploration of current topics in the field of laboratory medicine culminating in a written manuscript suitable for publication in a discipline-specific journal. The course may be repeated to appreciate various topical prospects. Enrollment is restricted to CLS majors. Offered spring semester.

Subject - Geology (GEOL)

2801 - Geology
3 Credits
Physical geology and paleogeology, including chemical properties of minerals and rocks, geologic processes, and earth materials. May be taken without GEOL 2811. Formerly GEOL 280. Offered fall semester.

2811 - Geology Lab
1 Credit
Labs utilize minerals, rock, sediments, maps and field trips to illustrate techniques used by geologists. A Nature Center use fee is charged. Offered fall semester. Corequisite(s): GEOL 2801.

2901 - Special Topics in Geology
1 to 3 Credits
May be repeated for credit up to total of 8 hours as the topic varies. Formerly GEOL 290. Offered fall semester. Prerequisite(s): (GEOL 2801 Minimum Grade of D or GEOL 280 Minimum Grade of D). This course is repeatable for a total of 7 hours.

2971 - Independent Study in Geology
1 to 3 Credits

Department of Communication and Theatre Arts

Subject - Communication Studies (CACS)

1111 - Presentational Speaking
3 Credits
Basic principles of preparation, organization, and delivery of original informative and persuasive speeches. Offered fall and spring semesters.
2031 - Communication Studies Practicum
1 to 3 Credits
Hands-on experiential learning related to a variety of areas of communication studies. Practicum experiences require faculty approval. Offered fall and spring semesters. This course is repeatable for a total of 5 hours.

2111 - Advanced Presentational Speaking
3 Credits
Advanced principles of preparation, organization, and delivery of original informative, persuasive, group and special occasion speeches in natural, conversational, and audience-centered styles. Offered spring semester. Prerequisite(s): CACS 1111 Minimum Grade of C or COMM 211 Minimum Grade of C.

2151 - Communication in the Classroom
3 Credits
Emphasis on special audiences and situations unique to classroom teaching. Focus on interpersonal and speaking skills as they relate to interactions with students, parents, and the educational system. Offered fall and spring semesters.

2211 - Interviewing
3 Credits
Basic principles and structures of interviewing are examined and applied to interview situations such as employment, performance/appraisal, journalism, counseling, etc. Offered fall semester.

2251 - Interpersonal Communication
3 Credits
Explores issues and theories which will assist students in their abilities to interact interpersonally in personal and professional relationships. Offered fall and spring semesters.

3111 - Rhetorical Theory
3 Credits
In depth examination and application of classical and contemporary rhetorical theories about the nature and dynamics of human communication. Offered alternate spring semesters. Prerequisite(s): CACS 1111 Minimum Grade of C or COMM 211 Minimum Grade of C or CACS 2251 Minimum Grade of C or COMM 225 Minimum Grade of C.

3201 - Cross-Cultural Communication
3 Credits
Equips students with an awareness of the social construction of values, cognitions, performances across cultural lines. Familiarization with major theories, concepts, and skills in cultural adaptation and identity management. Offered fall semester.

3211 - Group Dynamics and Team Interaction
3 Credits
Group dynamics, theory, and problem solving/decision making methods are examined; emphasis on working effectively in teams and effective team interaction. Offered fall semester.

3251 - Communication Theory
3 Credits
In depth examination and application of communication theories about the nature and dynamics of human communication/interaction. Offered alternate spring semesters. Prerequisite(s): CACS 1111 Minimum Grade of C or COMM 211 Minimum Grade of C or CACS 2251 Minimum Grade of C or COMM 225 Minimum Grade of C.

3351 - Internship
1 to 9 Credits
A supervised program of experiences applying discipline related theories and practices to a working experience. Approval of department necessary for course registration. Offered fall and spring semesters. This course is repeatable for a total of 9 hours.

3451 - Organizational Communication
3 Credits
Major organization and communication theories and their practical applications for effective communication within organizations. Communication processes, various roles and relationships in organizations, leadership communication, ethics, and problematic communication situations. Offered fall semester.

3481 - Health Communication
3 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 caretakers and patients, and in intercultural settings. Offered fall semester.

3501 - Film Study and Analysis
3 Credits
In depth exploration of the rhetorical principles found in popular contemporary films that define social trends, analyze social issues, and serve as metaphors for the human experience. Offered alternate fall semesters.

4211 - Political Communication and Campaigns
3 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. Offered alternate fall semesters.

4951 - Communication Studies Capstone
3 Credits
A multi-component project completed during the senior year. Integration of skills and experiences acquired during study to complete the major, including a major project and portfolio. Offered fall and spring semesters.

Subject - Electronic Media & Broadcasting (CAEM)

1501 - Introduction to Mass Media
3 Credits
A survey course that examines various aspects of mass media including broadcasting, cable, the internet, and the emerging electronic media. Offered fall semester.

2561 - Multimedia Writing
3 Credits
A study of the principles and techniques of copywriting for multimedia including radio and television and corporate audio/video. Offered spring semester. Prerequisite(s): CAEM 1501 Minimum Grade of C or COMM 150 Minimum Grade of C.

2571 - Electronic Media and Broadcasting Practicum
1 to 12 Credits
Production practicum utilizing the facilities of WONB Radio and/or ONU Cable for the purpose of directed study using various production programs and utilizing various production skills. Permission of instructor required. Offered fall and spring semesters. This course is repeatable for a total of 12 hours.

2581 - Electronic Media and Broadcasting Practicum: Audio
1 to 12 Credits
Production practicum utilizing the facilities of WONB Radio. Highly skilled non-majors are welcome to take the course. Permission of instructor required. Offered fall and spring semesters. This course is repeatable for a total of 12 hours.

2591 - Electronic Media and Broadcasting Practicum: Video
1 to 12 Credits
Production practicum utilizing the facilities of ONU Cable. Highly skilled non-majors are welcome to take the course. Permission of instructor required. Offered fall and spring semesters. This course is repeatable for a total of 12 hours.

3351 - Internship
1 to 12 Credits
A skills course blending classroom theory with practical experience through working in an outside organization. Approval of department required. Offered fall and spring semesters. This course is repeatable for a total of 12 hours.

3511 - Multimedia Production
3 Credits
Principles and techniques of multimedia production. Course will include lab times utilizing the facilities of WONB Radio and ONU Cable Television. Offered fall semester. Prerequisite(s): CAEM 2561 Minimum Grade of C or COMM 256 Minimum Grade of C.

3551 - Multimedia Journalism
3 Credits
Principles of multimedia news gathering and reporting primarily for television and radio. Subjective and objective analysis of news, its presentation, and its effects. Practical assignments emphasized. Offered alternate spring semesters. Prerequisite(s): CAEM 1501 Minimum Grade of C or COMM 150 Minimum Grade of C.

3571 - Introduction to DVD Design
2 Credits
Hands-on course designed to provide an introductory understanding of video DVD creation. Using Apple DVD Studio Pro as the core software, the student will learn the process of DVD authoring beginning with the basic user interface of iDVD, and growing to use the advanced interface options of the software. Students will create a finished menu-driven DVD as a final project. Offered spring semester. Prerequisite(s): CAEM 3511 Minimum Grade of C or COMM 351 Minimum Grade of C.

4511 - Beginning Digital Editing
2 Credits
The technology and practice of digital editing, conversion of analog video and digital capture to a final assembly. Editing software, importing files, assembling, applying the transitions, adding titles, editing techniques and theory. Software from AVID Technology will be used, however other brands will be discussed. Formerly COMM 451. Offered fall semester. Prerequisite(s): CAEM 3511 Minimum Grade of C or COMM 351 Minimum Grade of C.

4521 - Broadcast Sales, Marketing and Promotions
3 Credits
Skills involved in selling broadcast time and station promotion. Offered alternate spring semesters. Prerequisite(s): CAEM 1501 Minimum Grade of C or COMM 150 Minimum Grade of C.

4531 - Mass Media and Society
3 Credits
The legal, ethical, and social responsibilities of journalists and other multimedia communicators. Offered alternate fall semesters. Prerequisite(s): CAEM 1501 Minimum Grade of C or COMM 150 Minimum Grade of C.

4541 - Corporate Video Production
3 Credits
An overview of industrial video production and script writing for applications in business, education, and industry. Principles and techniques for non-linear video editing production of an industrial video using Apple’s Final Cut Pro software. Offered alternate spring semesters. Prerequisite(s): CAEM 3511 Minimum Grade of C or COMM 351 Minimum Grade of C.

4551 - Multimedia Management
3 Credits
Sales, programming, marketing, and management techniques unique to the multimedia. Offered alternate spring semesters. Prerequisite(s): CAEM 1501 Minimum Grade of C or COMM 150 Minimum Grade of C.

4561 - Advanced Digital Editing
2 Credits
Develops proficiency in using the AVID editing system, creation of videos, developing sophisticated editing skills, emphasis on editing aesthetics. Junior or senior standing. Offered spring semester. Prerequisite(s): CAEM 3511 Minimum Grade of C or COMM 351 Minimum Grade of C.

4951 - EMB: Senior Capstone
1 Credit
A production/performance based course which serves as the senior capstone for the Broadcasting and Electronic Media concentration. Permission of instructor required. Offered fall and spring semesters.
Subject - Public Relations (CAPR)

1301 - Introduction to Public Relations
3 Credits
The role, function, and responsibilities of the public relations practitioner within organizations. Offered fall and spring semesters.

2031 - Public Relations Practicum
1 to 8 Credits
Course provides students the opportunity to experience public relations firsthand through professional involvement with service and non-profit projects. Offered fall and spring semesters. Prerequisite(s): CAPR 2361 Minimum Grade of C or COMM 236 Minimum Grade of C. This course is repeatable for a total of 8 hours.

2361 - Public Relations Writing
3 Credits
Study of basic concepts for public relations writing projects and production of written public relations materials. The course consists of lectures, discussions, and supervised writing labs. Offered fall and spring semesters. Prerequisite(s): CAPR 1301 Minimum Grade of C or COMM 130 Minimum Grade of C.

2461 - Public Relations & Social Media
3 Credits
An introduction to basic concepts in public relations social media. Practitioners define social media in several ways. The course examines the similarities and differences while participating in hands-on writing and editing using the Internet and other social media tools. Offered fall semester. Prerequisite(s): CAPR 2361 Minimum Grade of C or COMM 236 Minimum Grade of C.

3351 - Public Relations Internship
1 to 12 Credits
A skills course blending classroom theory with practical experience through working in an outside organization. Permission of instructor required. Offered fall and spring semesters. Prerequisite(s): CAPR 2361 Minimum Grade of C or COMM 236 Minimum Grade of C. This course is repeatable for a total of 12 hours.

3361 - Advanced Public Relations Writing
3 Credits
The course presents opportunities for research, indentifying and writing public affairs columns, editorials, features, and position papers for use in the public relations arena. Offered fall semester. Prerequisite(s): CAPR 2361 Minimum Grade of C or COMM 236 Minimum Grade of C.

3421 - Public Relations Research
3 Credits
The planning and evaluation process and methods for public relations. Offered spring semester. Prerequisite(s): CAPR 3361 Minimum Grade of C or COMM 336 Minimum Grade of C.
3521 - Publicity Media and Campaigns
3 Credits
A course analyzing techniques for motivating target audiences with practical analysis. The preparation of communication materials to elicit reactions or support from specialized groups in order to build and/or maintain mutually beneficial relationships. Offered spring semester. Prerequisite(s): CAPR 3361 Minimum Grade of C or COMM 336 Minimum Grade of C.

3731 - Issues in Public Relations
1 to 3 Credits
Current topics in the field including but not limited to: the role of public relations in organizational decision making, ethics, and special practice areas. Offered spring semester. Prerequisite(s): CAPR 2361 Minimum Grade of C or COMM 236 Minimum Grade of C.

4951 - Public Relations Case Studies
3 Credits
Public relations case studies concerning problems in industry, business, education, government, social welfare, and trade associations. Offered spring semester. Prerequisite(s): CAPR 3521 Minimum Grade of C or COMM 330 Minimum Grade of C.

Subject - Communication & Theater Arts (CATA)

1001 - Orientation
0 Credits
Familiarization with the departmental requirements for majors, planning a program of courses, university catalog and library. Required of departmental majors. Offered fall semester.

1901 - Special Topics in Communication and Theatre Arts
1 to 3 Credits
Course may be repeated as topics vary, but only 24 hours will count toward graduation. Offered fall and spring semesters.

2901 - Special Topics in Communication and Theatre Arts
1 to 3 Credits
Course may be repeated as topics vary, but only 24 hours will count toward graduation. Offered fall and spring semesters.

2991 - Independent Study in Communication and Theatre Arts
1 to 3 Credits
A topic in Communication and Theatre Arts that is of particular interest to the student. Permission of the department. Formerly COMM 299. Offered fall and spring semesters.

3901 - Special Topics in Communication and Theatre Arts
1 to 3 Credits
Course may be repeated as topics vary, but only 24 hours will count toward graduation. Offered fall and spring semesters.
4901 - Special Topics in Communication and Theatre Arts  
1 to 3 Credits  
Course may be repeated as topics vary, but only 24 hours will count toward graduation. Offered fall and spring semesters.

4991 - Independent Study in Communication and Theatre Arts  
1 to 3 Credits  
A topic in Communication and Theatre Arts that is of particular interest to the student. Permission of the department. Offered fall and spring semesters.

Subject - Arts Administration (TAAD)

2111 - Art of Presenting: Arts Administration  
3 Credits  
General overview of programming, arts management skills, boards, mission statements, long and short range plans, personnel development, logistics of running various arts organizations and planning effective seasons. Offered alternate fall semesters.

2311 - Arts Marketing/Audience Development  
3 Credits  
Course focuses on marketing strategies for non-profit arts organizations and audience development. This includes the study of community outreach and arts education in addition to general audience development. Offered alternate spring semesters. Prerequisite(s): TAAD 2111 Minimum Grade of C.

2411 - Grant Writing/Arts Fundraising  
3 Credits  
Course explores fundraising techniques, prospect identification, gifts, capital campaigns and other sources of funding for arts organizations. An in-depth study of grant writing is also a major component. Offered alternate spring semesters. Prerequisite(s): TAAD 2111 Minimum Grade of C.

2611 - Arts Administration Practicum  
1 Credit  
Audience development, educational outreach and marketing within the Freed Center for the Performing Arts. Offered fall and spring semesters. This course may be repeated 3 times. This course is repeatable for a total of 3 hours.

3351 - Arts Administration Internship  
2 Credits  
External work experience in an arts organization. Offered fall and spring semesters.

Subject - Dance (TADN)

1101 - Introduction to Dance  
2 Credits
Ballet, jazz and tap presented to develop the ability to learn basic components and vocabulary of each of these forms. Offered fall semester.

**1201 - Ballet I**  
2 Credits  
Designed for the student with little experience in ballet technique. A repeatable course. Offered fall and spring semesters. This course may be repeated 1 time.

**1221 - International Folk Dance**  
1 Credit  
Dances from cultures around the world: step and rhythmic patterns, position, and formations of traditional and ethnic group dances. Offered alternate spring semesters.

**1301 - Modern Dance I**  
2 Credits  
Designed for the student with little experience in modern dance technique. A repeatable course. Offered spring semester. This course may be repeated 1 time.

**1401 - Jazz Dance I**  
2 Credits  
Designed for the student with little experience in jazz dancing. A repeatable course. Permission of instructor required. Offered spring semester. Prerequisite(s): TADN 1201 Minimum Grade of C or COMM 117 Minimum Grade of C. This course is repeated 1 time.

**1501 - Tap Dance I**  
2 Credits  
Designed for the student with little experience in tap dancing. A repeatable course. Offered fall semester. This course is repeated 1 time.

**1611 - Musical Theatre Dance Styles I**  
2 Credits  
The study and recreation of historical musical theatre dance and related social dances influencing Broadway stage choreography. Offered alternate spring semesters.

**2111 - Social Dance**  
1 Credit  
Social dance course to include waltz, foxtrot, swing, polka, rhumba, tango, and cha-cha. Emphasis will be placed on rhythm, style and skill development. Offered alternate fall semesters.

**2121 - Dance and Culture**  
3 Credits  
An investigation of movement and dance as a vehicle for understanding culture through movement and an understanding of the rich diversity of movement via readings, films and discussion. Offered alternate spring semesters.

**2201 - Ballet II**  
2 Credits  
For intermediate students with experience in ballet technique. A repeatable course. Permission of
2301 - Modern Dance II
2 Credits
For intermediate students with experience in modern technique. A repeatable course. Permission of instructor required. Offered fall semester. Prerequisite(s): TADN 1301 Minimum Grade of C or COMM 118 Minimum Grade of C. This course may be repeated 1 time.

2401 - Jazz Dance II
2 Credits
For intermediate students with experience in jazz dance. A repeatable course. Permission of instructor required. Offered fall semester. Prerequisite(s): TADN 1401 Minimum Grade of C or COMM 116 Minimum Grade of C. This course is repeated 1 time.

2501 - Tap Dance II
2 Credits
Designed for intermediate students with experience in tap dancing. A repeatable course. Permission of instructor required. Offered fall semester. Prerequisite(s): TADN 1501 Minimum Grade of C or COMM 115 Minimum Grade of C. This course is repeated 1 time.

2601 - Dance Practicum
1 to 3 Credits
Participation in a collaborative experience with guest artists and choreographers. Open only to students who have auditioned and have been awarded roles in dance productions. A repeatable course. Permission of the instructor. Offered fall and spring semesters.

2611 - Musical Theatre Dance Styles II
2 Credits
A continuation of Musical Theatre Dance Styles I. The study and recreation of historical musical theatre dance and related social dances influencing Broadway stage choreography. Offered alternate spring semesters.

3201 - Ballet III
2 Credits
For students with advanced experience in ballet technique. May include pointe work for students with strong technique. A repeatable course. Permission of instructor required. Offered alternate fall semesters. Prerequisite(s): TADN 2201 Minimum Grade of C or COMM 217 Minimum Grade of C. This course may be repeated 1 time.

3301 - Modern Dance III
2 Credits
For students with advanced experience in modern technique. A repeatable course. Permission of instructor required. Prerequisite(s): TADN 2301 Minimum Grade of C or COMM 218 Minimum Grade of C. This course may be repeated 1 time.

3401 - Jazz Dance III
2 Credits
For students with advanced experience in jazz dance. A repeatable course. Permission of instructor required. Offered spring semester. Prerequisite(s): TADN 2401 Minimum Grade of C or COMM 216 Minimum Grade of C. This course may be repeated 1 time.

**3501 - Tap Dance III**
*2 Credits*
For students with advanced experience in tap dance. A repeatable course. Permission of instructor required. Offered spring semester. Prerequisite(s): TADN 2501 Minimum Grade of C or COMM 215 Minimum Grade of C. This course may be repeated 1 time.

**3601 - Dance History**
*3 Credits*
From the Middle Ages through present times, an historical survey of the origins, growth, and development of theatrical dance. Focus on the forces, processes, and personalities that influenced dance. Offered alternate fall semesters.

**4201 - Ballet IV Pointe**
*2 Credits*
Techniques of pointe work at the barre and center work. A repeatable course. Permission of instructor required. Offered alternate fall semesters. Prerequisite(s): TADN 3201 Minimum Grade of C. This course may be repeated 1 time.

**4601 - Dance Composition**
*3 Credits*
Principles general to choreographic compositional styles and their application via compositional projects and in-class explorations. Permission of instructor required. Offered alternate spring semesters. Prerequisite(s): TADN 2201 Minimum Grade of C or COMM 217 Minimum Grade of C or TADN 2301 Minimum Grade of C or COMM 218 Minimum Grade of C or TADN 2401 Minimum Grade of C or COMM 216 Minimum Grade of C.

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**Subject - International Theater Production (TAIP)**

**2001 - Portfolio Review I**
*0 Credits*
International Theatre Production students are required to present an updated portfolio and resume of production and course work at a formal portfolio review session at the end of each year enrolled. The faculty will advise the student to continue in their ITP degree or select another degree program in the University. Open to freshmen and sophomores. This course may be repeated 1 time.

**2111 - Fundamentals of Stagecraft**
*3 Credits*
Theoretical and practical work in the fundamentals of technical theatre production. Content includes scenic construction, property construction, theatrical rigging, basic drafting, and basic design theory. Offered alternate fall semesters.
**2121 - Fundamentals of Lighting and Sound**  
*3 Credits*  
Theoretical and practical work in the fundamentals of lighting and sound production. Content includes stage lighting, sound theory for live reinforcement and recorded sound effects. Offered alternate fall semesters.

**2131 - Fundamentals of Costuming**  
*3 Credits*  
Theoretical and practical work in the hand sewing, draping and drafting of patterns for basic garments, various problems of layout and cutting, and specialized sewing techniques for costumes. Offered alternate fall semesters.

**2151 - Make-Up**  
*2 Credits*  
Methods and practice in the creation and application of stage makeup. Students may comprise makeup crews for University Theatre and Studio Theatre productions. Offered spring semester.

**2551 - Technical Direction**  
*3 Credits*  
Technology, organization, and operation of the theatrical scene shop centered around the proper and safe use of tools, the choosing of materials, and methods of construction. Offered alternate fall semesters.

**2571 - Shop Practicum**  
*1 to 3 Credits*  
Participation in a collaborative laboratory experience working in the scene or costume shop for University productions. A repeatable course. More than six hours may apply towards graduation only for Theatre, Musical Theatre and International Theatre Production majors. Permission of instructor. Offered fall and spring semesters.

**2601 - Stage Management**  
*3 Credits*  
Principles and practices of stage management and logistical organization of commercial and non-commercial theatre. Content includes scheduling, pre-production planning, auditions, rehearsals, performance procedures, budgeting, company organization and structure. Offered alternate fall semesters.

**2651 - Stage Management Practicum**  
*1 to 3 Credits*  
Participation in a collaborative laboratory experience working as a stage manager, assistant stage manager or company manager for University productions. A repeatable course. More than six hours may apply toward graduation only for Theatre, Musical Theatre and International Theatre Production majors. Permission of instructor. Offered fall and spring semesters.

**2751 - Introduction to Design**  
*3 Credits*  
Introduction to theory and practice of theatrical design, text analysis and the ways a production concept
and visual metaphor can be communicated in the design of scenery, costumes and lighting. Offered alternate fall semesters.

2761 - Production Practicum  
1 to 3 Credits  
Participation in a collaborative laboratory experience which involves serving on a crew for University productions. A repeatable course. More than six hours may apply toward graduation only for Theatre, Musical Theatre and International Theatre Production majors. Permission of instructor. Offered fall and spring semesters.

3351 - Internship in International Theatre Production  
1 to 12 Credits  
A skills course blending classroom theory with practical experience through working in an outside organization. Approval of department required prior to registration for course. Offered fall and spring semesters. This course is repeatable for a total of 12 hours.

3501 - Advanced Stagecraft  
3 Credits  
Advanced construction principles and techniques applied to stage scenery and design. Advanced woodworking, rigging and welding are possible topics covered. Offered alternate spring semesters.  
Prerequisite(s): TAIP 2111 Minimum Grade of C or COMM 275 Minimum Grade of C.

3551 - Topics in Theatre Technology  
3 Credits  
The principle technical elements of theatre including technical problem solving, scene painting, welding, and graphic solutions to technical theatre. A repeatable course. Offered alternate spring semesters.  
Prerequisite(s): TAIP 2111 Minimum Grade of C or COMM 275 Minimum Grade of C and TAIP 2121 Minimum Grade of C or COMM 274 Minimum Grade of C and TAIP 3501 Minimum Grade of C. This course may be repeated 3 times.

3751 - Topics in Theatre Design  
3 Credits  
The principle design elements of theatre including but not limited to scenic, costume, lighting and sound. A repeatable course. Permission of the instructor. Offered annually.  
Prerequisite(s): TAIP 2751 Minimum Grade of C. This course may be repeated 3 times.

3761 - Advanced Production Practicum  
1 to 3 Credits  
Participation in a collaborative laboratory experience which focuses on the supervision and execution of lights, sound, scenic, costumes or props for University productions. More than six hours may apply toward graduation only for Theatre, Musical Theatre and International Theatre Production majors. Permission of instructor. Offered fall and spring semesters.

3781 - Design Practicum  
1 to 3 Credits  
Participation in a collaborative laboratory experience which focuses on the design of lights, sound, scenic, or costumes for University productions. A repeatable course. More than six hours may apply toward graduation only for Theatre, Musical Theatre and International Theatre Production majors.
Permission of instructor. Offered fall and spring semesters.

4001 - Portfolio Review II
0 Credits
International Theatre Production students are required to present an updated portfolio and resume of production and course work at a formal portfolio review session at the end of each year enrolled. Upon completion of the final semester, students shall present their work at an exit portfolio presentation: all accumulated design and/or production work completed while enrolled in the B.F.A. program shall be presented. Open to juniors and seniors. Offered spring semester. Prerequisite(s): TAIP 2001 Minimum Grade of S. This course may be repeated 2 times.

4951 - International Theatre Production Capstone
1 Credit
An advanced production project which integrates skills and experiences acquired during the completion of the major. Permission of instructor and completion of project abstract. A graduating senior survey must be completed to receive credit for this course. Offered fall and spring semesters.

Subject - Musical Theater (TAMT)

2101 - Musical Theatre History & Literature
3 Credits
The history of American Musical Theatre, its origins, and development through the 20th century, covering Broadway and film musicals, as well as the famous and historical figures of Broadway. Offered alternate spring semesters.

2601 - Musical Theatre Performance Practicum
1 Credit
Participation in a collaborative rehearsal experience. Open only to students who have auditioned for and been awarded roles in University mainstage or studio theatre productions. A repeatable course but only 4 hours apply toward the major. Permission of instructor required. Offered fall and spring semesters.

2611 - Musical Theatre Pit Orchestra Practicum
1 Credit
Participation in a collaborative rehearsal experience. Open only to students who have been invited to perform in the pit orchestra of a University mainstage or studio theatre production. Permission of instructor required. Offered fall and spring semesters.

2951 - Musical Theatre Sophomore Hearing
0 Credits
An assessment procedure typically performed at the end of the second year spring semester. Students prepare monologues and song material for presentation and evaluation including dance assessment. Permission of instructor required. Offered spring semester. Prerequisite(s): (TATH 3601 or COMM 360) and (MUSC 1051 or MUSC 121) and MUSC 131 and (MUSC 2121 or APMU 225) and (TADN 2501 or COM
215 or TADN 2401 or COMM 216 or TADN 2201 or COMM 217 or TADN 2301 or COMM 218) all with a Minimum grade of C.

3351 - Internship in Musical Theatre
1-12 Credits
Working in an external organization having the opportunity to blend classroom theory and practical experience. Permission of instructor required. Offered fall and spring semesters. Prerequisite(s): TAMT 2951 Minimum Grade of S. This course is repeatable for a total of 12 hours.

3501 - Musical Theatre Audition Techniques
3 Credits
Prepares students for the musical theatre profession by exploring the skills and knowledge required for casting. This course focuses on audition techniques, selecting and interpreting audition material, and researching the resources available to actors seeking work in the professional theatre. Permission of instructor required. Offered alternate spring semesters. Prerequisite(s): TAMT 2951 Minimum Grade of S.

4501 - Acting Styles for Musical Theatre
3 Credits
A scene study class geared toward an understanding of the range of acting techniques used specifically in musical theatre from vaudeville to contemporary and modern musicals. Permission of instructor required. Offered alternate spring semesters. Prerequisite(s): TAMT 2951 Minimum Grade of S.

4951 - Musical Theatre Senior Showcase
1 Credit
Musical Theatre research, preparation, planning, and rehearsal, culminating in a presentation for agents and casting directors. Permission of instructor required. Offered spring semester. Prerequisite(s): TAMT 2951 Minimum Grade of S.

Subject - Theater (TATH)

1051 - Introduction to the Performing Arts
3 Credits
An introduction to theatre through the study of its origin and development, and its contemporary theory and practice. For the nonmajor. Includes lecture, play attendance and production experience. Offered fall and spring semesters.

2401 - Voice and Speech
2 Credits
An exploration of the voice as an organ and as a means of expression. Vocal technique is developed through exercises which expand breath, range and resonance while speech is enhanced through the exploration and expression of dramatic text. Offered fall semester.

2501 - Movement for the Actor
1 Credit
Enhances the actor's instrument through development of physical expression and character work. Techniques include but are not limited to: Alexander, Laban, Feldenkrais, Chekhov, and physical training such as yoga, pilates and tai chi. Offered spring semester.

**2591 - Acting for Nonmajors**  
*2 Credits*  
The fundamentals of stage acting through exercises, readings, discussions and scene study, for the student not majoring in performance. Offered fall semester. May not be enrolled in one of the following Major fields of study: Communication Arts/Musical Thr, Theatre.

**2601 - Introduction to Acting**  
*2 Credits*  
The fundamentals of stage acting through exercises, readings, discussion and scene study. The beginning actor learns to analyze action, activity, objectives and obstacles and to incorporate them into performance. Offered fall semester.

**2611 - Theatre Performance Practicum**  
*1 to 3 Credits*  
Participation in a collaborative performance experience. Open only to students who have auditioned for and have been awarded roles in University mainstage or studio theatre productions. Repeatable. Offered fall and spring semesters.

**2751 - Play Analysis**  
*3 Credits*  
A study of the play from page to stage with an emphasis on critical analysis of structure, style, theme, character, language, dramatic event, and the perspectives of the actor, director, critic, and audience. Offered fall semester.

**2911 - World Theatre History I**  
*3 Credits*  
A survey of the history and social impact of the theatre in Western and non-Western cultures from ancient times to the Renaissance. Permission of instructor required. Offered fall semester.  
Prerequisite(s): TATH 2751 Minimum Grade of C.

**2921 - World Theatre History II**  
*3 Credits*  
A survey of the history and social impact of the theatre in Western and non-Western cultures from the Renaissance to the 19th Century. Permission of instructor required. Offered spring semester.  
Prerequisite(s): TATH 2751 Minimum Grade of C.

**3001 - Symposium**  
*0 Credits*  
Workshop with visiting theatre professionals which may include stage directors, designers, choreographers, and professional performers. Repeatable with different topics. Student may complete 1 course per academic year. Offered fall and spring semesters. This course may be repeated 2 times.
3351 - Internship in Theatre
1 to 12 Credits
Blends classroom theory with practical experience through working in an external organization. Permission of Instructor. Offered fall and spring semesters. This course is repeatable for a total of 12 hours.

3501 - Stage Combat
2 Credits
An introduction to the fundamentals of stage combat including but not limited to: unarmed and rapier/dagger. Formerly COMM 262. Offered alternate spring semesters. Prerequisite(s): TATH 2601 Minimum Grade of C.

3601 - Acting II: Scene Study Intensive
3 Credits
A scene study intensive that expounds upon the techniques acquired in Intro. to Acting, TATH 2601. The actor now learns to apply acting skills to the development of a role in a scripted play with greater emphasis on the character and its throughline. Theatre and Musical Theatre Majors only, or permission of instructor. Offered annually. Prerequisite(s): TATH 2601 Minimum Grade of C or COMM 260 Minimum Grade of C. This course may be repeated 1 time. This course is repeatable for a total of 3 hours.

3621 - Directing Practicum
1 to 3 Credits
Participation in a collaborative directorial experience that focuses on directing a University mainstage or studio theatre production with faculty advising. Repeatable. Permission of instructor. Offered fall and spring semesters. Prerequisite(s): TATH 3861 Minimum Grade of C or COMM 386 Minimum Grade of C.

3651 - Acting III: Shakespeare
3 Credits
An exploration of the works of the world's most celebrated playwright, this course develops an understanding of Shakespeare's language, rhetoric and performance techniques through sonnets, monologues, scene study and demonstration. Offered annually. Prerequisite(s): TATH 3601 Minimum Grade of C or COMM 360 Minimum Grade of C and TATH 2401 Minimum Grade of C or COMM 340 Minimum Grade of C. This course may be repeated 1 time. This course is repeatable for a total of 3 hours.

3801 - Topics in Theatre History/Dramatic Literature
3 Credits
Major topics in theatre history and/or dramatic literature including but not limited to: 20th-century theatre, issues in contemporary theatre, Irish theatre, contemporary women playwrights. May be repeated with different topic. Offered annually. Prerequisite(s): TATH 2751 Minimum Grade of C. This course may be repeated 3 times. This course is repeatable for a total of 9 hours.

3821 - Playwriting
3 Credits
A writing workshop designed to introduce students to the basic building blocks of writing for the stage, including: plot, character, dialogue, setting and dramatic action. Offered alternate fall semesters.
3861 - Directing
3 Credits
Methods, theories, exercises, and practices in directing and presenting dramatic scenes. Offered fall semester. Prerequisite(s): TATH 2601 Minimum Grade of C or COMM 260 Minimum Grade of C.

3911 - American Theatre History
3 Credits
A historical survey of American theatre and popular entertainment forms from the colonial period through the rise of realism and contemporary theatre. Offered alternate spring semesters. Prerequisite(s): TATH 2751 Minimum Grade of C.

4451 - Business of Theatre
1 Credit
Prepares students for a career in the professional theatre by teaching the skills and knowledge needed for gaining employment and for good career management. Topics include audition/portfolio materials, audition techniques and resources for various professional markets. Offered alternate spring semesters.

4601 - Acting IV: Styles of Acting
3 Credits
A scene study course focusing on specific performance techniques of genres beyond American realism. The material practiced includes playwrights such as Chekhov, Beckett, Wilde, Moliere, Pinter and Ionesco. Offered alternate spring semesters. Prerequisite(s): TATH 3601 Minimum Grade of C or COMM 360 Minimum Grade of C and TATH 2401 Minimum Grade of C or COMM 340 Minimum Grade of C.

4851 - Dramatic Criticism and Production Analysis
3 Credits
The director and dramaturg's analysis of a play in preparation for production. Theories/approaches considered include: action structures, character-based analysis, epic theatre, feminism, and semiotics. Offered alternate spring semesters. Prerequisite(s): TATH 2751 Minimum Grade of C.

4951 - Senior Capstone
1 to 3 Credits
A production/performance based project that serves as the senior capstone for the Theatre major. Permission of instructor and senior status. Offered fall and spring semesters.

Department of Chemistry and Biochemistry

Subject - Chemistry (CHEM)

1001 - Chemistry in Society
3 Credits
The behavior of matter at the macroscopic level and explanations of this behavior using molecular-level models. Applications in everyday life. Chemistry 1711 recommended for science majors. Credit may
be received for only one of the following courses: CHEM 1001, CHEM 1201, CHEM 1501, CHEM 1711, or CHEM 1811. Offered fall and spring semesters.

1201 - Chemistry for the Health Sciences
5 Credits
Chemical principles and theories in the areas of atomic structure, chemical bonding, solution chemistry, redox chemistry and acid/base chemistry. Basic principles and applications of kinetics and thermodynamics. Stereochemistry, functional groups and the basic properties of functional groups. Structures, properties and functions of biologically relevant carbohydrates, lipids, and proteins. Facets of DNA structures and replication as well as relevant concepts in protein synthesis. Principles of enzyme catalysis in biochemical processes with application to specific pathways in both carbohydrate and lipid metabolism. Basic bioenergetic principles as present in the citric acid and oxidative phosphorylation. Credit may be received for only one of the following courses: CHEM 1001, CHEM 1201, CHEM 1501, CHEM 1711, or CHEM 1811. High school chemistry recommended. Offered fall and spring semesters.

1501 - Chemistry for Engineering
3 Credits
Atomic structure, the mole, stoichiometry, chemical reactions, thermochemistry, electron configuration, periodicity, bonding, molecular structure, states of matter, solutions, thermodynamics, kinetics, equilibrium, acids, bases, and electrochemistry. Credit may be received for only one of the following courses: CHEM 1001, CHEM 1201, CHEM 1501, CHEM 1711, or CHEM 1811. High school chemistry recommended. Offered fall semester. Prerequisite(s): CHEM 1551 Minimum Grade of D.

1551 - Chemistry for Engineering Lab
1 Credit
Lab for CHEM 1501. Offered fall semester. Prerequisite(s): CHEM 1501 Minimum Grade of D.

1711 - General Chemistry 1
5 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. Atomic theory and its application to bonding. Laboratory supports principles presented in lecture, including spectroscopy. Credit may be received for only one of the following courses: CHEM 1001, CHEM 1201, CHEM 1501, CHEM 1711, or CHEM 1811. High school chemistry required. Offered fall semester.

1721 - General Chemistry 2
5 Credits
Molecular structure, condensed phases, chemical reactions and mechanisms. Physical principles controlling chemical reactions including kinetics, thermodynamics, electrochemistry, and acid-base equilibrium conditions. Laboratory supports principles presented in lecture, including kinetics and equilibrium. Credit may be received for either CHEM 1721 or CHEM 1821, but not for both. Offered spring semester. Prerequisite(s): CHEM 1711 Minimum Grade of D or CHEM 1811 Minimum Grade of D or CHEM 172 Minimum Grade of D or CHEM 182 Minimum Grade of D.

1811 - General Chemistry 1 - Majors
5 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. Atomic theory and its application to bonding. Laboratory supports principles presented in lecture, including spectroscopy. Credit may be received for only one of the following courses: CHEM 1001, CHEM 1201, CHEM 1501, CHEM 1711, or CHEM 1811. Offered fall semester.

1821 - General Chemistry 2 - Majors
5 Credits
Molecular structure, condensed phases, chemical reactions and mechanisms. Physical principles controlling chemical reactions including kinetics, thermodynamics, electrochemistry, and acid-base equilibrium conditions. Laboratory supports principles presented in lecture, including kinetics and equilibrium. Credit may be received for either CHEM 1721 or CHEM 1821, but not for both. Offered spring semester. Prerequisite(s): CHEM 1711 Minimum Grade of D or CHEM 1811 Minimum Grade of D or CHEM 172 Minimum Grade of D or CHEM 182 Minimum Grade of D.

1901 - Special Topics
1 to 3 Credits
Can be repeated as topic varies.

2001 - Capstone 1
1 Credit
Methods and objectives of chemical research. Undergraduate research opportunities in the department. Science literature search engines. Summer research opportunities at other institutions. Offered fall semester. Prerequisite(s): CHEM 1821 Minimum Grade of D or CHEM 1721 Minimum Grade of D or CHEM 183 Minimum Grade of D or CHEM 173 Minimum Grade of D.

2311 - Analytical Chemistry 1
4 Credits
Practice and principles of modern chemical methods of analysis including instrumental methods. Offered fall semester. Prerequisite(s): CHEM 1721 Minimum Grade of D or CHEM 1821 Minimum Grade of D or CHEM 183 Minimum Grade of D or CHEM 173 Minimum Grade of D.

2401 - Elements of Physical Chemistry
3 Credits
Principles and applications of selected areas of physical chemistry including thermodynamics, kinetics, and spectroscopy. Credit may be received for CHEM 2401 or CHEM 3411 but not for both. Offered alternate spring semesters. Prerequisite(s): CHEM 1501 Minimum Grade of D or CHEM 1721 Minimum Grade of D or CHEM 1821 Minimum Grade of D or CHEM 183 Minimum Grade of D or CHEM 173 Minimum Grade of D or CHEM 226 Minimum Grade of D.

2481 - Chemical Applications of Mathematics
3 Credits
Application of mathematical techniques to problems in chemistry. Offered spring semester. Prerequisite(s): (CHEM 1721 Minimum Grade of D or CHEM 1821 Minimum Grade of D or CHEM 183 Minimum Grade of D or CHEM 173 Minimum Grade of D) and (MATH 1641 Minimum Grade of D or MATH 165 Minimum Grade of D).
2511 - Organic Chemistry 1
3 Credits
Bonding, acidity, functional groups, conformations, stereochemistry, nomenclature, fundamental reactions/mechanisms (SN1, SN2, E1, E2) of organic chemistry, addition reactions to alkenes and alkynes, oxidation and reduction, and structure determination using IR, NMR, and MS spectroscopy. Credit may be received for CHEM 2511 or 2611, but not for both. Offered fall and spring semesters. Prerequisite(s): (CHEM 1721 Minimum Grade of D or CHEM 1821 Minimum Grade of D or CHEM 183 Minimum Grade of D or CHEM 173 Minimum Grade of D) and CHEM 2551 Minimum Grade of D.

2521 - Organic Chemistry 2
3 Credits
Reactions with/on radicals, dienes, aromatics, alcohols, carbonyls, amines, the structure and chemistry of carbohydrates, and organic polymer chemistry. Credit may be received for CHEM 2521 or 2621, but not for both. Formerly known as CHEM 253. Offered spring semester. Prerequisite(s): (CHEM 2511 Minimum Grade of D or CHEM 2611 Minimum Grade of D or CHEM 252 Minimum Grade of D or CHEM 262 Minimum Grade of D) and (CHEM 2551 Minimum Grade of D or CHEM 2651 Minimum Grade of D or CHEM 255 Minimum Grade of D or CHEM 265 Minimum Grade of D) and CHEM 2561 Minimum Grade of D.

2551 - Organic Chemistry Lab 1
1 Credit
Basic laboratory techniques used for synthesis, isolation, purification, and analysis of organic compounds are studied in the course. Some functional group interconversion, substitution, and elimination processes are introduced. Structure analysis using spectroscopy. The lab experiments are designed to illustrate practical implementation of the theories and concepts learned in lecture. Credit may be received for CHEM 2551 or 2651, but not for both. Offered fall and spring semesters. Prerequisite(s): CHEM 2511 Minimum Grade of D.

2561 - Organic Chemistry Lab 2
1 Credit
Reactions with/on radicals, dienes, aromatics, alcohols, carbonyls, amines, the structure and chemistry of carbohydrates, and organic polymer chemistry. Credit may be received for CHEM 2561 or 2661, but not for both. Offered spring semester. Prerequisite(s): CHEM 2521 Minimum Grade of D.

2611 - Organic Chemistry 1 - Majors
3 Credits
Bonding, acidity, functional groups, conformations, stereochemistry, nomenclature, fundamental reactions/mechanisms (SN1, SN2, E1, E2) of organic chemistry, addition reactions to alkenes and alkynes, oxidation and reduction, and structure determination using IR, NMR, and MS spectroscopy. Credit may be received for CHEM 2511 or 2611, but not for both. Offered fall semester. Prerequisite(s): (CHEM 1721 Minimum Grade of D or CHEM 1821 Minimum Grade of D or CHEM 183 Minimum Grade of D or CHEM 173 Minimum Grade of D) and CHEM 2651 Minimum Grade of D.

2621 - Organic Chemistry 2 - Majors
3 Credits
Reactions with/on radicals, dienes, aromatics, alcohols, carbonyls, amines, the structure and chemistry of carbohydrates, and organic polymer chemistry. Credit may be received for CHEM 2521 or 2621, but not for both. Formerly known as CHEM 263. Offered spring semester. Prerequisite(s): (CHEM 2511 Minimum Grade of D or CHEM 2611 Minimum Grade of D or CHEM 252 Minimum Grade of D or CHEM 262 Minimum Grade of D or CHEM 255 Minimum Grade of D or CHEM 265 Minimum Grade of D).
262 Minimum Grade of D) and (CHEM 2551 Minimum Grade of D or CHEM 2651 Minimum Grade of D or CHEM 255 Minimum Grade of D or CHEM 265 Minimum Grade of D) and CHEM 2661 Minimum Grade of D.

2651 - Organic Chemistry Lab 1 - Majors
1 Credit
Basic laboratory techniques used for synthesis, isolation, purification, and analysis of organic compounds are studied in the course. Some functional group interconversion, substitution, and elimination processes are introduced. Structure analysis using spectroscopy. The lab experiments are designed to illustrate practical implementation of the theories and concepts learned in lecture. Credit may be received for CHEM 2551 or 2651, but not for both. Offered fall semester. Prerequisite(s): CHEM 2611 Minimum Grade of D.

2661 - Organic Chemistry Lab 2 - Majors
2 Credits
Free radical reactions, cycloaddition, electrophilic aromatic substitution, and other reactions relevant to the lecture material are explored. The reactivity of phenols, enolates, amines, and carboxylic acid derivatives is investigated. The structure of carbohydrates, and representative multiple-step organic syntheses of relevant pharmaceutical agents are explored. Grignard and multiple step synthesis are introduced. Use of the chemical literature. Routine acquisition of NMR, IR, MS spectra and other physical data are used for structure elucidation of unknown organic compounds. In-depth coverage of two-dimensional NMR, IR, UV, and MS spectroscopy. Credit may be received for CHEM 2561 or 2661, but not for both. Formerly known as CHEM 266. Offered spring semester. Prerequisite(s): CHEM 2621 Minimum Grade of D.

2901 - Special Topics
1 to 3 Credits
Can be repeated as topic varies.

2971 - Independent Study
1 to 4 Credits
Can be repeated for a maximum of 4 credit hours. Offered fall and spring semesters. This course may be repeated 3 times. This course is repeatable for a total of 4 hours.

3001 - Capstone 2
1 Credit
Careers in the chemical/biochemical sciences. Critical evaluation of scientific literature. Preparation for oral presentations. Offered spring semester. Prerequisite(s): CHEM 2001 Minimum Grade of D or CHEM 200 Minimum Grade of D.

3111 - Biochemistry
3 Credits
Fundamentals of Biochemistry with emphasis on the structures and properties of the major classes of biological molecules and the relationships between biomolecular structure and function; introduction to enzyme catalysis and metabolic pathways. Optional associated laboratory: CHEM 3151. Offered fall semester. Prerequisite(s): (CHEM 2521 Minimum Grade of D or CHEM 2621 Minimum Grade of D or CHEM 253 Minimum Grade of D or CHEM 263 Minimum Grade of D) and (CHEM 2561 Minimum Grade
of D or CHEM 2661 Minimum Grade of D or CHEM 256 Minimum Grade of D or CHEM 266 Minimum Grade of D).

3151 - Biochemistry Lab
1 Credit
Structure and properties of proteins, carbohydrates, lipids, and nucleic acids; introduction to enzyme kinetics and proteomics. Offered fall semester. Prerequisite(s): (CHEM 3111 Minimum Grade of D or PHBS 3411 Minimum Grade of D).

3201 - Medicinal Chemistry
3 Credits
Fundamentals of drug design and drug action including SAR, stereochemical considerations, free energy relationships, receptors, enzymes, prodrugs and drug metabolism. Isolation, synthesis, characterization, and biology of bioactive natural products. Offered alternate spring semesters. Prerequisite(s): (CHEM 2521 Minimum Grade of D or CHEM 2621 Minimum Grade of D or CHEM 253 Minimum Grade of D or CHEM 263 Minimum Grade of D) and (CHEM 2561 Minimum Grade of D or CHEM 2661 Minimum Grade of D or CHEM 256 Minimum Grade of D or CHEM 266 Minimum Grade of D).

3261 - Medicinal Chemistry Lab
1 Credit

3411 - Physical Chemistry 1
4 Credits
Classical thermodynamics. Quantum mechanics of atoms and molecules. Laboratory illustrates principles and applications. Knowledge of computer programming recommended. Offered fall semester. Prerequisite(s): CHEM 271 Minimum Grade of D or (MATH 263 Minimum Grade of D and MATH 272 Minimum Grade of D and MATH 275 Minimum Grade of D) and (PHYS 231 Minimum Grade of D and PHYS 232 Minimum Grade of D and MATH 233 Minimum Grade of D and MATH 234 Minimum Grade of D and PHYS 235 Minimum Grade of D and PHYS 236 Minimum Grade of D).

3421 - Physical Chemistry 2
4 Credits
Molecular structure, statistical thermodynamics, and reaction dynamics. Laboratory illustrates applications in spectroscopy and kinetics. Offered spring semester. Prerequisite(s): CHEM 3411 Minimum Grade of D or CHEM 342 Minimum Grade of D.

3601 - Organic Synthesis
4 Credits
Retrosynthetic analysis, functional group transformations, asymmetric synthesis, organometallic chemistry. Laboratory involves multistep synthesis utilizing techniques to work with air and water sensitive materials, standard purification techniques, and organic product characterization. Offered alternate spring semesters. Prerequisite(s): (CHEM 2621 Minimum Grade of D and CHEM 2661 Minimum Grade of D) or (CHEM 263 Minimum Grade of D and CHEM 266 Minimum Grade of D).

3711 - Inorganic Chemistry 1
3 Credits
Bonding, structures, preparation, properties, compounds, and reactions of main group and transition metal elements. Laboratory involves basic methods of synthesis and characterization. Offered fall semester. Prerequisite(s): (CHEM 2621 Minimum Grade of D and CHEM 2661 Minimum Grade of D) or (CHEM 263 Minimum Grade of D and CHEM 266 Minimum Grade of D).

3751 - Inorganic Chemistry 1 Lab
1 Credit
Lab for CHEM 3711. Offered fall semester. Corequisite(s): CHEM 3711.

3901 - Special Topics
1 to 3 Credits
Can be repeated as topic varies.

4001 - Capstone 3
2 Credits
Oral presentation and a formal paper on a chemical topic. Offered spring semester. Prerequisite(s): CHEM 3001 Minimum Grade of D or CHEM 300 Minimum Grade of D.

4111 - Advanced Biochemistry: Proteins and Metabolism
3 Credits
In depth study of protein structure and function; enzyme kinetics and mechanisms; regulation and integration of metabolism; bioenergetics. Offered alternate spring semesters. Prerequisite(s): CHEM 3111 Minimum Grade of D or CHEM 311 Minimum Grade of D.

4121 - Advanced Biochemistry: Information Transfer
3 Credits
DNA replication and repair; transcription; RNA modifications; translation; control of gene expression; signal transduction. Offered alternate spring semesters. Prerequisite(s): CHEM 3111 Minimum Grade of D or CHEM 311 Minimum Grade of D.

4161 - Advanced Biochemistry Lab
2 Credits
Purification and characterization of biological macromolecules; enzyme kinetics and uses of enzymes in biochemical analyses. Offered spring semester. Prerequisite(s): (CHEM 3151 Minimum Grade of D or CHEM 315 Minimum Grade of D) and (CHEM 4111 Minimum Grade of D or CHEM 4121 Minimum Grade of D).

4321 - Analytical Chemistry 2
3 Credits
Theoretical and experimental study of modern methods of instrumental analysis. Principles, design and use of chemical instrumentation. Laboratory stresses independent, investigative experimentation. Offered alternate spring semesters. Prerequisite(s): (CHEM 2311 Minimum Grade of D or CHEM 351 Minimum Grade of D) and (CHEM 3421 Minimum Grade of D or CHEM 343 Minimum Grade of D).

4421 - Advanced Physical Chemistry
3 Credits
Selected topics from group theory, advanced quantum mechanics, spectroscopy and chemical dynamics.
Knowledge of computer programming recommended. Offered alternate spring semesters. Prerequisite(s): CHEM 3421 Minimum Grade of D or CHEM 343 Minimum Grade of D.

4601 - Physical Organic Chemistry
3 Credits
Application of molecular orbital theory, thermodynamics, and kinetics to the study of organic reaction mechanisms. Offered alternate spring semesters. Prerequisite(s): (CHEM 2521 Minimum Grade of D or CHEM 2621 Minimum Grade of D or CHEM 253 Minimum Grade of D or CHEM 263 Minimum Grade of D) and (CHEM 2561 Minimum Grade of D or CHEM 2661 Minimum Grade of D or CHEM 256 Minimum Grade of D or CHEM 266 Minimum Grade of D) and (CHEM 3421 Minimum Grade of D or CHEM 343 Minimum Grade of D).

4721 - Inorganic Chemistry 2
3 Credits
Theory, bonding, spectroscopy, reaction mechanisms and organometallic compounds. Laboratory involves advanced methods of synthesis and characterization. Offered alternate spring semesters. Prerequisite(s): (CHEM 3711 Minimum Grade of D or CHEM 324 Minimum Grade of D) and (CHEM 3421 Minimum Grade of D or CHEM 343 Minimum Grade of D).

4811 - Senior Research 1
2 Credits
Mentored research project. Offered fall semester. Prerequisite(s): CHEM 3001 Minimum Grade of D.

4821 - Senior Research 2
2 Credits
Mentored research project. Offered spring semester. Prerequisite(s): CHEM 4811 Minimum Grade of D.

4901 - Special Topics
1 to 3 Credits
Can be repeated as topic varies.

4971 - Independent Study
1 to 4 Credits
Can be repeated for a maximum of 4 credit hours. Offered fall and spring semesters. This course may be repeated 3 times. This course is repeatable for a total of 4 hours.

Center for Teacher Education

Subject - Early Childhood Education (ECED)

2051 - Children's Literature in the Early Childhood Classroom
3 Credits
Selecting and evaluating quality children's literature. Examination of works of notable authors and
illustrators, concepts of diversity, strategies for integrating various genre into the curriculum, storytelling, and helping children respond to literature. Offered spring semester.

**2301 - Early Childhood Mathematics Methods**  
2 Credits  
Content, strategies, materials, technology and assessment from a constructivist perspective in the early childhood mathematics classroom. Offered fall semester. Prerequisite(s): MATH 1661 Minimum Grade of D and MATH 1671 Minimum Grade of D.

**2401 - Introduction to Early Childhood Education**  
3 Credits  
Introduction to the profession with emphasis on issues, ethics, developmentally appropriate practices in early childhood education including creating effective family and community partnerships. Offered spring semester. Prerequisite(s): EDUC 1151 Minimum Grade of D.

**2421 - Early Childhood Curriculum and Policies**  
3 Credits  
Early childhood curriculum, curriculum delivery models, unit planning, guidance approach to classroom and behavior management appropriate to the early childhood classroom. Admission to Teacher Education required. Offered fall semester. Prerequisite(s): ECED 2401 Minimum Grade of D.

**2671 - Educational Psychology**  
3 Credits  
Psychological theories, concepts, and principles applied to teaching and learning. Learning processes, motivation, development, social processes, individual differences, and instruction practices. Case study applications. Admission to Teacher Education required. Offered fall semester.

**3051 - Social Studies in Early Childhood Education**  
2 Credits  
An integrated approach to the planning, processes and content of the social studies based on developmental characteristics of the preschool/primary child. Admission to Teacher Education required. Offered spring semester.

**3151 - Teaching Science as Inquiry**  
3 Credits  
Constructivist approach to science education methods and materials in the early childhood classroom. Focus on standards, inquiry, safety, assessment, and incorporation of technology with content of a general science curriculum. Admission to Teacher Education required. Offered spring semester.

**3181 - Education Assessment for Early Childhood**  
3 Credits  
Concepts in developmentally appropriate assessment with emphasis on crafting assessments to inform teaching and learning aligned with state and national standards. Development and appropriate use of traditional and alternative assessments, evaluating student progress, applying technologies, interpreting and using standardized tests and federal and state assessment requirements/reporting. Offered fall semester. Prerequisite(s): EDUC 1151 Minimum Grade of D.
3351 - **Visual Arts in Early Childhood Education**

2 **Credits**
An integrated, constructivist approach to curriculum and pedagogy for teaching the visual arts based on developmental characteristics of the preschool-primary child. Admission to Teacher Education required. Offered spring semester.

3551 - **Music and Movement in Early Childhood Education**

2 **Credits**
An integrated, constructivist approach to incorporating music into the PreK and K-3 primary curricula. Elements of music and movement applied to developmentally appropriate practice. Admission to Teacher Education required. Offered spring semester.

3901 - **Special Topics in Early Childhood Education**

3 **Credits**
Selected special topics in early childhood education. Can be repeated as the topic varies.

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**Subject - Education (EDUC)**

1151 - **Culture and Schooling**

3 **Credits**
The philosophical, historical, and sociological aspects of the American public school experience. Included is the impact that cultural factors have on students, teachers, and on the development and enactment of the school curriculum. Offered fall and spring semesters.

1501 - **Five-Day Field Experience I**

1 **Credit**
Observation and participation with students and teachers in a racially or ethnically diverse school setting for five consecutive school days and a minimum of 35 hours. A paper, pre-conference and post-conference are required. Approval of advisor and the Director of Teacher Education are required prior to this experience. Offered fall and spring semesters. Prerequisite(s): EDUC 1151 Minimum Grade of D.

1521 - **Five-Day Field Experience II**

1 **Credit**
Observation and participation with students and teachers in a school setting for five consecutive school days and a minimum of 35 hours. Experience will focus on teaching and the reflective practice. A paper, pre-conference and post-conference are required. Approval of the advisor and the Director of Teacher Education are required prior to this experience. Offered fall and spring semesters. Prerequisite(s): EDUC 1501 Minimum Grade of S.

2101 - **Exceptional Learners**

3 **Credits**
Understanding the varying characteristics and needs of exceptional individuals; legal requirements, bilingual/multicultural considerations, least restrictive environment and programming alternatives developed to meet student needs. Offered fall and spring semesters. Prerequisite(s): EDUC 1151 Minimum Grade of D.
2681 - Curriculum and Assessment
3 Credits
General and specific topics related to curriculum development and general teaching methods, lesson and unit development, constructivist teaching, and effective classroom practices including formal and informal assessment for adolescent and multiage classrooms. Offered fall and spring semesters. Prerequisite(s): EDUC 1151 Minimum Grade of D.

3001 - Foundations of Literacy
3 Credits
Theoretical orientations of the reading processes, brief history of the U.S. literacy trends, and evaluation of literacy materials in accordance with literacy theories. Offered fall and spring semesters. Prerequisite(s): EDUC 1151 Minimum Grade of D.

3041 - Strategies for Technology Education
3 Credits
Technology and technological activity to assist the synthesis of learning. The use of materials, tools and processes to enhance learning and to assist in developing interests and talents. Emphasis on STEM integration through the development of hands-on, manipulative, problem based learning strategies to be used in the classroom. Typical problems and the planning and organizing of the learning environment. Admission to Teacher Education required. Offered alternate spring semesters.

3121 - Teaching Phonics
3 Credits
Emphasis on stages of orthographic development, phonics generalizations, how to teach phonics, and word recognition skills within a structured word study methodology. Offered fall and spring semesters. Prerequisite(s): EDUC 3001 Minimum Grade of D.

3201 - Instructional Media and Educational Technologies
3 Credits
The role that technologies play in our schools of today as well as in American society. Emphasis on technology integration in instruction including planning, selection, utilization, operation, and evaluation of hardware (computers, digital cameras, digital camcorders, digital document cameras, smart board, etc.) and software applications; culminating in the production of a multimedia project for a classroom teacher and his/her students. Admission to Teacher Education required. Offered fall and spring semesters.

3221 - Integrated Language Arts
3 Credits
Strategies for integrating the language arts within a literacy program with an emphasis on the writing process, applications and conventions. Admission to Teacher Education required. Offered fall and spring semesters. Prerequisite(s): EDUC 3001 Minimum Grade of D.

3421 - Literacy Across the Content Areas
3 Credits
Literacy connections across the curriculum including instruction methods in prereading, vocabulary, comprehension strategies, and study skills. Appropriate for licensure requirements in ECED and MCED.
Admission to Teacher Education required. Offered fall and spring semesters. Prerequisite(s): EDUC 3001 Minimum Grade of D.

3451 - Literacy Across the Content Areas/AYA/MA
3 Credits
Literacy connections across the curriculum including instruction methods in prereading, vocabulary, comprehension strategies, and study skills. Appropriate for licensure requirements in AYA and MA. Admission to Teacher Education required. Offered fall and spring semesters.

3901 - Special Topics in Education
3 Credits
Selected special topics in education. Can be repeated as the topic varies.

4001 - Assessment of Reading Instruction
3 Credits
Use of student assessment information to inform planning, teaching and learning for struggling readers and writers. Admission to Teacher Education required. Offered fall and spring semesters. Prerequisite(s): EDUC 3121 Minimum Grade of D.

4401 - Educational Psychology and Instructional Practices
3 Credits
Teaching behavior, instructional techniques and classroom management from a constructivist perspective essential for effective instruction in adolescent and multiage classrooms. Admission to Teacher Education required. Offered fall and spring semesters.

4451 - Leadership Seminar in Education
3 Credits
An emphasis on professional growth and development and an overview of legal and financial aspects of education, organizational structure at the local and state level, influence and requirements from the state and federal government, and information related to teaching position search. Admission to Teacher Education required. Offered fall and spring semesters.

4511 - Integrated Science Methods
3 Credits
Constructivist approach to science education methods and materials in the AYA classroom. Focus on standards, inquiry, safety, assessment, and incorporation of technology with content of a general science curriculum. Admission to Teacher Education required. Offered fall semester.

4521 - Integrated Language Arts Methods
3 Credits
Effective methods in teaching language, writing, and literature. Preparation for Praxis II English content exam and PLT. Admission to Teacher Education required. Offered alternate fall semesters.

4531 - Integrated Social Studies Methods
3 Credits
A theoretical basis for social studies education with a strong emphasis on the teaching methods and
practices that enliven the social studies classroom for adolescent students. Admission to Teacher Education required. Offered fall semester.

4541 - Integrated Mathematics Methods  
3 Credits  
Methods and current issues in adolescent/young adult mathematics teaching including concept construction, differentiation, assessment, technology, and teaching strategies. Admission to Teacher Education required. Offered fall semester.

4561 - Integrated Modern Language Methods  
3 Credits  
Practical approaches to meeting standards for foreign language teaching. Strategies for developing communication skills, addressing diverse learner needs, and assessing outcomes. Admission to Teacher Education required. Offered alternate fall semesters.

4571 - Integrated Art Methods  
3 Credits  
Effective strategies and methods of instruction in teaching visual art. Lesson planning, resource materials, media, curriculum, issues, and assessment of a comprehensive program. Admission to Teacher Education required. Offered alternate fall semesters.

4581 - Organization and Methods of Technology Education  
3 Credits  
Philosophical constructs, organizing courses, program and course objectives, preparing lesson plans and industrial materials, laboratory procedures, administrative practices, and project management. Offered alternate spring semesters.

4591 - Integrated Music Methods  
3 Credits  
Philosophy, techniques, materials, curriculum planning for the music teacher. Admission to Teacher Education required. Offered alternate fall semesters.

4601 - Integrated Health Methods  
3 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. Admission to Teacher Education required. Offered alternate spring semesters.

4611 - Integrated Physical Education Methods  
3 Credits  
Methods and techniques most effective in teaching of the discipline in the public schools. Includes analysis of successful teaching behaviors during the planning and implementation of quality learning experiences. Admission to Teacher Education required. Offered fall semester. Corequisite(s): PHED 3001

4651 - Science Education Portfolio  
0 Credits
Self-directed exploration of topics important to secondary education, including the history of science, its relationship to other disciplines and society, ethics and legal issues, laboratory safety, and scientific research. Admission to Teacher Education required. Offered fall semester. Corequisite(s): EDUC 4511.

4701 - Student Teaching - EC/MC
6 or 12 Credits
Capstone practicum of supervised teaching in the major licensure field of the candidate. Admission to Teacher Education required. Offered fall and spring semesters. Corequisite(s): EDUC 4451.

4721 - Student Teaching-Adolescent
6 or 12 Credits
Capstone practicum of supervised teaching in the major licensure field of the candidate. Admission to Teacher Education required. Offered fall and spring semesters. Corequisite(s): EDUC 4451.

4761 - Education Capstone
3 Credits
Exploration of a topic in education with faculty supervision including preparation of a paper on the topic. Admission to Teacher Education required. Offered fall and spring semesters.

Subject - Middle Childhood Education (MCED)

2601 - Introduction to Middle Childhood Education
3 Credits
The history, philosophy, and organization of middle school education. Planning, instructional strategies, and evaluation responsive to the needs of young adolescents. Utilization of multi-media materials, creative exploration, and enrichment activities to build an effective middle school curriculum. Offered fall semester. Prerequisite(s): EDUC 1151 Minimum Grade of D.

2621 - Middle Childhood Methods, Curriculum, and Policies
3 Credits
The understanding of theory, organization, and decision making in middle school curriculum from an integrated, interdisciplinary focus. Includes the development of integrated planning, teaching, and assessing at the middle school level. Offered spring semester. Prerequisite(s): MCED 2601 Minimum Grade of D.

2671 - Educational Psychology and Middle Childhood Assessment
3 Credits
Connecting learning with formal and informal assessments and from a cognitive, linguistic, and social development perspective in a middle childhood classroom. Offered spring semester. Prerequisite(s): EDUC 1151 Minimum Grade of D.

3021 - Classroom Guidance, Family, School, and Community Partnerships
3 Credits
A guidance approach to classroom and behavior management appropriate to the middle school classroom. Understanding students and families through sensitivity to diversity and effective
communication strategies. Research and development of family/school/community plans. Admission to Teacher Education required. Offered fall semester.

3051 - Young Adult Literature for the Middle Childhood Classroom
3 Credits
Literature for individual, group, and whole-class reading in middle childhood education (grades 4-9). Offered fall semester.

3081 - Middle School Mathematics Methods
3 Credits
Methods and current issues in middle school mathematics teaching, including content, strategies, materials, technology and assessment. Admission to Teacher Education required. Offered spring semester.

3091 - Middle School Science Methods
3 Credits
Constructivist approach to science education methods and materials in the middle school classroom. Focus on standards, inquiry, safety, assessment, and incorporation of technology with content of a general science curriculum. Admission to Teacher Education required. Offered fall semester.

3111 - Middle School Social Studies Methods
3 Credits
A theoretical basis for social studies education with a strong emphasis on the teaching methods and practices that enliven the social studies classroom for middle childhood students. The student will also be prepared to effectively teach Ohio history, including coverage of the necessary content. Admission to Teacher Education required. Offered fall semester.

3901 - Special Topics in Middle Childhood Education
3 Credits
Selected special topics in middle childhood education. Can be repeated as the topic varies.
**Department of English**

**Subject - English (ENGL)**

**0011 - Enrichment**
0 Credits
Enrichment of the curriculum for English majors through required attendance at designated cultural and academic extracurricular events. Must be completed twice each academic year by all English majors. Graded S/U. Offered fall and spring semesters. This course may be repeated 8 times.

**1001 - Introduction to Literature**
3 Credits
Approaches to analyzing, interpreting, and writing about literature. Offered fall and spring semesters.

**1221 - Writing Seminar**
3 Credits
Introduction to college-level writing skills, including critical reading, the formulation of arguments, researching and incorporating outside sources, and writing essays. Required of all students. Meets university first-year writing requirement. Placement: students with ACT Reading and Writing scores of 24 or below will place into ENGL 1221. Offered fall and spring semesters.

**1231 - Writing Seminar**
3 Credits
Introduction to college-level writing skills, including critical reading of challenging texts, advanced argumentation, researching and incorporating outside sources, and writing essays. Meets university first-year writing requirement. Placement: students with ACT Reading and Writing scores of 25 or above will place into ENGL 1231. Offered fall and spring semesters.

**1411 - Intensive College Composition 1**
3 Credits
Academic English skills for students whose native language is not English, with a focus on grammar and sentence-level structures leading to fully-developed paragraphs and short essays. This intensive course meets five hours per week. Enrollment determined by ONU Writing Placement Exam administered during International Student Orientation. ENGL 1411 and ENGL 1421 together satisfy the general education first-year writing requirement. Students must earn a C or better to advance to ENGL 1421. Offered fall semester.

**1421 - Intensive College Composition 2**
3 Credits
Continuation of ENGL 1411 with additional emphasis on academic writing including documentation of sources and research writing. This intensive course meets five hours per week. ENGL 1411 and ENGL 1421 together satisfy the general education first-year writing requirement. Students must earn a C or better in ENGL 1411 to enroll in this course. Offered spring semester. Prerequisite(s): ENGL 1411 Minimum Grade of C.
1511 - College Composition 1
3 Credits
Academic English skills for students whose native language is not English, with emphasis on reading and writing. Enrollment determined by ONU Writing Placement Exam administered during International Student Orientation. ENGL 1511 and ENGL 1521 together satisfy the general education first-year writing requirement. Students must earn a C or better to advance to ENGL 1521. A score of 3.5 or higher on the ONU Writing Placement Exam is required to enroll in this course. Offered fall semester.

1521 - College Composition 2
3 Credits
Continuation of ENGL 1511 with additional emphasis on academic writing including documentation of sources and research writing. ENGL 1511 and ENGL 1521 together satisfy the general education first-year writing requirement. Students must earn a C or better to satisfy the general education first-year writing requirement. Students must earn a C or better in ENGL 1511 to enroll in this course. Offered spring semester. Prerequisite(s): ENGL 1511 Minimum Grade of C

1611 - News Writing
3 Credits
Introduction to the basics of news reporting, including interviewing techniques and other methods of news gathering, organizing information, and copy editing. (Taken in conjunction with ENGL 2501 - Newspaper Practicum.) Offered fall semester.

2001 - Grammar in Context
3 Credits
English grammatical structures and their rhetorical effects. Offered alternate fall semesters.

2011 - Introduction to Creative Writing
3 Credits
Introduction to creative writing techniques and texts in multiple genres. Offered spring semester.

2041 - Great Works
3 Credits
Major literary texts covering a range of historical periods and genres. A general education course with an emphasis on writing. Offered fall and spring semesters. Prerequisite(s): ENGL 1221 Minimum Grade of D or ENGL 1231 Minimum Grade of D

2051 - Writing in the Professions
3 Credits
The functions, uses, history, and practice of writing in professional situations, with a focus on practical understanding of fundamental rhetorical concepts. Assignments include print and online writing, research, and documentation projects in various professional situations with emphasis on grammatical correctness, concision and clarity, and the revision process. Offered alternate fall semesters. Prerequisite(s): ENGL 1221 Minimum Grade of D or ENGL 1231 Minimum Grade of D.

2071 - Topics in Fiction
3 Credits
Exploration of thematic and stylistic elements in fiction from a variety of cultures and periods. Offered alternate spring semesters.
2081 - Topics in Drama
3 Credits
Exploration of thematic and stylistic elements in dramatic literature from a variety of cultures and periods. Offered alternate spring semesters.

2091 - Topics in Poetry
3 Credits
Exploration of thematic and stylistic elements in poetry from a variety of cultures and periods. Offered alternate spring semesters.

2101 - Proseminar: English Studies
3 Credits
Overview of theoretical and practical approaches to interpreting and writing about texts. Offered fall semester. Prerequisite(s): ENGL 1221 Minimum Grade of D or ENGL 1231 Minimum Grade of D.

2111 - American Literature 1
3 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. Offered alternate fall semesters. Prerequisite(s): ENGL 1221 Minimum Grade of D or ENGL 1231 Minimum Grade of D.

2121 - American Literature 2
3 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. Offered alternate spring semesters. Prerequisite(s): ENGL 1221 Minimum Grade of D or ENGL 1231 Minimum Grade of D.

2131 - British Literature 1
3 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. Offered alternate fall semesters. Prerequisite(s): ENGL 1221 Minimum Grade of D or ENGL 1231 Minimum Grade of D.

2141 - British Literature 2
3 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. Offered alternate spring semesters. Prerequisite(s): ENGL 1221 Minimum Grade of D or ENGL 1231 Minimum Grade of D.

2191 - Topics in World Literature
3 Credits
Approaches to reading world literatures in a variety of cultural and literary contexts. Offered alternate spring semesters.
2201 - Layout and Design

3 Credits
Design principles used in the printing industry and on the web, as well as coverage of basic headline and cutline writing skills. Practical application of software publication tools in a computer classroom setting. Issues specific to English Department programs. Open to English Department majors. Others by permission of the department. Offered spring semester.

2251 - Children's and Young Adult Literature

3 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. Offered fall semester. Prerequisite(s): ENGL 1221 Minimum Grade of D or ENGL 1231 Minimum Grade of D.

2501 - Newspaper Practicum

1 to 3 Credits
Journalism activities on the Northern Review. One to six credits, depending on role, to be determined by department. Course may be repeated, but only six hours will count toward graduation. Graded S/U. Offered fall and spring semesters. This course may be repeated 8 times. This course is repeatable for a total of 6 hours.

2511 - Magazine Publishing Practicum

1 to 3 Credits
Publication activities on the ONU creative writing journal Polaris. One to six credits, depending on role, to be determined by the department. Course may be repeated, but only six hours will count toward graduation. Graded S/U. Offered fall and spring semesters. This course may be repeated 8 times. This course is repeatable for a total of 6 hours.

2521 - Journal Publishing Practicum

1 to 3 Credits
Workshop experience for English majors in technical and management skills related to the publication of professional journals. One to three credits, depending on role, to be determined by department. Course may be repeated, but only six hours will count toward graduation. Graded S/U. Offered fall and spring semesters. This course may be repeated 8 times. This course is repeatable for a total of 6 hours.

2531 - Web Publishing Practicum

1 to 3 Credits
Publication activities on the ONU electronic magazine eMedia. One to six credits, depending on role, to be determined by department. Course may be repeated, but only six hours will count toward graduation. Graded S/U. Offered fall and spring semesters. This course may be repeated 8 times. This course is repeatable for a total of 6 hours.

2541 - Screenwriting Workshop

1 to 3 Credits
Weekly workshop for the exploration of all aspects of screenwriting. Suitable for all levels of experience. Variable credit of one to three hours (at the instructor’s discretion). May be repeated, but only six hours count toward graduation. Offered fall and spring semesters. This course may be repeated 8 times. This
cours is repeatable for a total of 6 hours.

2551 - Creative Writing Workshop
1 to 3 Credits
Weekly workshop. An introduction to multiple creative writing genres and techniques with an emphasis on practice through prompts and other activities. Suitable for all levels of experience. Variable credit of one to three hours (at the instructor's discretion). May be repeated, but only six hours count toward graduation. Offered fall and spring semesters. This course may be repeated 8 times. This course is repeatable for a total of 6 hours.

2561 - English Department Newsletter
1 to 3 Credits
Creation of the annual department newsletter; involves interviews, writing articles, layout and design. English majors only and with instructor approval. Offered spring semester. This course may be repeated 2 times. This course is repeatable for a total of 6 hours.

2571 - Research Practicum
1 to 3 Credits
Practical experience in using such research skills as documentation, editing, and preparing manuscripts. Student will work with faculty member as research assistant. One to six credits, depending on role, to be determined by department. May be repeated, but only six hours will count toward graduation. Offered fall and spring semesters.

2601 - Introduction to Shakespeare
3 Credits
Representative plays and poetry from the entire span of Shakespeare's career and from each of the genres. May be repeated as content varies. Offered alternate spring semesters. Prerequisite(s): ENGL 1221 Minimum Grade of D or ENGL 1231 Minimum Grade of D. This course may be repeated 1 time. This course is repeatable for a total of 3 hours.

2631 - Women's Literature
3 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. Offered alternate fall semesters.

2741 - American Multicultural Literature
3 Credits
American multicultural literature with emphasis on aesthetic value and cultural context. Offered alternate fall semesters.

2901 - Special Topics
3 Credits
May be repeated as the topic varies. With Department approval. Offered alternate spring semesters.

2921 - Photojournalism
3 Credits
Focuses on the art of news photography, and covers basic instruction in photography and lighting, as
well as the types of photography found in the news, specifically sports coverage, feature shots, straight news. Camera provided. Open to English Department majors. Others by permission of the department. Offered alternate fall semesters.

3101 - Topics in Medieval Literature
3 Credits
Exploration of themes in and cultural contexts of medieval literature. Offered alternate spring semesters. Prerequisite(s): ENGL 2041 Minimum Grade of D or ENGL 1001 Minimum Grade of D

3191 - Renaissance and Jacobean Literature
3 Credits
Major writers, themes, movements, or genres from 1485 to 1660, including such figures as Marlowe, Jonson, Spenser, Donne, and Milton. Offered alternate spring semesters. Prerequisite(s): ENGL 2041 Minimum Grade of D or ENGL 1001 Minimum Grade of D

3201 - European Literature
3 Credits
The Western tradition in literature, including representative continental literature in translation from the Classical Greek era to the present. Offered alternate spring semesters. Prerequisite(s): ENGL 2041 Minimum Grade of D or ENGL 1001 Minimum Grade of D

3221 - Restoration & 18th Century Literature
3 Credits
Major works of English prose and drama between 1660 and 1789, with concentration on a few writers such as Dryden, Behn, Congreve, Addison & Steele, Richardson, Swift, Pope, and Sheridan. Offered alternate spring semesters. Prerequisite(s): ENGL 1221 Minimum Grade of D or ENGL 1231 Minimum Grade of D

3261 - Post-World War I British Literature
3 Credits
British literature from the 1900 to the present, with concentration on a few selected writers. Offered alternate fall semesters. Prerequisite(s): ENGL 2041 Minimum Grade of D or ENGL 1001 Minimum Grade of D

3301 - Postcolonial Literature
3 Credits
Major works in world literatures written in English from such regions as India, Anglophone Africa, Australia, and the Caribbean, with attention to cultural context. This course satisfies the Arts and Sciences non-Western requirement. Offered alternate fall semesters. Prerequisite(s): ENGL 2041 Minimum Grade of D or ENGL 1001 Minimum Grade of D

3341 - American Literature pre-1865
3 Credits
American literature from 1492 to the 1870s, with concentration on a few selected writers or themes in the context of literary and social influences. Offered alternate fall semesters. Prerequisite(s): ENGL 2041 Minimum Grade of D or ENGL 1001 Minimum Grade of D.
3351 - American Literature post-1865
3 Credits
American literature from the 1870s to the present, with a concentration on a few selected writers or themes in the context of literary and social influences. Offered alternate fall semesters. Prerequisite(s): ENGL 2041 Minimum Grade of D or ENGL 1001 Minimum Grade of D.

3401 - Intermediate Poetry Writing
3 Credits
The discipline and technique of poetry writing and analysis. Workshop and discussion setting. Requires permission of the instructor and consultation with the department internship committee, completion of application, and 2.75 GPA. Offered alternate fall semesters. Prerequisite(s): ENGL 1221 Minimum Grade of D or ENGL 1231 Minimum Grade of D.

3411 - Intermediate Fiction Writing
3 Credits
The discipline and technique of fiction writing and analysis. Workshop and discussion setting. Permission of instructor required. Offered alternate fall semesters. Prerequisite(s): ENGL 1221 Minimum Grade of D or ENGL 1231 Minimum Grade of D.

3421 - Screenwriting
3 Credits
The theory and practice of screenwriting in a workshop setting. Permission of instructor required. Offered alternate spring semesters. Prerequisite(s): ENGL 1221 Minimum Grade of D or ENGL 1231 Minimum Grade of D.

3441 - Introduction to Convergent Publishing
3 Credits
This course is a hands-on introduction to two of the most widely used pagination and image manipulation software packages in publishing today: InDesign CS5 and Adobe Photoshop CS5. Students will also explore web page design as it pertains to publishing. Offered alternate spring semesters. Prerequisite(s): ENGL 2201 Minimum Grade of D.

3511 - English Language
3 Credits
History of the English language, developments in American and world English, and changes in vocabulary, grammar, phonology, and dialects. Offered alternate fall semesters. Prerequisite(s): ENGL 2101 Minimum Grade of D and (ENGL 2041 Minimum Grade of D or ENGL 1001 Minimum Grade of D).

3551 - Feature Writing
3 Credits
Understanding and practice in writing soft news. Class assignments may profile people who make the news; explain events that move or shape the news; analyze what is happening in the world, nation, or community; teach an audience how to do something; suggest better ways to live; examine trends; or entertain. Offered alternate spring semesters. Prerequisite(s): ENGL 1411 Minimum Grade of D.

3641 - British Novel
3 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. Offered alternate spring semesters. Prerequisite(s): ENGL 2041 Minimum Grade of D or ENGL 1001 Minimum Grade of D.

3651 - American Novel
3 Credits
Selected novels from the eighteenth century to the present in the context of diverse literary and social influences. Offered alternate spring semesters.

3721 - Advanced Reporting (Capstone)
3 Credits
Advanced journalism reporting techniques, research tools, and formats used by newspapers in covering public policy issues. Offered alternate fall semesters. Prerequisite(s): ENGL 1411 Minimum Grade of D.

3781 - Journal Publishing
3 Credits
Hands-on opportunity to learn about scholarly journal publication. Issues of budgeting, layout, and design, creation of style manuals, copy editing and other responsibilities of an editor. Offered alternate spring semesters. Prerequisite(s): ENGL 2041 Minimum Grade of D or ENGL 1001 Minimum Grade of D.

3801 - Literary Journalism (Capstone)
3 Credits
The journalist as a creator of literature: the transformation of significant literary figures from working journalists to award-winning fiction writers and the writing techniques they employ. Includes such authors as Hemingway, Hersey, Wolfe, Breslin and Thompson. Offered alternate fall semesters. Prerequisite(s): ENGL 1411 Minimum Grade of D.

3811 - Modernist and Contemporary Poetry
3 Credits
Exploration and contextualization of major writers, poems, and movements in 20th-century American and European poetry. Offered alternate fall semesters. Prerequisite(s): ENGL 2101 Minimum Grade of D and (ENGL 2041 Minimum Grade of D or ENGL 1001 Minimum Grade of D).

3901 - Special Topics in English
3 Credits
May be repeated as the topic varies. Department approval required. Offered alternate spring semesters.

4051 - Studies in Literary and Cultural Theory
3 Credits
The academic and professional interpretation of literary and multimedia texts in their social, cultural, and historical contexts. Offered alternate spring semesters. Prerequisite(s): ENGL 2101 Minimum Grade of D and (ENGL 2041 Minimum Grade of D or ENGL 1001 Minimum Grade of D).

4101 - Chaucer
3 Credits
The poetry of Chaucer, with special emphasis on the Canterbury Tales, Troilus and Criseyde, and reading
and understanding Middle English. Offered alternate fall semesters. Prerequisite(s): ENGL 2101 Minimum Grade of D and ( ENGL 2041 Minimum Grade of D or ENGL 1001 Minimum Grade of D)

4121 - Shakespeare Studies
3 Credits
Close reading and analysis of Shakespeare's plays with their historical context, using a variety of critical approaches. May be repeated as content varies. Offered alternate fall semesters. Prerequisite(s): ENGL 2101 Minimum Grade of D and ( ENGL 2041 Minimum Grade of D or ENGL 1001 Minimum Grade of D). This course may be repeated 1 time. This course is repeatable for a total of 6 hours.

4231 - British Romanticism
3 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. Offered alternate fall semesters. Prerequisite(s): ENGL 2101 Minimum Grade of D and ( ENGL 2041 Minimum Grade of D or ENGL 1001 Minimum Grade of D).

4241 - Victorian Period
3 Credits
British literature between 1832 and 1901, with an emphasis on cultural and historical contexts. Offered alternate fall semesters. Prerequisite(s): ENGL 2101 Minimum Grade of D and ( ENGL 2041 Minimum Grade of D or ENGL 1001 Minimum Grade of D).

4311 - Studies in American Literature
3 Credits
A major writer, genre, or theme in American literature, with attention to cultural context. Offered alternate spring semesters. Prerequisite(s): ENGL 2101 Minimum Grade of D and ( ENGL 2041 Minimum Grade of D or ENGL 1001 Minimum Grade of D).

4321 - Studies in Comparative Literature
3 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. Offered alternate spring semesters. Prerequisite(s): ENGL 2101 Minimum Grade of D and ( ENGL 2041 Minimum Grade of D or ENGL 1001 Minimum Grade of D).

4401 - Advanced Poetry Writing
3 Credits
The discipline and technique of advanced poetry writing and analysis, with an introduction to publication possibilities. Workshop and discussion setting. May be continued as ENGL 4961 - Independent Study in Writing. Offered alternate spring semesters. Prerequisite(s): ENGL 3401 Minimum Grade of D.

4411 - Advanced Fiction Writing
3 Credits
The discipline and technique of writing fiction, with an introduction to publication possibilities. Workshop and discussion setting. May be continued as ENGL 4961 - Independent Study in Writing. Offered alternate spring semesters. Prerequisite(s): ENGL 3411 Minimum Grade of D.
4421 - Nonfiction Writing  
3 Credits  
A literary approach to the reading and writing of non-fiction essays. Offered alternate spring semesters. Prerequisite(s): ENGL 2101 Minimum Grade of D.

4461 - Capstone Presentation  
1 Credit  
Oral presentation of the project completed in a designated 3000-4000 level course as a capstone project. Offered spring semester.

4501 - Communications Law and Ethics  
3 Credits  
A survey of contemporary ethical, legal, and diversity issues confronting the media; the press as a cultural force in society. Offered alternate spring semesters.

4521 - Rhetorical Theory  
3 Credits  
The history and theory of rhetoric and its practice in contemporary public discourse and media. Offered alternate spring semesters. Prerequisite(s): ENGL 2101 Minimum Grade of D and (ENGL 2041 Minimum Grade of D or ENGL 1001 Minimum Grade of D).

4701 - Editing  
3 Credits  
Editing techniques and concerns critical to producing polished writing on a variety of levels, from corporate communications to book publishing. Offered fall semester. Prerequisite(s): ENGL 2001 Minimum Grade of D and ENGL 2101 Minimum Grade of D.

4711 - History of Journalism  
3 Credits  
Survey of American journalism history and principles. Concentration on the development of a free press from colonial period to present day with special emphasis on the various heroes and villains of the media including Day, Pulitzer, Hearst, Murrow, and Murdock. Offered alternate spring semesters. Prerequisite(s): ENGL 1411 Minimum Grade of D.

4811 - Journalism Internship  
1 to 3 Credits  
Provides practical experience outside the classroom and enhances the students professional interests. Courses appropriate for the internship required. Graded S/U. Offered fall and spring semesters. This course is repeatable for a total of 16 hours.

4821 - Professional Writing Internship  
1 to 3 Credits  
Provides practical experience outside the classroom and enhances the students professional interests. Courses appropriate for the internship required. Graded S/U. Offered fall and spring semesters. This course is repeatable for a total of 16 hours.
4901 - Special Topics
3 Credits
May be repeated as the topic varies. Department approval required. Offered fall and spring semesters.

4961 - Independent Study in Creative Writing
1 to 3 Credits
May be repeated as the topic varies. Department approval required.

4971 - Independent Study in Literature
1 to 3 Credits
May be repeated as the topic varies. Department approval required. Offered fall and spring semesters.

4981 - Independent Study in Professional Writing
1 to 3 Credits
May be repeated as the topic varies. Department approval required. Offered fall and spring semesters.

4991 - Independent Study in Journalism
1 to 3 Credits
May be repeated as the topic varies. Department approval required. Offered fall and spring semesters.

Subject - ESL Program (ESL)

1101 - Reading and Vocabulary 1
1 to 3 Credits
Integrated reading and vocabulary skill development for academic purposes. (formerly incorporated in ESL 100) Offered fall semester. Corequisite(s): ESL 1251.

1111 - Reading and Vocabulary 2
1 to 3 Credits
Integrated reading and vocabulary skill development for academic purposes. (formerly incorporated in ESL 100 and ESL 101) Offered fall semester. Corequisite(s): ESL 1261.

1121 - Reading and Vocabulary 3
1 to 3 Credits
Integrated reading and vocabulary skill development for academic purposes. (formerly incorporated in ESL 101 and ESL 102) Offered spring semester. Corequisite(s): ESL 1271.

1131 - Reading and Vocabulary 4
1 to 3 Credits
Integrated reading and vocabulary skill development for academic purposes. (formerly incorporated in ESL 102) Offered spring semester. Corequisite(s): ESL 1281.
1201 - Listening and Speaking 1  
1 to 6 Credits  
Integrated listening and speaking skill development for academic purposes. (formerly incorporated in ESL 100) Offered fall semester. Corequisite(s): ESL 1251.

1211 - Listening and Speaking 2  
1 to 6 Credits  
Integrated listening and speaking skill development for academic purposes. (formerly incorporated in ESL 100 and ESL 101) Offered fall semester. Corequisite(s): ESL 1261.

1221 - Listening and Speaking 3  
1 to 6 Credits  
Integrated listening and speaking skill development for academic purposes. (formerly incorporated in ESL 101 and ESL 102) Offered spring semester. Corequisite(s): ESL 1271.

1231 - Listening and Speaking 4  
1 to 6 Credits  
Integrated listening and speaking skill development for academic purposes. (formerly incorporated in ESL 102) Offered spring semester. Corequisite(s): ESL 1281.

1251 - ESL Lab 1  
1 Credit  
ESL Lab 1 Offered fall semester.

1261 - ESL Lab 2  
1 Credit  
ESL Lab 2 Offered fall semester.

1271 - ESL Lab 3  
1 Credit  
ESL Lab 3 Offered spring semester.

1281 - ESL Lab 4  
1 Credit  
ESL Lab 4 Offered spring semester.

Department of History, Politics, and Justice

Subject - Criminal Justice (CJ)

1211 - Introduction To Criminal Justice  
3 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.
2001 - Criminal Justice Systems: The Police
3 Credits
Historical, philosophical and legal basis of police institutions, practices and procedures. Issue oriented course. Discussion topics will vary with prevailing policing issues.

2101 - Criminal Justice Systems: The Courts
3 Credits
Prosecution and defense in criminal cases. Constitutional rules that apply to criminal cases at trial and under appeal. The concept of due process. The rights and limitations of the state and the defense under the Bill of Rights. Preliminary hearings, arraignment, trials, sentencing, and appeals.

2201 - Criminal Justice Systems: Corrections
3 Credits
Historical, philosophical and legal basis of correctional procedures and institutions. Probation and parole. Issue oriented course. Discussion topics will vary with prevailing corrections issues.

3021 - Nature Center Seminar In Criminal Justice
1 Credit
Weekend seminar at the Metzger Nature Center on a wide range of topics in criminal justice. May be repeated as topic varies. A Nature Center use fee is charged.

3401 - Comparative Criminal Justice
3 Credits
Comparison of the American criminal justice system with international systems from the common, civil, socialist, and Islamic legal traditions. Comparative analysis of police, courts, corrections, and legal definitions of crime. Transnational crime.

3431 - Substantive Criminal Law
3 Credits

3541 - Women In Criminal Justice
3 Credits

3551 - Minorities In Criminal Justice
3 Credits
Racial and ethnic minorities in the American criminal justice system. Minority and ethnic group members as offenders, victims of crime, and criminal justice professionals. Impact of racism, prejudice, and discrimination.

3561 - Juvenile Justice
3 Credits

3601 - Criminal Investigation
3 Credits

3901 - Special Topics In Criminal Justice
3 Credits
May be repeated as topic varies.

4011 - The Death Penalty
3 Credits
Examination of the Eighth Amendment and the death penalty. Major United States Supreme Court decisions that relate to the death penalty. Theoretical and practical perspectives on the death penalty. Historical development of the death penalty. Capital trials, the appeals process, methods of execution, and the doctrine of proportionality. Comparisons between male and female capital offenders. Rules that govern insane and juvenile capital offenders. The costs of executions.

4101 - Criminal Behavior
3 Credits
Use of the descriptions and explanations that criminals themselves provide to understand how people become criminals. The roles that social and peer groups, social environment, and learning play in the process. Theoretical and policy implications of criminal behavior.

4111 - Serial Killers
3 Credits
The historical origins of the concept of serial killers. The methods, motives, and psychological background of American serial killers. The culture of serial killers. Theories to explain serial killing. The concept and application of profiling.

4121 - Domestic Violence
3 Credits

4211 - Crime And The Media
3 Credits
Representations of crime and the criminal justice system in the media. How media representations affect society and the criminal justice system. How the media construct reality, influence attitudes and perceptions of crime and criminality, and affect criminal cases.

4621 - Issues In Criminal Justice
3 Credits
Intensive study of selected topics related to criminal justice. May be repeated as topic varies.

4711 - Public Service Internship Program
1 to 15 Credits
Field experience in the area of public service. Student works in a close relationship with public offices and officials or approved private agencies and firms. Student must enroll in at least 1 credit hour of Public Service Internship per internship experience. A full time Public Service Internship requires 600 hours of on-site work. Student may apply up to 15 credit hours of departmental internship to the BA degree. Consultation with the department internship committee and completion of the application process; 2.75 GPA; junior or senior status required. This course may be repeated 15 times. This course is repeatable for a total of 15 hours.

4721 - Seminar - The Washington Center Seminar
3 Credits
Requires prior departmental approval.

4901 - Special Topics In Criminal Justice
3 Credits
May be repeated as topic varies. Formerly PLSC 490.

4941 - Seminar In Criminal Justice
3 Credits
May be repeated as topic varies.

4961 - Independent Study In Criminal Justice
1 to 3 Credits
Approval of department chair required prior to registration.

4981 - Senior Thesis 1
1 Credit
Topic selection and development of bibliography and outline for senior thesis under the direction of a departmental faculty member. First part of departmental Capstone course for majors in Criminal Justice. Required of all Criminal Justice majors. Enrollment at least two semesters before the semester of expected graduation. Junior status, major in Criminal Justice required. Formerly PLSC 488. Prerequisite(s): ISR 2531 Minimum Grade of D and ISR 2541 Minimum Grade of D.
4991 - Senior Thesis 2  
2 Credits  
Completion of senior thesis under the direction of a departmental faculty member and a second reader. Second part of departmental Capstone course for majors in Criminal Justice. Required of all Criminal Justice majors. Enrollment at least one semester before the semester of expected graduation. Junior status; major in Criminal Justice required. Prerequisite(s): CJ 4981 Minimum Grade of D.

Subject - Geography (GEOG)

1001 - Introduction To Geography: Methods And Materials  
3 Credits  
Methods and tools that geographers use to study the complex relationship between place and space. The major academic subdisciplines of geography, including physical geography, political geography, cartography, population geography, historical geography, and GIS.

1901 - Special Topics In Geography  
1 to 3 Credits  
May be repeated as topic varies.

2261 - World Regional Geography  
3 Credits  
Regional survey of the non-Western world. Examination of the leading cultural, economic, historical, political, and environmental features of the non-Western world. Confers IR-CP elective credit.

2371 - Physical Geography  
3 Credits  
Basic concepts in physical geography. The atmosphere, the biosphere, the lithosphere, and the hydrosphere. Processes driving physical systems on the earth, interactions among physical systems, human interaction with the physical environment. Basic physical geographic processes and the global geographic patterns. Formerly GEOG 237.

2401 - Political Geography  
3 Credits  

2421 - Population Geography  
3 Credits  
Spatial variations in the distribution, composition, migration, and growth of populations in relation to the nature of places. Demography from a geographical perspective.

2481 - Introduction To Geographic Information Systems  
3 Credits  
Fundamentals of geographic information systems (GIS). Basic cartographic principles, general geography
concepts and spatial analysis, and hardware and software elements of GIS. Lab exercises in various applications of GIS technology to engineering, political science, health, environmental science, business, government, and criminal justice. GIS terminology, raster and vector data structures, data sources and accuracy, methods of data acquisition, conversion, input, and working with spatial databases. Working knowledge of Windows operating system required. Exercises require work in the computer lab outside class hours.

2551 - Spatial Methods 1
3 Credits
Introduction to the application of quantitative and qualitative methods in geography. Quantitative methods, including descriptive statistics; descriptive spatial statistics; normal, Poisson, and binomial probabilities. Introduction to qualitative methods, including interviewing, observation, document analysis, and visual analysis.

2561 - Spatial Methods 2
3 Credits
Intermediate application of quantitative and qualitative methods in geography. Quantitative methods used by geographers, including multivariate analysis, factor analysis, and spatial modeling. Continues discussion on qualitative methods used by geographers. Prerequisite(s): GEOG 2551 Minimum Grade of D.

2681 - Cartography
3 Credits
The art and science of making maps. The history of map-making, elements of map construction, and properties of map projections. How to construct different kinds of thematic maps and manipulate geographic data to illustrate characteristics of distribution, concentration, or other geographic patterns that promote interpretation of the earth’s features. Exercises require work in the computer lab outside class hours. Offered alternate years.

2901 - Special Topics In Geography
1 to 3 Credits
May be repeated as topic varies.

3021 - Nature Center Seminar In Geography
1 Credit
Weekend seminar at the Metzger Nature Center on a wide range of topics in geography. May be repeated as topic varies. A Nature Center use fee is charged.

3481 - Applied Geographic Information Systems
3 Credits
Advanced discussion of spatial interpolations, error, and uncertainty, Global Positioning Systems (GPS), and spatial model-building. Advanced knowledge of GIS theory and science. Computer lab projects geared toward the relevant major. Exercises require work in the computer lab outside class hours. Offered alternate years. Prerequisite(s): GEOG 2481 Minimum Grade of D.

3901 - Special Topics In Geography
1 to 3 Credits
May be repeated as topic varies. Formerly GEOG 393.

4001 - Introduction To Remote Sensing
3 Credits
Principles and application of remote sensing. The fundamental characteristics of electromagnetic radiation, and energy-atmosphere interactions. The design of remote sensing instruments. Techniques to extract problem-solving information from remote sensing data. Emphasis on digital image-processing techniques and the algorithms involved in measurement, analysis, and interpretation of electromagnetic energy collected by remote sensing instruments. Prerequisite(s): GEOG 248 Minimum Grade of D.

4711 - Public Service Internship Program
1 to 15 Credits
Field experience in the area of public service. Student works in a close relationship with public offices and officials or approved private agencies and firms. Student must enroll in at least 1 credit hour of Public Service Internship per internship experience. A full time Public Service Internship requires 600 hours of on-site work. Student may apply up to 15 credit hours of departmental internship to the BA degree. Consultation with the department internship committee and completion of the application process; 2.75 GPA; junior or senior status required. This course may be repeated 15 times. This course is repeatable for a total of 15 hours.

4721 - Seminar - The Washington Center Seminar
3 Credits
Requires prior departmental approval.

4901 - Special Topics In Geography
1 to 3 Credits
May be repeated as topic varies.

4941 - Seminar In Geography
3 Credits
May be repeated as topic varies.

4961 - Independent Study In Geography
1 to 3 Credits
Approval of department chair required prior to registration.

Subject - Geography and Crim Justice (GGCJ)

3521 - Spatial Analysis In Criminal Justice
3 Credits
Spatial aspects of criminal justice. Geographies of crime, policing, and related topics.

3921 - Special Topics In Geography And Criminal Justice
1 to 3 Credits
May be repeated as topic varies.

Subject - Geography and History - Sem (GGHS)

3531 - Historical Geography
3 Credits
Spatial aspects of history. Geographies of historical events and trends and spatial analysis of the past. May be repeated once as topic varies.

3931 - Special Topics In Geography And History
1 to 3 Credits
May be repeated as topic varies.

Subject - Geography for Marketing (GGMK)

3541 - Geography For Marketing
3 Credits
Geographies of markets, analysis of the location of markets, spatial and temporal trends, mapping markets, and GIS.

3941 - Special Topics In Geography And Marketing
1 to 3 Credits
May be repeated as topic varies.

Subject - Geography and Political Science (GGPS)

3951 - Special Topics In Geography And Politics
1 to 3 Credits
May be repeated as topic varies.

Subject - History (HIST)

0041 - Teacher Licensure Orientation
0 Credits
Introduction to the National Council for the Social Studies Ten Themes for Teaching and requirements for teacher licensure. The Ohio State Board of Education requires this course for Social Studies licensure. Graded S/U. Major in Social Studies required. A Nature Center use fee is charged. Must be enrolled in one of the following Fields of Study: Social Studies
<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1101 - Western Civilization 1</td>
<td>3</td>
<td>Ideas, attitudes, and institutions basic to civilization as it developed in the West from ancient times to the sixteenth century.</td>
</tr>
<tr>
<td>1111 - Western Civilization 2</td>
<td>3</td>
<td>Ideas, attitudes, and institutions basic to civilization as it developed in the West from the seventeenth century to the present.</td>
</tr>
<tr>
<td>1151 - World Civilizations 1</td>
<td>3</td>
<td>The emergence, development, and interactions of civilizations in Africa, Asia, Europe, and the Americas, from the Neolithic Revolution to 1400 CE.</td>
</tr>
<tr>
<td>1161 - World Civilizations 2</td>
<td>3</td>
<td>The development and interactions of Western and non-Western civilizations from 1400-present.</td>
</tr>
<tr>
<td>1201 - Public History</td>
<td>3</td>
<td>Fundamentals of public history. Investigation, examination, and study of museums and historical societies, historic preservation, material culture, popular culture, and family and ethnic group history. Readings, discussions, demonstrations, and fieldwork. Student who completes HIST 1201 may not enroll in HIST 3201.</td>
</tr>
<tr>
<td>1301 - Local History</td>
<td>3</td>
<td>Significant aspects of local history for reference and teaching purposes. Investigation, examination, and study of topics and trends in local history theory and practice. Readings, discussions, demonstrations, and fieldwork. Student who completes HIST 1301 may not enroll in HIST 3301.</td>
</tr>
<tr>
<td>1401 - America Rising</td>
<td>3</td>
<td>America rose from isolated colonies to an economic juggernaut between 1600 and the 1890s. The course will consider the effect of European colonization, interaction with Native Americans, colonial struggles leading to independence, the creation of a new republic, the Antebellum Period, the Civil War, and the rise of industrial America. Special consideration given to the struggle over definition of the new republic and its conflict over slavery.</td>
</tr>
<tr>
<td>1411 - The American Century</td>
<td>3</td>
<td>Already an economic power at the end of the 19th century, the United States achieved the status of superpower in the wake of the second World War. This course will consider what Time publisher, Henry Luce famously called the 'American Century.' Special consideration given to the debate over the meaning of 'America' and over the nation's role in the world. Covers the period from the Spanish American War in 1898 to Francis Fukuyama's declaration of the triumph of American-style liberal democracy and free market capitalism in the 1990s.</td>
</tr>
</tbody>
</table>
1901 - Special Topics In History
1 to 3 Credits
May be repeated as topic varies.

2041 - Historiography
3 Credits
Methods for researching and writing history from textual sources. Examination of major theories and schools of historical writing. Requires a fully documented research paper written predominantly from primary sources. Fulfills the research methods requirement for History and Social Studies majors.

2141 - United States History To 1877
3 Credits
American colonies and United States from 1492 to 1877. Emphasis is placed on the formation of American political, economic, and social attitudes, their application in the early Republic, the Civil War, and Reconstruction.

2151 - United States History Since 1877
3 Credits
The United States since the end of Reconstruction. Major topics include the role played by the US in global affairs and US domestic policy.

2301 - Introduction To Museums And Archives
3 Credits
Theoretical, administrative, and curatorial aspects of museum and archival management and practice. Topics include the growth of museums and archives, the development of private and public institutions, and the manner in which museum and archival collections are gathered, catalogued, utilized, stored, and made available for research, educational and exhibition purposes. Students gain proficiency in PastPerfect.

2901 - Special Topics In History
1 to 3 Credits
May be repeated as topic varies.

3001 - Myth In History
3 Credits
Analysis of the nature and function of myth in historical societies. Case studies in the mythologies of the ancient Near East, Greece, Rome, northern Europe, the Americas, Australia, and the Pacific.

3021 - Nature Center Seminar In History
1 Credit
Weekend seminar at the Metzger Nature Center on a wide range of topics in history. May be repeated as topic varies. A Nature Center use fee is charged.

3071 - Introduction To Family History And Genealogy
3 Credits
Genealogical research and practice for understanding family history and social development. Exploration of family records; local, state, and federal records; church records; census records; land and probate
records and documents; school records; immigration lists and naturalization records; and miscellaneous
records to document specific ethnic origins. Offered alternate years.

3081 - Material Culture
3 Credits
Material culture as a means of understanding history and the built environment. Interdisciplinary trends
in theory and methodology. The importance of material culture analysis to understand issues such as
consumption, fashion, gender, technology, built form, and popular contemporary culture. Offered
alternate years.

3131 - East Asia To 1800
3 Credits
Historical evolution of imperial authority in China and Japan. Cultural institutions in China, Japan, Korea
and southeast Asia. Cultural interactions between those nations. The beginnings of European
penetration into the East. Offered alternate years.

3141 - East Asia Since 1800
3 Credits
Interaction between East and West. Increasing European control over Asia. Attempts to modernize on
the Western model. Militarism and Communism in the 20th century. The Asian economic miracles.
Offered alternate years.

3201 - Public History
3 Credits
Fundamentals of public history. Investigation, examination, and study of museums and historical
societies, historic preservation, material culture, popular culture, and family and ethnic group history.
Readings, discussions, demonstrations, and fieldwork. Requires extensive readings and a research
project. Intended for History majors and minors and Social Studies majors. Student who completes HIST
1201 may not enroll in HIST 3201.

3301 - Local History
3 Credits
Significant aspects of local history for reference and teaching purposes. Investigation, examination, and
study of topics and trends in local history theory and practice. Readings, discussions, demonstrations,
and fieldwork. Requires extensive readings and a research project. Intended for History majors and
minors and Social Studies majors. Student who completes HIST 1301 may not enroll in HIST 3301.

3401 - Colonial North America
3 Credits
Colonial North American colonies c. 1550-1763. The land, English and French institutions and
interactions, relations with Amerindians, slavery, religious diversity, economic enterprise, and politics.

3411 - Western Expansion
3 Credits
The American West as frontier and region. Major Indian cultures of North America. Federal policies.
Economic development and its impact on the environment, politics, and culture of the frontier in
American society.
3421 - The Constitutional Era In United States History  
3 Credits  

3451 - African American History  
3 Credits  
The history of the African-American experience from the African beginnings to the present-day.

3611 - 20th Century United States Political History  
3 Credits  
Evolution of U.S. government during the 20th century. Delineation of political eras. How the roles of the three branches of the federal government have changed and how domestic and foreign crises have shaped political and institutional responses and changes.

3621 - 20th Century United States Cultural History  
3 Credits  
Changes in U.S. culture through World War I, the 1920s, the Great Depression, World War II, and the shaky post-war peace. Emphasis on how these events affected cultural creation and evolution.

3701 - The Ancient World  
3 Credits  
The political, social, economic, and cultural development of the Near Eastern, Greek, and Roman civilizations of antiquity.

3711 - Medieval Europe  
3 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.

3731 - The Age Of Revolutions  
3 Credits  
The American and French Revolutions, Latin American revolutions, the Revolutions of 1830, 1848, and 1870, and the Industrial Revolution. Uncovers parallel patterns and divergences in the organized political violence of the modern Western world. Revolutions in culture, customs, agriculture, industry, science, society, religion, and philosophy as well as political revolutions and revolutionary conflicts.

3741 - Russia To 1905  
3 Credits  
Russia from its origins to 1905. The Kievan Rus, the Mongols, Muscovy, and imperial Russia under the Romanovs. Examines geography, the conflict of cultures, the development of social, political and religious institutions, and serfdom.
3791 - Topics In Modern Europe
3 Credits
Various topics that provide added depth in various areas of modern European history and allow professors to utilize their areas of expertise more fully. May be repeated as topic varies.

3901 - Special Topics In History
1 to 3 Credits
May be repeated as topic varies.

4121 - Field School In Archaeology
3 Credits
Basic archaeology and archaeological field work. Curriculum includes survey and excavation; basic geophysical survey methods; preparation of field notes and documentation; and instruction in other fundamental field skills. A Nature Center use fee is charged.

4211 - Fascism
3 Credits
Origins and nature of fascism. Contrasts the regimes and leaders in Italy and Germany with those in Spain, France, and elsewhere. Utilizes biographical, descriptive, analytical, and theoretical approaches. Examines fascist leaders, including Mussolini, Hitler, Franco, Ptain, and Pern as well as activists, journalists, and intellectual such as Codreanu, Drieu la Rochelle, Dat, Herv, Doriot, and Ezra Pound.

4221 - Hitler And Nazism
3 Credits
Personal, intellectual, and political biography of Adolf Hitler in the context of his times. Uses original photo documentation to examine Hitler's early life and the pre- and post-WWI historical and intellectual milieu out of which Nazism emerged. Considers the Nazi regime before and during WWII not as a military account of that war.

4231 - The Holocaust
3 Credits
Origins, nature, and implications of the Holocaust. Consideration of the general problem of modern anti-Semitism. Current representations of the Holocaust as keys to understanding the generation of historical meaning in the modern world. Employs documentaries, docudramas, and original photo documentation from Germany, Austria, and important sites in Eastern Europe, including Poland, Hungary, and Ukraine.

4301 - Military And Society
3 Credits
The evolving relationship between warfare and the societies that wage wars, from the Middle Ages to the 20th century. The values, attitudes, purposes, and methods that have given direction and shape to military operations in the Western world.

4311 - The Crusades
3 Credits
The origins, operations, and effects of the crusading movements of the Middle Ages. The impact of the crusades on the relationship between Christendom and Islam.
4331 - Civil War And Reconstruction
3 Credits
Origins, operations, and effects of the American Civil War. Team taught course.

4341 - World War I
3 Credits
Origins, operations, devastation, and longer-term effects of the war. Biographies, letters, posters, poetry, novels, films, documentaries, and military history. WWI as much as a revolution as a war, from which emerged communism, fascism, Nazism, and an acceleration of modernist and post-modern currents.

4351 - World War II
3 Credits
Origins, operations, and effects of the war that defined the 20th century. The military, political, and social forces that the war unleashed. Presentation of World War II in the popular culture.

4361 - Cold War
3 Credits
Capitalism vs. communism in a race for global dominance. Political and cultural trends in the events of half a century of East-West conflict. Team taught course.

4371 - Vietnam War
3 Credits
The origins, operations, and effects of the wars in Vietnam, from 1945 to the present.

4401 - Sport And Society
3 Credits
History of the rise of sport in America from Colonial Period to the present. Influence of sport on society and of society on sport. Examine influence of technology, economics, politics, race, class, and gender on sport.

4411 - Baseball in American Culture
3 Credits
Origins and history of baseball from 1840s to the present. Social, political, and economic forces that shaped the game and American culture during that period along with baseball's importance to our history and in the popular culture.

4421 - Football in America
3 Credits
Origins and history of football from 1860s to the present. Social, political, and economic forces that shaped the game and American culture. The rise of professional football from obscurity to the most followed sport in America.

4511 - History of Law
3 Credits
Evolution of law as an instrument of dispute resolution and social control. Development of the civil law tradition and the English common law tradition to the seventeenth century.
4711 - Public Service Internship Program
1 to 15 Credits
Field experience in the area of public service. Student works in a close relationship with public offices and officials or approved private agencies and firms. Student must enroll in at least 1 credit hour of Public Service Internship per internship experience. A full time Public Service Internship requires 600 hours of on-site work. Student may apply 3 credit hours of HIST 4711 to an HIST Elective major requirement. Student may apply up to 15 credit hours of departmental internship to the BA degree. Consultation with the department internship committee and completion of the application process; 2.75 GPA; junior or senior status required. This course may be repeated 15 times. This course is repeatable for a total of 15 hours.

4721 - Seminar - The Washington Center Seminar
3 Credits
Requires prior departmental approval.

4901 - Special Topics In History
1 to 3 Credits
May be repeated as topic varies.

4941 - Seminar In History
3 Credits
May be repeated as topic varies.

4961 - Independent Study In History
1 to 3 Credits
Approval of department chair required prior to registration.

4981 - Senior Thesis 1
1 Credit
Topic selection and development of bibliography and outline for senior thesis under the direction of a departmental faculty member. First part of departmental Capstone course for majors in History or Social Studies. Required of all History and Social Studies majors. Enrollment at least two semesters before the semester of expected graduation. Junior status; major in History or Social Studies required. Prerequisite(s): HIST 2041 Minimum Grade of D.

4991 - Senior Thesis 2
2 Credits
Completion of senior thesis under the direction of a departmental faculty member and a second reader. Second part of departmental Capstone course for majors in History or Social Studies. Required of all History and Social Studies majors. Enrollment at least one semester before the semester of expected graduation. Junior status; major in History or Social Studies required. Formerly HIST 489. Prerequisite(s): HIST 4981 Minimum Grade of D.

Subject - History, Political Science and Criminal Justice (HSPS)
1001 - Orientation - Department of History, Politics and Justice
    1 Credit
Introduction to the faculty, programs, procedures, and opportunities in the Department of History, Politics and Justice. Exploration of the practical and intellectual dimensions of academic life at Ohio Northern University.

1901 - Special Topics In History and Politics
    1 to 3 Credits
May be repeated as topic varies.

2211 - Europe In Transition
    3 Credits
European history, politics, and culture from the end of World War II. The Cold War, European Integration, and accelerating globalization. Post-war migrations, immigration, and the periodic challenges from the political extremes. Cultural and intellectual trends. Growing religious and ethnic tensions, especially as they pertain to terrorism. Student who completes HSPS 2211 may not enroll in HSPS 3211.

2221 - Asia In Transition
    3 Credits
Transformation of political systems, economic systems, societies, culture, art, religion, and the family in Asia since World War II. Student who completes HSPS 2221 may not enroll in HSPS 3221.

2231 - Africa In Transition
    3 Credits
The transition of sub-Saharan Africa from traditional society to modernity and from colonialism to independence and state building. Political, economic, social, cultural trends since World War II. Requires integration of readings, audio-visual presentations, discussions, and lectures. Student who completes HSPS 2231 may not enroll in HSPS 3231.

2241 - The Middle East In Transition
    3 Credits
The political, economic, social, cultural, and intellectual development of Southwest Asia and North Africa since World War II. The clash of Western and non-Western power centers in the region. The rise of political Islam. Student who completes HSPS 2241 may not enroll in HSPS 3241.

2251 - Latin America In Transition
    3 Credits
The oscillation of Latin America between dictatorship and democracy, the transition from rural to urban societies, and the evolving relationship between Latin America and the world. Political, social, economic, and cultural trends since World War II. Requires integration of readings, audio-visual presentations, discussions, and lectures. Student who completes HSPS 2251 may not enroll in HSPS 3251.

2901 - Special Topics In History And Politics
    1 to 3 Credits
May be repeated as topic varies.
3021 - Nature Center Seminar In History And Politics
1 Credit
Weekend seminar at the Metzger Nature Center on a wide range of interdisciplinary topics in history, politics, and government. May be repeated as topic varies. A Nature Center use fee is charged. Formerly HSPS 302.

3211 - Europe In Transit
3 Credits
European history, politics, and culture from the end of World War II. The Cold War, European Integration, and accelerating globalization. Post-war migrations, immigration, and the periodic challenges from the political extremes. Cultural and intellectual trends. Growing religious and ethnic tensions, especially as they pertain to terrorism. Requires a research project. Student who completes HSPS 3211 may not enroll in HSPS 2211. IR-CP Elective.

3221 - Asia In Transition
3 Credits
Transformation of political systems, economic systems, societies, culture, art, religion, and the family in Asia since World War II. Requires a research project. Student who completes HSPS 3221 may not enroll in HSPS 2221. IR-CP Elective.

3231 - Africa In Transition
3 Credits
The transition of sub-Saharan Africa from traditional society to modernity and from colonialism to independence and state building. Political, economic, social, cultural trends since World War II. Requires integration of readings, audio-visual presentations, discussions, and lectures. Requires a research project. Student who completes HSPS 3231 may not enroll in HSPS 2231. IR-CP Elective.

3241 - The Middle East In Transition
3 Credits
The political, economic, social, cultural, and intellectual development of Southwest Asia and North Africa since World War II. The clash of Western and non-Western power centers in the region. The rise of political Islam. Requires a research project. Student who completes HSPS 3241 may not enroll in HSPS 2241. IR-CP Elective.

3251 - Latin America In Transition
3 Credits
The oscillation of Latin America between dictatorship and democracy, the transition from rural to urban societies, and the evolving relationship between Latin America and the world. Political, social, economic, and cultural trends since World War II. Requires integration of readings, audio-visual presentations, discussions, and lectures. Requires a research project. Student who completes HSPS 3251 may not enroll in HSPS 2251. IR-CP Elective.

3901 - Special Topics In History And Politics
1 to 3 Credits
May be repeated as topic varies. Formerly HSPS 392.

4161 - Russia And The Near Abroad
3 Credits
Comparative study of the transition from autocratic to democratic political systems in the region formerly dominated by the Soviet Union. From Tsarist Russia and the Communist period to present-day efforts of democratization. IR-CP Elective. Formerly PLSC 416.

**4521 - American Foreign Relations**  
3 Credits  
Analytical and conceptual overview of the nature of American foreign policy decision-making. Uses case studies to uncover the variables at play in recent American foreign policy. IR-CP Elective.

**4531 - Spy vs. Spy: Espionage, 1947-Present**  
3 Credits  
A comprehensive and detailed overview of the US intelligence community from 1947 to the present. Collection and analysis of information. Counter-intelligence and covert action. An overview of foreign intelligence services. The management structure responsible for directing and supervising intelligence organizations and activities. IR-CP Elective.

**4711 - Public Service Internship Program**  
1 to 15 Credits  
Field experience in the area of public service. Student works in a close relationship with public offices and officials or approved private agencies and firms. Student must enroll in at least 1 credit hour of Public Service Internship per internship experience. A full time Public Service Internship requires 600 hours of on-site work. Student may apply 3 credit hours of HSPS 4711 to an HIST Elective major requirement. Student may apply up to 15 credit hours of departmental internship to the BA degree. Consultation with the department internship committee and completion of the application process; 2.75 GPA; junior or senior status required. This course may be repeated 15 times. This course is repeatable for a total of 15 hours.

**4721 - Seminar - The Washington Center Seminar**  
3 Credits  
Requires prior departmental approval.

**4901 - Special Topics In History And Politics**  
1 to 3 Credits  
May be repeated as topic varies.

**4941 - Seminar In History And Politics**  
3 Credits  
May be repeated as topic varies.

**4961 - Independent Study In History And Politics**  
1 to 3 Credits  
Approval of department chair required prior to registration.

**4981 - Senior Thesis 1**  
1 Credit  
Topic selection and development of bibliography and outline for interdisciplinary senior thesis and under the direction of a departmental faculty member. First part of departmental Capstone course for double majors in History and Political Science who elect to enroll in this course to meet the Capstone
requirement. Enrollment at least two semesters before the semester of expected graduation. Junior status; double major in History and Political Science required. Prerequisite(s): HIST 2041 Minimum Grade of D or (ISR 2531 Minimum Grade of D and ISR 2541 Minimum Grade of D).

4991 - Senior Thesis 2
2 Credits
Completion of interdisciplinary senior thesis under the direction of a departmental faculty member and a second reader. Second part of departmental Capstone course for double majors in History and Political Science who elect to enroll in this course to meet the Capstone requirement. Enrollment one semester before the semester of expected graduation. Senior status; double major in History and Political Science required. Prerequisite(s): HIST 4981 Minimum Grade of D.

Subject - Leadership Studies (LEAD)

4901 - Foundations Of Leadership
2 Credits
Leadership and how it works. Theories, definitions and models of leadership. Participants interview a contemporary leader, analyze that leader's style, and complete a personal vision statement. Junior standing and above.

4911 - Techniques And Dynamics Of Leadership
2 Credits
Effective techniques and the discernable dynamics of leadership. Leading in groups, team building, problem solving and negotiation, leadership in crises, and getting a foothold in the real world. Participants will be involved in a civic engagement project or an alternate leadership project and report on the same. Junior standing and above.

4921 - Issues In Contemporary Leadership
2 Credits
Effective leadership in the contemporary setting. The use of personal leadership to improve communities. Leadership in an era of social, cultural, racial and gender diversity. Balancing commitments to career, family and community. The future of leadership. Participants will link with an experienced leader for participatory mentoring and report on their experience. Junior standing and above.

4991 - Leadership Practicum
1 to 2 Credits
Field experience in leadership. Significant involvement in a civic project or a major leadership role on campus. Maintenance of a journal that reflects the involvement and reactions to the experience. Additional requirements may be included in the contract. Requires approval of the Leadership Studies Committee and the instructor. May be repeated as topic varies. Junior standing and above. This course may be repeated 2 times. This course is repeatable for a total of 2 hours.

Subject - Political Science (PLSC)
1901 - Special Topics In Political Science
1 to 3 Credits
May be repeated as topic varies.

2011 - Introduction To American Politics
3 Credits
Constitutional underpinnings, political behavior, processes, and institutions of American national politics.

2201 - Introduction To International Relations
3 Credits
The relations of states, governments, political movements, and international organizations in the global context. Political actors and their objectives in a world of limited resources. Global collective responses to global problems. Competition between rich and poor nations and between major and minor powers in terms of the collective good. Formerly HSPS 107.

2211 - Introduction To Comparative Politics
3 Credits
Comparative study of political institutions and processes and individual and group behavior. Interrelationships among the historical, cultural, social, and economic characteristics of national political systems. Comparative governmental structures and patterns of mass political behavior.

2901 - Special Topics In Political Science
1 to 3 Credits
May be repeated as topic varies.

3021 - Nature Center Seminar In Political Science
1 Credit
Weekend seminar at the Metzger Nature Center on a wide range of topics in politics and government. May be repeated as topic varies. A Nature Center use fee is charged.

3061 - Environmental Law
3 Credits
American legal system used to preserve the nation's environment. Significant environmental laws and policies developed for implementation. American Politics Elective. Formerly HSPS 306.

3101 - State And Local Politics
3 Credits
Legal underpinnings, political behavior, processes, and institutions of American states and localities. American Politics Elective.

3201 - Topics In American Politics
3 Credits
May be repeated as topic varies.

3211 - Political Parties And Interest Groups
3 Credits
Formation, maintenance, and influence of interest groups and political parties in the United States. American Politics Elective.

3221 - Campaigns And Elections
3 Credits

3231 - Mass Media And Politics
3 Credits
Historical development and contemporary operation of the mass media as they relate to the American political system. American Politics Elective.

3241 - Film And Politics
3 Credits
Historical development and contemporary role of films that relate to political processes and institutions. American Politics Elective.

3251 - Popular Culture In American Politics
3 Credits
Historical development and contemporary role of popular culture in American politics. American Politics Elective.

3301 - Comparative Politics Of Democracies
3 Credits
Comparison of the politics of democracies. The impact of political culture and the operations of governmental institutions, parties, and interest groups on public policy-making. IR-CP Elective.

3311 - Comparative Politics In The Developing World
3 Credits
Comparison of contemporary politics in developing and non-Western societies. The impact of cultural fragmentation, modernization, social unrest, and rising expectations on the stability and effectiveness of governmental institutions and processes. IR-CP Elective.

3411 - Human Rights
3 Credits
Philosophical, political, and legal bases of international human rights. The ongoing debate over universality, cultural relativity and human rights, humanitarian intervention and sovereignty, and specific foreign policy choices. Strategies designed to advance human rights and accountability, including the use of military force and the development of international criminal courts, truth commissions, and other forms of transitional justice. IR-CP Elective.

3421 - Conflict Analysis And Resolution
3 Credits
Underlying causes of conflicts. Dynamics that lead to open expression and escalation of conflict. The strategic choices of adversaries. The intractability of intense conflict. Methods of prevention,
negotiation, and third-party intervention that support accommodation, de-escalation, settlement, and transformation. IR-CP Elective.

3431 - Terrorism
3 Credits

3441 - Wars In Africa
3 Credits
Causes and types of war in Africa. Processes of resolution and management of civil wars by interested stakeholders. Global responses, underlying principles for such responses, and their effectiveness. Obstacles to the resolution of civil wars in Africa. IR-CP Elective.

3501 - Constitutional Law And Government
3 Credits
Social and political forces that shaped constitutional political theory. The interaction of law and politics through the Reconstruction era. Relationship of the Supreme Court with respect to Congress, the executive, states, and emergency powers. American Politics Elective.

3511 - Constitutional Law And Civil Liberties
3 Credits
Late nineteenth, twentieth, and twenty-first century decisions of the Supreme Court pertaining to civil liberties, civil rights, and criminal justice. American Politics Elective.

3541 - Judicial Process, Behavior, And Impact
3 Credits
The roles of lawyers, judges, and juries in the judicial process. The organization and operation of federal and state trial courts. The decision-making process of federal and state appellate courts. The voting behavior of federal and state appellate judges. The impact of appellate court decisions on society and on the operations of criminal justice agencies. American Politics Elective.

3661 - Public Administration
3 Credits
Bureaucrats as actors in the American political system, their sources of power, and their relationship to elected public officials. American Politics Elective.

3671 - Policy Analysis
3 Credits
Basic dynamics and problems of policymaking and the widely used analytical approaches to public policy. American Politics Elective.

3881 - International Law And Organizations
3 Credits
Factors and forces that determine the policies of nation-states with respect to international
cooperation. The structure, operation, and legal setting of international politics. The role of IGOs and NGOs. The evolving international legal order. IR-CP Elective.

3901 - Special Topics In Political Science
1 to 3 Credits
May be repeated as topic varies.

4091 - The Presidency
3 Credits

4111 - Congress
3 Credits

4581 - Western Political Thought 1
3 Credits
Western political theory from Plato, Aristotle, and the Stoics through Machiavelli, the Reformation, and the Wars of Religion. Examines the political and theoretical elements of pre-modern thought.

4591 - Western Political Thought 2
3 Credits
Western political theory from the Enlightenment through John Rawls. Examines the political and theoretical implications of constitutionalism, contract theory, conservatism, idealism, romanticism, liberalism, utilitarianism, Marxism, anarchism, socialism, elite theories, social Darwinism, racism, anti-Semitism, fascism, feminism, environmentalism, and libertarianism. Confers American Politics elective credit if not used for Major Course credit. Formerly HSPS 459.

4711 - Public Service Internship Program
1 to 15 Credits
Field experience in the area of public service. Student works in a close relationship with public offices and officials or approved private agencies and firms. Student must enroll in at least 1 credit hour of Public Service Internship per internship experience. A full time Public Service Internship requires 600 hours of on-site work. Student may apply up to 15 credit hours of departmental internship to the BA degree. Consultation with the department internship committee and completion of the application process; 2.75 GPA; junior or senior status required. This course may be repeated 15 times. This course is repeatable for a total of 15 hours.

4721 - Seminar - The Washington Center Seminar
3 Credits
Requires prior departmental approval.

4751 - Model United Nations
1 to 2 Credits
Preparation to participate in regional Model United Nations conferences and the National Model United Nations conference in New York City. An integrated simulation of key operations of the United Nations. Travel to New York City in the spring. Student may apply 3 credit hours of Model United Nations to the
Political Science/International Relations - Comparative Politics major (Academic Component). Student may apply up to 9 credit hours of Model United Nations to the BA degree. Open to any major. This course may be repeated 5 times. This course is repeatable for a total of 9 hours.

4761 - Mock Trial
1 to 2 Credits
Preparation to participate in regional and national mock trial competitions held at various sites throughout the United States. Preparation of both civil and criminal cases, including opening and closing arguments, direct and cross examination of witnesses, and objections. Student may apply 3 credit hours of Mock Trial to the Criminal Justice major or to the Political Science/U.S. Politics major (Academic Component). Student may apply up to 9 credit hours of Mock Trial to the BA degree. Confers up to 3 hours of American Politics Elective credit. Open to any major. This course may be repeated 5 times. This course is repeatable for a total of 9 hours.

4901 - Special Topics In Political Science
1 to 3 Credits
May be repeated as topic varies.

4911 - Special Topics in American Politics
1 to 3 Credits
May be repeated as topic varies. This course may be repeated 97 times.

4921 - Special Topics In International Relations
1 to 3 Credits
May be repeated as topic varies.

4931 - Special Topics in Comparative Politics
1 to 3 Credits
May be repeated as topic varies. This course may be repeated 97 times.

4941 - Seminar In Political Science
3 Credits
May be repeated as topic varies.

4961 - Independent Study In Political Science
1 to 3 Credits
Approval of department chair required prior to registration.

4981 - Senior Thesis 1
1 Credit
Topic selection and development of bibliography and outline for senior thesis under the direction of a departmental faculty member. First part of departmental Capstone course for majors in Political Science. Required of all Political Science majors. Enrollment at least two semesters before the semester of expected graduation. Junior status; major in Political Science required. Prerequisite(s): ISR 2531 Minimum Grade of D and ISR 2541 Minimum Grade of D.

4991 - Senior Thesis 2
2 Credits
Completion of senior thesis under the direction of a departmental faculty member and a second reader. Second part of departmental Capstone course for majors in Political Science. Required of all Political Science majors. Enrollment at least one semester before the semester of expected graduation. Junior status; major in Political Science required. Prerequisite(s): PLSC 4981 Minimum Grade of D.

Department of Human Performance and Sport Sciences

Subject - Activities (ACTV)

1001 - Lifetime, Fitness and Wellness
1 Credit
The course evaluates one's current health levels, fitness levels, and attitudes toward living a healthy lifestyle. This experience provides the knowledge base for health and fitness, and enables the students to implement healthy living factors and personalized fitness prescriptions into each of their lifestyles, both now and in the future. Learning experiences include some lecture and physical activity on a daily basis. Offered fall and spring semesters. May not be enrolled in one of the following Colleges: Pharmacy, Engineering.

Subject - Water Activities (AQUA)

2101 - Lifeguarding
1 Credit
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. Fee required. Offered fall semester.

2111 - Water Safety Instruction
2 Credits
To develop knowledge and skills to teach swimming and water safety skills, methods and techniques. Successful completion of the course will lead to American Red Cross Water Safety Instruction certification. Offered spring semester.

Subject - Athletic Training (ATTR)

1001 - Basic Athletic Training
3 Credits
The prevention, recognition and care of athletic injuries as well as common principles associated with the athletic training profession. For ATTR majors only. Must be taken in conjunction with ATTR 1011 Basic Athletic Training Lab. Offered fall and spring semesters.
1011 - Basic Athletic Training Lab
1 Credit
Lab focusing on tasks associated with athletic training including but not limited to: taping, ice and heat application, referral procedures, examination and screening procedures, wound care, etc. Taken in conjunction with ATTR 1001. Offered fall and spring semesters.

1101 - Professional Emergency Care
2 Credits
To provide the citizen responder with the knowledge and practical skills necessary to help sustain life, reduce pain and minimize the consequences of injury or sudden illness until EMS arrives. Skills in first aid and advanced assessment and care including AEDs, BVM, stabilization, transportation and special resuscitation techniques. American Red Cross First Aid Responding to Emergencies and CPR for the Professional Rescuer certifications may be obtained by students who pass written and skill examinations. Course can be taken only once for graduation credit. Course may be repeated once for recertification as space permits. (Fee) Offered fall and spring semesters. This course may be repeated 1 times. This course is repeatable for a total of 1 hour.

1201 - Adv Wt. Control/Sports Nutrition
2 Credits
The nutritional requirements for athletes and physically active population. Analyze principles of weight control, including body fat, caloric requirements, effects of exercise and fluid loss/replacement. Recognize disordered eating habits and illnesses associated with poor nutritional habits and implement proper referral procedures. Offered fall semester.

2101 - Advanced Strength & Conditioning w/ Lab
3 Credits
Addresses physiological response to exercise, proper and safe methods and techniques of strength training, testing of strength and conditioning, interpreting testing data, and developing proper strength and conditioning programs for various individuals and groups. Proper performance and instruction of strength and conditioning methods will be addressed. Formerly known as HPES 207. Offered spring semester. Prerequisite(s): BIOL 2311 Minimum Grade of D.

2301 - Pre-Season AT Clinical
1 Credit
On-campus clinical field experience in pre-season football, soccer or volleyball prior to the start of the academic year. Offered fall semester. Prerequisite(s): ATTR 1001 Minimum Grade of D and ATTR 1011 Minimum Grade of D and ATTR 1101 Minimum Grade of D and ATTR 1201 Minimum Grade of D. This course may be repeated 3 times. This course is repeatable for a total of 3 hours.

2401 - AT Clinical Level 1
1 to 2 Credits
On-campus clinical experience rotation as assigned by the athletic training staff. Under the supervision of an approved clinical instructor, specific clinical proficiencies and skills will be completed. Must have valid First Aid and CPR PR certifications. Offered fall and spring semesters. Prerequisite(s): ATTR 1001 Minimum Grade of D and ATTR 1011 Minimum Grade of D and ATTR 1101 Minimum Grade of D and ATTR 1201 Minimum Grade of D.
2451 - AT Clinical Level 2
1 to 2 Credits
On-campus clinical experience rotation as assigned by the athletic training staff. Under the supervision of an approved clinical instructor, specific clinical proficiencies and skills will be completed. Must have valid First Aid and CPR PR certifications. Offered fall and spring semesters. Prerequisite(s): ATTR 2401 Minimum Grade of D.

2601 - Eval Tech of AT 1
3 Credits
General overview of the injury evaluation process including medical terminology and SOAP note writing. Practical application of lower extremity anatomy, neurovascular, pathology, injury evaluation and diagnosis. Formerly known as HPES 277. Offered fall semester.

2651 - Eval Tech of AT 2
3 Credits
Practical application of upper extremity anatomy, neurovascular, pathology, injury evaluation and diagnosis. Offered spring semester. Prerequisite(s): ATTR 2601 Minimum Grade of D.

2801 - Athletic Taping and Bracing
1 Credit
Athletic taping and bracing principles and techniques associated with specialized taping, wrapping, bracing and padding selected joints and body parts. Additional focus will be on concepts regulating design, application, construction, maintenance and reconditioning of immobilization devices. Graded S/U. Offered fall semester.

3101 - Therapeutic Modalities in Athletic Training
4 Credits
A review of therapeutic modalities used in the athletic training and other rehabilitation settings. To include indications and contraindications as well as the practical application of these modalities as they relate to the healing process. Formerly known as HPES 271. Offered fall semester. Prerequisite(s): ATTR 2651 Minimum Grade of D and EXPH 2301 Minimum Grade of D.

3201 - Exercise Rehab in AT
4 Credits
Basic components of a comprehensive rehabilitation program. To concentrate on techniques used in the restoration of flexibility, strength, endurance and functional activity. Selection of therapeutic exercises for injuries and corrective surgeries sustained by the athlete and others actively involved in sports activities. Formerly known as HPES 372. Offered spring semester. Prerequisite(s): ATTR 3101 Minimum Grade of D.

3301 - Psychosocial Factors of AT
2 Credits
The psychological and sociocultural factors relative to an athletic population as well as the roles and functions of various health care providers responsible for professional care. Strategies for identifying problems, intervening and making appropriate referrals are presented. Offered spring semester. Prerequisite(s): ATTR 3401 Minimum Grade of D.
3401 - AT Clinical Level 3
1 to 2 Credits
On-campus clinical experience rotation as assigned by the athletic training staff. Under the supervision of an approved clinical instructor, specific clinical proficiencies and skills will be completed. Must have valid First Aid and CPR PR certifications. Offered fall and spring semesters. Prerequisite(s): ATTR 2451 Minimum Grade of D and ATTR 2651 Minimum Grade of D and ATTR 2101 Minimum Grade of D and BIOL 2321 Minimum Grade of D and EXPH 2301 Minimum Grade of D. This course may be repeated 2 times. This course is repeatable for a total of 2 hours.

3451 - AT Clinical Level 4
1 to 2 Credits
On-campus clinical experience rotation as assigned by the athletic training staff. Under the supervision of an approved clinical instructor, specific clinical proficiencies and skills will be completed. Must have valid First Aid and CPR PR certifications. Offered fall and spring semesters. Prerequisite(s): ATTR 3401 Minimum Grade of D. This course may be repeated 2 times. This course is repeatable for a total of 2 hours.

3501 - Off Campus AT Clinical Experience
0 Credits
Taken concurrently with ATTR 3451; ATTR 4401 or ATTR 4451 indicating involvement in an off-campus clinical experience at a local high school and/or outpatient sports medicine/rehabilitation clinic. Must have valid First Aid and CPR PR certifications. Offered fall and spring semesters. Prerequisite(s): ATTR 2451 Minimum Grade of D and ATTR 2651 Minimum Grade of D and ATTR 2101 Minimum Grade of D and BIOL 2321 Minimum Grade of D and EXPH 2301 Minimum Grade of D. Corequisite(s): ATTR 3401, ATTR 3451, ATTR 4401, ATTR 4451.

4101 - Medical Considerations
3 Credits
Etiology, recognition, evaluation, treatment and referral of general medical conditions and disabilities. Focus on assessment of body systems. Pharmacological applications relevant to treatment of injuries and illnesses common to athletes. Offered alternate fall semesters. Prerequisite(s): ATTR 2451 Minimum Grade of D and ATTR 2651 Minimum Grade of D and ATTR 2101 Minimum Grade of D and EXPH 2301 Minimum Grade of D.

4201 - Trends in Athletic Training
3 Credits
Current topical issues affecting Athletic Training Profession include organization and administration topics, legal issues, and selected health issues that are present in the athletic population. Offered alternate fall semesters. Prerequisite(s): ATTR 2451 Minimum Grade of D.

4401 - AT Clinical Level 5
1 to 2 Credits
On-campus clinical experience rotation as assigned by the athletic training staff. Under the supervision of an approved clinical instructor, specific clinical proficiencies and skills will be completed. Must have valid First Aid and CPR PR certifications. Offered fall and spring semesters. Prerequisite(s): ATTR 3451 Minimum Grade of D and ATTR 3201 Minimum Grade of D. This course may be repeated 2 times. This course is repeatable for a total of 2 hours.
4451 - AT Clinical Level 6
1 to 2 Credits
On-campus clinical experience rotation as assigned by the athletic training staff. Under the supervision of an approved clinical instructor, specific clinical proficiencies and skills will be completed. Must have valid First Aid and CPR PR certifications. Offered fall and spring semesters. Prerequisite(s): ATTR 4401 Minimum Grade of D. This course may be repeated 2 times. This course is repeatable for a total of 2 hours.

4601 - Senior Seminar in Athletic Training
3 Credits
Professional preparation for athletic training students taking the BOC exam. Review of athletic training domains, exam simulations, mock interviews, professional presentations, and practical application of psychomotor skills will be emphasized. Offered spring semester. Prerequisite(s): ATTR 4401 Minimum Grade of D and EXPH 3201 Minimum Grade of D.

Subject - Exercise Physiology (EXPH)

1001 - Introduction to Exercise & Health
3 Credits
Examination of basic physiological, fitness and health concepts utilized to promote a healthy, active lifestyle. Topics discussed include exercise prescriptions, health and fitness benefits of exercise, adaptations to exercise training, disease prevention and weight management. Laboratory experiences will focus on basic exercise measurements of health and fitness parameters. Offered fall semester.

2101 - Sports Nutrition and Supplementation
3 Credits
Examination of the role of macro/micronutrients, ergogenic aids and nutritional supplements in exercise performance. Offered fall semester. Prerequisite(s): EXPH 1001 Minimum Grade of D.

2201 - Kinesiology
3 Credits
Practical analysis of human movement patterns with emphasis on a muscle's action and appropriate strengthening and stretching techniques for the human body. Additional course concepts include Functional Movement Screening (FMS) techniques and Gait analysis via utilization of Dartfish motion analysis software. Offered spring semester. Prerequisite(s): BIOL 2311 Minimum Grade of D.

2301 - Exercise Physiology
4 Credits
The physiological basis and application of exercise physiology adaptations to exercise training, fitness and health. Laboratory experiences will expose students to common exercise physiology techniques and evaluations used to assess physical conditioning. Offered spring semester. Prerequisite(s): BIOL 2311 Minimum Grade of D.

3101 - Exercise Testing and Prescription I
3 Credits
Basic and advanced exercise testing, evaluation and programming in healthy and diseased populations.
Emphasis will be placed on designing exercise prescriptions using American College of Sports Medicine guidelines. Offered fall semester. Prerequisite(s): EXPH 2301 Minimum Grade of D.

3151 - Exercise Testing and Prescription II
3 Credits
Basic and advanced exercise testing, assessment and interpretation of cardiovascular, respiratory and muscular changes associated with training, aging and disease. Formerly known as HPES 262. Offered spring semester. Prerequisite(s): EXPH 3101 Minimum Grade of D.

3201 - Research and Design
3 Credits
The development, design and critical analysis of scientific research. Topics discussed include scientific research problem development, literature databases and search strategies, experimental design, research methodology and statistical analysis. Offered fall and spring semesters.

3301 - Exercise Management of Chronic Disease
3 Credits
Research and design of exercise programming strategies appropriate for select populations. Course topics include, but are not limited to: exercise considerations for cardiovascular, pulmonary, metabolic, immunological, neuromuscular, and orthopedic patients as well as adolescents, pregnant women, and geriatric patients. Offered fall semester. Prerequisite(s): EXPH 2301 Minimum Grade of D.

3401 - Exercise Physiology Practicum I
1 Credit
This course will engage the student in practical exercise experience in adult exercise programming. Students will design and implement an exercise program for an ONU faculty/staff needing exercise assistance for one semester. Offered fall semester. Prerequisite(s): EXPH 2201 Minimum Grade of D and EXPH 2301 Minimum Grade of D.

4101 - Administration of Health Promotion Programs
3 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. Offered spring semester.

4201 - ECG Analysis and Interpretation
3 Credits
Basic electrocardiographic analysis and interpretation of ECGs in healthy and diseased populations. Offered spring semester. Prerequisite(s): EXPH 2201 Minimum Grade of D and EXPH 2301 Minimum Grade of D.

4401 - Exercise Physiology Practicum II
1 Credit
This course will engage the student in practical exercise experience in adult exercise programming. Students will design and implement an exercise program for an ONU faculty/staff needing exercise assistance for one semester. Offered spring semester.
4501 - Exercise Physiology Internship

12 Credits
Participation in a broad, off-campus experience designed for fitness development or health promotion program under the supervision of the University as well as a work site supervisor. Offered fall and spring semesters. Prerequisite(s): EXPH 3151 Minimum Grade of D Corequisite(s): EXPH 4601
This course may be repeated 4 times. This course is repeatable for a total of 12 hours.

4601 - Senior Seminar in Exercise Physiology

1 Credit
Discussion and analysis of the field setting, practice and organization. Includes monitoring and evaluation of the internships. To be taken concurrently with an Exercise Physiology Internship. Offered fall and spring semesters. Prerequisite(s): EXPH 3151 Minimum Grade of D.

4701 - Personal Training I

2 Credits
This course immerses the student into a personal training experience by partnering the student with a volunteer adult participant needing assistance with exercise programming. Students will complete pre-exercise participation methods such as conducting a client interview, establishing fitness goals, determining risk-benefit ratio, and assessing anthropometric, fitness, and functional movement capability of his/her volunteer participant. All results will culminate into the creation of an exercise program that will be implemented with the volunteer participant during the semester. Finally, students will participate in course seminar sessions to examine exercise strategies and current trends in the personal training profession. Formerly known as HPES 362. Offered fall semester. Prerequisite(s): EXPH 2201 Minimum Grade of D and EXPH 3151 Minimum Grade of D.

4751 - Personal Training II

2 Credits
This course immerses the student into a personal training experience by partnering the student with a volunteer adult participant needing assistance with exercise programming. Students will complete pre-exercise participation methods such as conducting a client interview, establishing fitness goals, determining risk-benefit ratio, and assessing anthropometric, fitness, and functional movement capability of his/her volunteer participant. All results will culminate into the creation of an exercise program that will be implemented with the volunteer participant during the semester. Finally, students will participate in course seminar sessions to examine exercise strategies and current trends in the personal training profession. Formerly known as HPES 363. Offered spring semester. Prerequisite(s): EXPH 2201 Minimum Grade of D and EXPH 3151 Minimum Grade of D.

4801 - Exercise Pathophysiology

3 Credits
The etiology of health-related disease development (i.e. coronary heart and artery disease, hypertension, diabetes, and hyperlipidemia) and the pharmacological agents prescribed to manage these disease states will be discussed. Formerly known as HPES 441. Offered fall semester. Prerequisite(s): EXPH 2301 Minimum Grade of D.

4851 - Exercise Biochemistry

3 Credits
The examination of energy metabolism and ATP production at rest and during exercise. The major biochemical pathways, enzymes, intermediates and control of carbohydrate, fat and protein metabolism
will be discussed. Biochemical pathways covered include glycolysis and gluconeogenesis, beta oxidation and fat biosynthesis, protein and amino acid metabolism, the urea cycle and the glucose/alanine cycle, and mitochondrial respiration and the electron transport chain. Offered fall semester. Prerequisite(s): EXPH 2301 Minimum Grade of D.

Subject - Health Education (HLED)

1101 - Personal Health Problems
3 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. Offered fall semester.

1201 - School & Community Health
2 Credits
Focus on skills and knowledge in identifying and understanding the relationship of the environment to the students habits and health concerns which directly impact school and future success. Observation and understanding of target populations with an emphasis on protecting and improving the health of identified target groups through needs assessment, program planning, program implementation, and program evaluation through affective community action plans. Understanding and implementation of strategies for health professionals that can be used in working with populations regarding successful health change, attitudes, and behaviors. Offered fall semester.

2101 - AIDS & Other STDs
3 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: history of AIDS; treatment and prevention of HIV/AIDS and STDs; medical aspects of HIV/AIDS; HIV testing; counseling of HIV/AIDS positive individuals; AIDS education within school systems; women and HIV/AIDS; legal and ethical aspects of HIV/AIDS; and living with HIV/AIDS. Offered spring semester.

Subject - Physical Education (PHED)

1001 - HPE Foundations
3 Credits
The course is an introductory course into the major of Physical Education. It deals with the foundation areas of history, philosophy, psychology, physiology, and sociology of human movement and sport. The course will identify professional opportunities within physical education and sport, look at current issues, and the future direction of physical education and related fields. HPSS or related field majors only. Offered fall semester.

2101 - Ind. Skill Development in Sports
3 Credits
The fundamental skills, methods and techniques in teaching the following individual and dual sports: tennis, bowling, golf, weight lifting, badminton, track and field. Offered fall semester.

2201 - Team Concepts in Physical Education
3 Credits
The fundamental skills, methods, and techniques in teaching team sports including but not limited to: basketball, volleyball, soccer, baseball/softball, hockey, team handball and touch football. Offered spring semester.

3001 - Practicum in Teaching Physical Education
1 Credit
Required of all Physical Education majors, preferably in their junior year. Involves assisting in service classes. Permission of department chair required. Offered fall semester.

3101 - Adapted Physical Education
3 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 classroom or in the clinical setting. Offered spring semester. Prerequisite(s): BIOL 1341 Minimum Grade of D.

3201 - Elementary School Physical Education
3 Credits
The objectives, methods, and techniques of teaching physical education in the elementary school are emphasized in this course. The need for physical activity and practical application of theories are emphasized. Offered fall semester.

3301 - Test & Measurements of HPE
3 Credits
The fundamental considerations of measurement and evaluation in the areas of health and physical education will be studied in this class. Students will learn to administer and design both written and skills tests. Students will study the validity, reliability, and objectivity of normative and criterion related tests. Special emphasis will be placed on application to health and physical education. Offered spring semester.

3401 - Motor Learning
3 Credits
Motor Learning - studies the factors affecting the learning of motor skills. You will be presented with 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. Formerly known as HPES 271. Offered spring semester.

Subject - Sport Management (SPMG)

1001 - Introduction to Sport Management
3 Credits
Initial introduction to basic concepts, career preparation, professional opportunities, and professional skills necessary to be successful in a career in sport management are explored. Offered fall semester.

2101 - Social/Psychological Issues in Sport
3 Credits
Analysis of the social significance and interrelationship that social history, values, and power structures in and outside of sports influence individual and societal beliefs, attitudes, and practices in sports. Specific focus on the topics of youth, deviance and violence, gender/orientation, race and ethnicity, religion, social class, and future of sports in society are also explored. Offered spring semester.

2201 - Promotions/Marketing in Sport
3 Credits
The practice of marketing, promotions and sales in the sport marketplace. Introduction to event management, print and broadcast media advertising, marketing strategies, and a class project. Open to Sport Management majors and others with approval of the department chair. Offered fall semester.

2301 - Facility/Event Management in Sport
3 Credits
Explore issues related to facility and event management unique to the sport environment while developing an understanding of successful practices and procedures for managing sport and event enterprises. Focus on the skills necessary for sport and event managers needed for successful human and capital resource management, as well as the financial viability and sustainability of sport facilities. Offered spring semester.

3001 - Sport Facilities Management Practicum
1 Credit
Designed to give Sport Management majors the opportunity to experience facilities management through involvement with the sports facilities at the University. Offered fall and spring semesters.

3051 - Team Promotions Practicum
1 Credit
Designed to give Sport Management majors the opportunity to acquire promotional experience through involvement with a sport team at the University. Offered fall and spring semesters.

3101 - Organization/Administration in Sport
3 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. Offered fall semester.

3201 - Finance/Economics in Sport
3 Credits
The application of economic and financial theories applied to the sports industry in both the professional and the amateur sports markets. The critical and objective evaluation of economic and financial issues that arise in the sports industry. Increase knowledge of various sports markets, while emphasizing the role economics plays in determining outcomes in these markets. Offered spring semester.
4101 - Ethics in Sport  
3 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. Offered spring semester.

4201 - Legal Issues in Sport  
3 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. Offered fall semester.

4501 - Internship in Sport Management  
12 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 Senior Seminar to assist the students with the integration of field work and classroom learning. Junior status and permission of department chair required. Offered fall and spring semesters. Corequisite(s): SPMG 4601. This course may be repeated 4 times. This course is repeatable for a total of 12 hours.

4601 - Senior Seminar in Sport Management  
1 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. Offered fall and spring semesters.

Subject - Varsity Sports (VARS)

1001 - Cross Country (Men) - Varsity  
1 Credit  
Graded S/U. Offered fall semester.  
This course may be repeated 4 times.

1011 - Cross Country (Women) - Varsity  
1 Credit  
Graded S/U. Offered fall semester.  
This course may be repeated 4 times.

1021 - Football - Varsity  
1 Credit  
Graded S/U. Offered fall semester.  
This course may be repeated 4 times.
1031 - Soccer (Men) - Varsity
1 Credit
Graded S/U. Offered fall semester.
This course may be repeated 4 times.

1041 - Soccer (Women) - Varsity
1 Credit
Graded S/U. Offered fall semester.
This course may be repeated 4 times.

1051 - Volleyball - Varsity
1 Credit
Graded S/U. Offered fall semester.
This course may be repeated 4 times.

2001 - Basketball (Men) - Varsity
1 Credit
Graded S/U. Offered fall and spring semesters.
This course may be repeated 8 times. This course is repeatable for a total of 4 hours.

2011 - Basketball (Women) - Varsity
1 Credit
Graded S/U. Offered fall and spring semesters.
This course may be repeated 8 times. This course is repeatable for a total of 4 hours.

2021 - Indoor Track (Men) - Varsity
1 Credit
Graded S/U. Offered fall and spring semesters.
This course may be repeated 8 times. This course is repeatable for a total of 4 hours.

2031 - Indoor Track (Women) - Varsity
1 Credit
Graded S/U. Offered fall and spring semesters.
This course may be repeated 8 times. This course is repeatable for a total of 4 hours.

2041 - Swimming & Diving (Men) - Varsity
1 Credit
Graded S/U. Offered fall and spring semesters.
This course may be repeated 8 times. This course is repeatable for a total of 4 hours.

2051 - Swimming & Diving (Women) - Varsity
1 Credit
Graded S/U. Offered fall and spring semesters.
This course may be repeated 8 times. This course is repeatable for a total of 4 hours.

2061 - Wrestling - Varsity
1 Credit
Graded S/U. Offered fall and spring semesters.
This course may be repeated 8 times. This course is repeatable for a total of 4 hours.

3001 - Baseball - Varsity
1 Credit
Graded S/U. Offered spring semester. This course may be repeated 4 times.

3011 - Golf (Men) - Varsity
1 Credit
Graded S/U. Offered spring semester. This course may be repeated 4 times.

3021 - Golf (Women) - Varsity
1 Credit
Graded S/U. Offered spring semester. This course may be repeated 4 times.

3031 - Outdoor Track (Men) - Varsity
1 Credit
Graded S/U. Offered spring semester. This course may be repeated 4 times.

3041 - Outdoor Track (Women) - Varsity
1 Credit
Graded S/U. Offered spring semester. This course may be repeated 4 times.

3051 - Softball - Varsity
1 Credit
Graded S/U. Offered spring semester. This course may be repeated 4 times.

3061 - Tennis (Men) - Varsity
1 Credit
Graded S/U. Offered spring semester. This course may be repeated 4 times.

3071 - Tennis (Women) - Varsity
1 Credit
Graded S/U. Offered spring semester. This course may be repeated 4 times.

Department of Mathematics and Statistics

Subject - Mathematics (MATH)

1201 - Mathematics for Liberal Arts
3 Credits
This is a mathematics course for non-math, non-science majors. It provides an opportunity for students to see mathematics used in ways not emphasized in traditional courses. It covers a variety of topics which may include, but is not limited to, problem solving, set theory, logic, graph theory, numeration systems, number theory, modeling, consumer mathematics, apportionment, voting methods, and counting techniques. Two years high school algebra required. Offered fall and spring semesters.
1251 - College Algebra  
3 Credits  
The real number system, exponents, polynomials, factoring, rational expressions, equations and inequalities, functions and their graphs, polynomial and rational functions. Two years high school algebra required. Not open for credit to students who have received a grade of C or better in any higher numbered course. Offered fall and spring semesters.

1401 - Functions for Science and Technology  
3 Credits  
Functions and their graphs, exponential and logarithmic functions, trigonometric functions, analytic trigonometry, analytic geometry. Not open to any student who has received a grade of C or higher in any calculus course. Offered fall and spring semesters. Prerequisite(s): MATH 1251 Minimum Grade of D.

1431 - Calculus for Science and Technology  
3 Credits  
Applying mathematical techniques to problems in science and technology, including analysis, formulation, and problem solutions. Techniques of differentiation max/min problems, and elementary techniques of integration. Not open to students who have received a grade of C or higher in any other calculus course. Offered fall and spring semesters. Prerequisite(s): MATH 1401 Minimum Grade of D.

1461 - Calculus for Life Sciences  
3 Credits  
Concepts of differentiation and integration applied to algebraic, exponential, and logarithmic functions. Offered fall and spring semesters. Prerequisite(s): MATH 1251 Minimum Grade of D.

1611 - Calculus w/Precalculus 1  
4 Credits  
A fast-paced review of algebraic and trigonometric functions. Limit of a function, continuity, the derivative, and the antiderivative. Introduction to definite and indefinite integrals and the Fundamental Theorem of Calculus. Two years high school algebra and one-half year high school trigonometry required. Formerly MATH 157. Offered fall semester.

1621 - Calculus w/Precalculus 2  
4 Credits  
Continued development of differentiation techniques, extrema, Mean Value Theorem, curve plotting, other applications of the derivative, continued development of integration techniques and their applications, and calculus of exponentials and logarithms. Formerly MATH 159. Offered spring semester. Prerequisite(s): MATH 1611 Minimum Grade of D.

1631 - Calculus 1  
4 Credits  
Limit of a function, continuity, the derivative, extrema, Mean Value Theorem, curve plotting, applications of the derivative, introduction to integration and its applications. Two years high school algebra and one-half year high school trigonometry required. Formerly MATH 163. Offered fall and spring semesters.
1641 - Calculus 2
4 Credits
Inverse functions; logarithmic, exponential, inverse trig, hyperbolic and inverse hyperbolic functions; sequences and series; Taylor series; parametric curves; polar coordinates; conic sections. Formerly MATH 165. Offered fall and spring semesters. Prerequisite(s): (MATH 1621 Minimum Grade of D or MATH 1631 Minimum Grade of D).

1661 - Fundamental Mathematics 1
3 Credits
Problem solving skills and techniques, elementary set theory, whole numbers, integers, theory of arithmetic, and introductory number theory. Formerly MATH 172. Offered fall semester.

1671 - Fundamental Mathematics 2
3 Credits
Rational and real numbers, introduction to the fundamentals of counting, probability and statistics, geometric figures, measurement, congruence, symmetry, constructions, transformations, and similarity. Formerly MATH 173. Offered spring semester.

1901 - Special Topics in Mathematics
1 to 3 Credits
Formerly MATH 190.

1911 - Special Topics in Mathematics
1 to 3 Credits
Formerly MATH 190.

2011 - History of Mathematics
3 Credits
An introduction to the history and origin of mathematics, restricted principally to mathematics through elementary calculus. A chronological study of some mathematicians and their contributions to mathematical thought. Formerly MATH 245. Offered spring semester. Prerequisite(s): (MATH 1431 Minimum Grade of D or MATH 1461 Minimum Grade of D or MATH 1621 Minimum Grade of D or MATH 1631 Minimum Grade of D).

2631 - Calculus 3
4 Credits
Vectors and vector valued functions, planes and lines in space, multivariate functions, differential and integral calculus of multivariate functions. Formerly MATH 263. Offered fall and spring semesters. Prerequisite(s): MATH 1641 Minimum Grade of D.

2651 - Differential Equations
4 Credits
Matrices and vector spaces; bases and dimension; first and second order linear differential equations with applications, LaPlace transforms. Formerly MATH 275. Offered fall and spring semesters. Prerequisite(s): MATH 1641 Minimum Grade of D.
2691 - Foundations of Mathematics with Problem Solving  
3 Credits  
A hands-on introduction to problem solving strategies and techniques of formal proof. Formerly MATH 295. Offered spring semester. Prerequisite(s): MATH 1641 Minimum Grade of C.

2901 - Special Topics in Mathematics  
1 to 3 Credits  
Formerly MATH 290.

2911 - Special Topics in Mathematics  
1 to 3 Credits  
Formerly MATH 290.

2921 - Special Topics in Mathematics  
1 to 3 Credits  
Formerly MATH 290.

2931 - Special Topics in Mathematics  
1 to 3 Credits  
Formerly MATH 290.

2971 - Independent Study  
1 to 3 Credits  
Formerly MATH 297. This course may be repeated 2 times.

3011 - Mathematics for Secondary Teachers  
3 Credits  
To include topics from problem solving, probability, number theory, number systems, trigonometry, mathematical induction, geometry, graph theory, and discrete mathematics. Formerly MATH 301. Offered alternate fall semesters. Prerequisite(s): MATH 2691 Minimum Grade of C.

3061 - Discrete Mathematics  
3 Credits  
An introduction to discrete mathematical structures: sets, logic, combinatorics, relations and digraphs, functions, integers and related algorithms, partially ordered sets, lattices and Boolean algebras, Karnaugh maps, elementary graph theory. Formerly MATH 336. Offered fall and spring semesters. Prerequisite(s): MATH 1631 Minimum Grade of C.

3221 - Operations Research  
3 Credits  
Linear programming, simplex method, duality, sensitivity analysis, PERT/CPM. Standard O.R. applications including transportation, maximum flow, and shortest path problems, among others. Formerly MATH 332. Offered alternate spring semesters. Prerequisite(s): MATH 2651 Minimum Grade of C or MATH 3261 Minimum Grade of C.

3241 - Topology  
3 Credits  
Metrics and metric spaces, topological spaces, topological invariants. Examples in real space and more
general topological spaces. Formerly MATH 324. Offered alternate spring semesters. Prerequisite(s): MATH 2691 Minimum Grade of C.

3261 - Linear Algebra
3 Credits
Finite and infinite dimensional vector spaces over a field, linear transformations, inner product spaces, and canonical forms. Formerly MATH 372. Offered fall semester. Prerequisite(s): MATH 2691 Minimum Grade of C or MATH 3061 Minimum Grade of C.

3411 - Abstract Algebra 1
3 Credits
An introduction to algebraic structures; groups, rings and fields. Formerly MATH 311. Offered fall semester. Prerequisite(s): MATH 2691 Minimum Grade of C.

3421 - Abstract Algebra 2
3 Credits
A continued study of groups, rings, and fields. Formerly MATH 312. Offered alternate spring semesters. Prerequisite(s): MATH 3411 Minimum Grade of C.

3601 - Mathematical Programming
3 Credits
Programming concepts and techniques. Programming applications using MATLAB, Visual Basic for Applications, or a programmable calculator. Introduction to Maple. Use of Equation Editors. Formerly MATH 360. Offered spring semester. Prerequisite(s): MATH 2651 Minimum Grade of C or MATH 3261 Minimum Grade of C.

3611 - Real Analysis 1
3 Credits
Real numbers, sequences, limits of functions, continuous functions. Formerly MATH 352. Offered fall semester. Prerequisite(s): MATH 2691 Minimum Grade of C.

3621 - Real Analysis 2
3 Credits
Continuous functions. Differentiation, derivative theorems, Taylor's formula. The Riemann integral and properties of integrals. Formerly MATH 353. Offered alternate spring semesters. Prerequisite(s): MATH 3611 Minimum Grade of C.

3631 - Complex Variables
3 Credits
Complex algebra, complex calculus, analytic functions, infinite series over the complex plane, theory of residues, conformal mapping. Formerly MATH 363. Offered alternate spring semesters. Prerequisite(s): MATH 2631 Minimum Grade of C.

3651 - Partial Differentiable Equations
3 Credits
First-order equations: the method of characteristics and systems of first-order equations. Second-order equations: the Cauchy-Kowaleskaya theorem, canonical forms of second-order equations, Fourier series, Fourier integrals, boundary-value and initial-value problems. Formerly MATH 362. Offered alternate
spring semesters. Prerequisite(s): MATH 2631 Minimum Grade of C and MATH 2651 Minimum Grade of C.

3901 - Special Topics in Mathematics
1 to 3 Credits
Formerly MATH 390.

3911 - Special Topics in Mathematics
1 to 3 Credits
Formerly MATH 390.

3921 - Special Topics in Mathematics
1 to 3 Credits
Formerly MATH 390.

3931 - Special Topics in Mathematics
1 to 3 Credits
Formerly MATH 390.

3951 - Junior Seminar
1 Credit
Career options. Graduate and professional school options. Attendance at department seminars and capstone presentations. Self-evaluation of progress in the major. Preparation for MATH 4951 - Senior Seminar including selection of senior capstone advisor and research topic. Formerly MATH 370. Offered spring semester.

4211 - Foundations of Geometry
3 Credits
An axiomatic approach to geometry including the concepts of incidence, ordering, separation, and congruence in incidence, affine, Euclidean, and non-Euclidean geometries. Formerly MATH 421. Offered alternate fall semesters. Prerequisite(s): MATH 2691 Minimum Grade of C.

4401 - Mathematics Internship
1 to 8 Credits
Formerly MATH 470.

4411 - Number Theory w/Applications
3 Credits
An introduction to number theory, modular arithmetic and finite fields, with applications to pseudo-random sequences, cryptography and coding theory. Formerly MATH 411. Offered alternate spring semesters. Prerequisite(s): MATH 1631 Minimum Grade of C.

4611 - Numerical Analysis
3 Credits
Review of programming concepts using MATLAB or other programming software. Errors that occur in representing numbers on a computer and approximating solutions; methods for locating roots of a non-linear equation; interpolation, numerical differentiation; and numerical integration. Numerical solution of differential equations and of systems of linear algebraic equations. Splines. Formerly MATH 461.
Offered alternate spring semesters. Prerequisite(s): MATH 2651 Minimum Grade of C and MATH 3601 Minimum Grade of C.

4651 - Probability Theory
3 Credits
Axioms of probability theory; Discrete and continuous random variables; multivariate distributions; functions of random variables; Central Limit Theorem. Formerly MATH 480. Offered alternate fall semesters. Prerequisite(s): MATH 2631 Minimum Grade of C.

4661 - Mathematical Statistics
3 Credits
Sampling distributions; Central Limit Theorem; point and confidence interval estimation; hypothesis testing. Formerly MATH 481. Offered alternate spring semesters. Prerequisite(s): MATH 4651 Minimum Grade of C.

4901 - Special Topics in Mathematics
1 to 3 Credits
Formerly MATH 490.

4911 - Special Topics in Mathematics
1 to 3 Credits
Formerly MATH 490.

4921 - Special Topics in Mathematics
1 to 3 Credits
Formerly MATH 490.

4931 - Special Topics in Mathematics
1 to 3 Credits
Formerly MATH 490.

4951 - Senior Seminar
1 Credit
The student prepares a paper and gives a presentation based on the work done in both MATH 3951 - Junior Seminar and this course. Formerly MATH 493. Offered fall and spring semesters. Prerequisite(s): MATH 3951 Minimum Grade of C.

4961 - Seminar in Mathematics
1 to 3 Credits
Formerly MATH 494.

4971 - Independent Study
1 to 3 Credits
Formerly MATH 497. This course may be repeated 2 times.

Subject - Statistics (STAT)
1311 - Introduction to Statistical Reasoning
3 Credits
Descriptive and graphical methods for univariate and bivariate data; probability concepts; binomial and normal distributions; statistical inference; point estimation, confidence intervals, hypothesis tests. Formerly STAT 142. Offered fall and spring semesters. Prerequisite(s): MATH 1251 Minimum Grade of C.

1561 - Statistics for Professionals 1
3 Credits
Describing data graphically and numerically; describing bivariate data; probability concepts; random variables and probability distributions (both discrete and continuous); sampling distributions; statistical inference (point estimation, confidence intervals, hypothesis testing) for a single mean and the difference between two means; statistical study designs. Formerly STAT 156. Offered fall and spring semesters. Prerequisite(s): MATH 1251 Minimum Grade of C.

1761 - Statistics for Pharmacy
3 Credits
Describing data graphically and numerically; describing bivariate data; probability concepts; random variables and probability distributions (both discrete and continuous); sampling distributions; statistical inference (point estimation, confidence intervals, hypothesis testing) for single means and proportions, and the difference between two means and proportions; statistical study designs. Prerequisite(s): MATH 1401 Minimum Grade of C. Must be enrolled in one of the following Colleges: Pharmacy.

1901 - Special Topics in Statistics
1 to 3 Credits
Formerly STAT 190. Prerequisite(s): STAT 1311 Minimum Grade of C or STAT 1561 Minimum Grade of C.

1911 - Special Topics in Statistics
1 to 3 Credits
Formerly STAT 190. Prerequisite(s): STAT 1311 Minimum Grade of C or STAT 1561 Minimum Grade of C.

1921 - Special Topics in Statistics
1 to 3 Credits
Formerly STAT 190.

1931 - Special Topics in Statistics
1 to 3 Credits
Formerly STAT 190.

2501 - Statistics for Scientists and Engineers
3 Credits
Basic statistical techniques; random variables and their distributions; statistical inference (point estimation, confidence intervals, hypothesis testing); statistical study designs; linear regression and analysis of variance methods. Formerly STAT 280. Offered fall semester. Prerequisite(s): MATH 1641 Minimum Grade of C.
2561 - Statistics for Professionals 2
3 Credits
Review of inferential statistics; categorical data analysis (including goodness-of-fit tests and contingency table analysis); simple linear regression and correlation; multiple regression analysis; analysis of variance; analysis of covariance; statistical study designs. Formerly STAT 256. Offered fall and spring semesters. Prerequisite(s): STAT 1561 Minimum Grade of C.

2901 - Special Topics in Statistics
1 to 3 Credits
Formerly STAT 290. Prerequisite(s): STAT 2561 Minimum Grade of C.

2911 - Special Topics in Statistics
1 to 3 Credits
Formerly STAT 290. Prerequisite(s): STAT 2561 Minimum Grade of C.

2921 - Special Topics in Statistics
1 to 3 Credits
Formerly STAT 290.

2931 - Special Topics in Statistics
1 to 3 Credits
Formerly STAT 290.

2971 - Independent Study in Statistics
1 to 3 Credits
Permission of instructor required. Formerly STAT 297. This course may be repeated 2 times.

3501 - Applied Regression and Correlation Analysis
3 Credits
Simple linear regression and correlation data analysis methods; multiple regression methods; analysis of variance; analysis of covariance; statistical study designs. Formerly STAT 281. Offered fall semester. Prerequisite(s): STAT 2561 Minimum Grade of C.

3511 - Categorical Data Analysis
3 Credits
Statistical inference with regard to categorical variables, including goodness-of-fit tests, contingency table analysis, Fisher exact test, and logistic regression models. Formerly STAT 351. Offered alternate spring semesters. Prerequisite(s): STAT 2561 Minimum Grade of C.

3521 - Analysis of Variance w/ Experimental Design
3 Credits
Single factor analysis of variance, multiple comparisons, two and multiple factor analysis of variance, completely randomized designs, randomized block designs, analysis of covariance, random effects models, additional experimental designs. Formerly STAT 352. Offered alternate spring semesters. Prerequisite(s): STAT 2561 Minimum Grade of C.

3531 - Survey Sampling Methods
3 Credits
Statistical methods pertaining to survey sampling, with an emphasis on human populations, including simple random sampling, stratified sampling, cluster sampling, systematic sampling, and the use of demographic information to reduce margins of error. Formerly STAT 353. Offered alternate spring semesters. Prerequisite(s): STAT 2561 Minimum Grade of C.

**3541 - Nonparametric Statistical Methods**  
*3 Credits*  
Review of parametric inferential methods; nonparametric hypothesis testing (including Wilcoxon rank-sum, Wilcoxon signed-rank, sign, Kruskal-Wallis, Friedman); nonparametric point and confidence interval estimation; rank correlation; randomization and permutation tests. Formerly STAT 354. Prerequisite(s): STAT 2561 Minimum Grade of C.

**3551 - Applied Probability**  
*3 Credits*  
Combinational analysis; discrete probability distributions; exponential distribution; Poisson distribution; normal distribution; DeMoivre-LaPlace limit theorem; random variables and their properties; laws of large numbers; generating functions; random walk and ruin problems; Markov chains. Formerly STAT 355. Prerequisite(s): (STAT 1561 Minimum Grade of C or STAT 2501 Minimum Grade of C or MATH 4651 Minimum Grade of C) and (MATH 1461 Minimum Grade of C or MATH 1621 Minimum Grade of C or MATH 1631 Minimum Grade of C).

**3571 - Data Management and Statistical Computing**  
*3 Credits*  
Use of statistical software packages such as SAS, SPSS, or Excel. Topics include data management, data analysis, graphical displays and computer simulation. Formerly STAT 350. Prerequisite(s): STAT 2561 Minimum Grade of C.

**3901 - Special Topics in Statistics**  
*1 to 3 Credits*  
Formerly STAT 390. Prerequisite(s): STAT 2561 Minimum Grade of C

**3911 - Special Topics in Statistics**  
*1 to 3 Credits*  
Formerly STAT 390. Prerequisite(s): STAT 2561 Minimum Grade of C

**3921 - Special Topics in Statistics**  
*1 to 3 Credits*  
Formerly STAT 390.

**3931 - Special Topics in Statistics**  
*1 to 3 Credits*  
Formerly STAT 390.

**4561 - Introduction to Stochastic Processes**  
*3 Credits*  
Random variables and stochastic processes; Markov chains and their properties (discrete and continuous); other important stochastic processes and their properties; elementary stochastic calculus.
Formerly STAT 356. Prerequisite(s): ( STAT 2501 Minimum Grade of C or MATH 4651 Minimum Grade of C) and ( MATH 2651 Minimum Grade of C or MATH 3261 Minimum Grade of C).

**4571 - Linear Statistical Models**  
*3 Credits*  
Review of linear algebra; linear statistical models, including regression and analysis of variance models, from a vector space perspective; Bivariate and multivariate normal distributions. Prerequisite(s): ( STAT 1561 Minimum Grade of C or STAT 2501 Minimum Grade of C or MATH 4661 Minimum Grade of C) and ( MATH 3061 Minimum Grade of C or MATH 2651 Minimum Grade of C).

**4901 - Special Topics in Statistics**  
*1 to 3 Credits*  
Permission of instructor required. Formerly STAT 490.

**4911 - Special Topics in Statistics**  
*1 to 3 Credits*  
Permission of instructor required. Formerly STAT 490.

**4921 - Special Topics in Statistics**  
*1 to 3 Credits*  
Formerly STAT 490.

**4931 - Special Topics in Statistics**  
*1 to 3 Credits*  
Formerly STAT 490.

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**Department of Modern Languages**

**Subject - Arabic (ARAB)**

**1011 - Elementary Arabic 1**  
*3 Credits*  
This course assumes no previous study of Arabic. The course will introduce the alphabet and sound system of Arabic and will assist in developing some basic reading, writing, speaking and listening skills. The course will deal mainly with Modern Standard Arabic which is the formal language spoken in the Arab world. Some dialectal variations of Arabic will also be introduced when necessary.

**1021 - Elementary Arabic 2**  
*3 Credits*  
This course will reinforce material learned and practiced in Elementary Arabic 1 and help promote development of Arabic language abilities. This course will devote special attention to Arabic grammar and vocabulary to assist with developing an intermediate level of language accuracy. The course will deal mainly with Modern Standard Arabic, which is the formal language spoken in the Arab world. Some
direct attention will be given to the different Arab dialects. Prerequisite: ARAB 1011 or proficiency. Prerequisite(s): ARAB 1011 Minimum Grade of D.

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**Subject - Chinese (CHIN)**

**1011 - Elementary Chinese 1**

3 Credits

Introduction to basic conversational Mandarin, familiarity with the foundations of the Chinese writing system.

**1021 - Elementary Chinese 2**

3 Credits

Continuation of CHIN 1011. Prerequisite(s): CHIN 1011 Minimum Grade of D.

**2011 - Intermediate Chinese 1**

3 Credits

Further building of listening and speaking skills. Continued addition of traditional and simplified characters, reading and composition practice. Prerequisite(s): CHIN 1021 Minimum Grade of D.

**2021 - Intermediate Chinese 2**

3 Credits

Continuation of CHIN 2011. Offered spring semester. Prerequisite(s): CHIN 2011 Minimum Grade of D.

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**Subject - French (FREN)**

**1011 - Elementary French 1**

3 Credits

Basic proficiency in understanding, speaking, reading and writing French in everyday situations. Emphasis on comprehension and oral expression. Digitized and Internet realia illustrate contemporary French and francophone cultural values. Offered fall semester.

**1021 - Elementary French 2**

3 Credits

Continuation of FREN 1021. Offered spring semester. Prerequisite(s): FREN 1011 Minimum Grade of C.

**2011 - Intermediate French 1**

3 Credits

Continued development of proficiency in understanding, speaking, reading and writing French. Emphasis on high-frequency vocabulary and grammatical structures. Increased exposure to and discussion of contemporary French and francophone cultural values. Offered fall semester. Prerequisite(s): FREN 1021 Minimum Grade of C.
2021 - Intermediate French 2
3 Credits
Continuation of FREN 2021. Offered spring semester. Prerequisite(s): FREN 2011 Minimum Grade of C.

3011 - Introduction to French Literature
3 Credits
Basic principles of analyzing and appreciating major works in French, poetry, prose and theater. Reading and discussion of, and written reflection on, representative French and francophone texts. Prerequisite(s): FREN 2021 Minimum Grade of C.

3021 - Advanced French: Speaking
3 Credits
Intensive practice of oral communication in conversations, role-playing, and oral interviews within French and francophone cultural contexts. Emphasis on developing fluidity and accurate pronunciation. Prerequisite(s): FREN 2021 Minimum Grade of C.

3031 - Advanced French: Writing
3 Credits
Intensive practice of writing in various contexts, such as correspondence, research, and creative narrative. Topics based on French-speaking societies and cultures. Formerly FREN 312. Prerequisite(s): FREN 2021 Minimum Grade of C.

3041 - Cultural History of France 1
3 Credits
Discussion in French of French history, art, architecture, and cultural institutions from their origins to the Fifth Republic. Prerequisite(s): FREN 3021 Minimum Grade of C and FREN 3031 Minimum Grade of C.

3051 - Cultural History of France 2
3 Credits
Discussion in French of French culture with emphasis on the family, education, employment, politics, technology and cultural institutions from the Fifth Republic to the present. Prerequisite(s): FREN 3021 Minimum Grade of C and FREN 3031 Minimum Grade of C.

3061 - Francophone Cultures
3 Credits
Discussion in French of francophone cultures, including Quebec, the Caribbean, the Maghreb, and sub-Saharan Africa, in terms of historical perspectives and contemporary concerns. Prerequisite(s): FREN 3021 Minimum Grade of C and FREN 3031 Minimum Grade of C.

4001 - Special Topics
3 Credits
May be repeated as topic varies. Prerequisite(s): FREN 3021 Minimum Grade of C and FREN 3031 Minimum Grade of C.

4011 - French Novel 1
3 Credits
Reading and discussion of, and written reflection on, representative French novels in their historical and
cultural contexts from the 16th century to the Revolution. Prerequisite(s): FREN 3011 Minimum Grade of C and FREN 3021 Minimum Grade of C and FREN 3031 Minimum Grade of C.

4021 - French Novel 2
3 Credits
Reading and discussion of, and written reflection on, representative French and francophone novels in their historical and cultural contexts from the Revolution through the 21st century. Prerequisite(s): FREN 3011 Minimum Grade of C and FREN 3021 Minimum Grade of C and FREN 3031 Minimum Grade of C.

4031 - French Theatre
3 Credits
Reading and discussion in French of representative works from the 17th century to the present. Prerequisite(s): FREN 3011 Minimum Grade of C and FREN 3021 Minimum Grade of C and FREN 3031 Minimum Grade of C.

4101 - French Poetry and Song
3 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.' Prerequisite(s): FREN 3011 Minimum Grade of C and FREN 3021 Minimum Grade of C and FREN 3031 Minimum Grade of C.

4201 - French Film
3 Credits
Viewing, discussion, and analysis in French of representative French and francophone films, directors, and actors. Prerequisite(s): FREN 3021 Minimum Grade of C and FREN 3031 Minimum Grade of C.

4301 - Francophone Literature
3 Credits
Reading and discussion in French of works by contemporary writers in francophone countries including Quebec, the Caribbean, the Maghreb, and sub-Saharan Africa. Prerequisite(s): FREN 3011 Minimum Grade of C and FREN 3021 Minimum Grade of C and FREN 3031 Minimum Grade of C.

4401 - Modern French Musical
3 Credits
Oral and written analysis of visual, auditory, and lyrical elements of musical theatre as text. Opportunities to enrich and enhance literary analytical skills in a multimedia environment while improving linguistic competencies and cultural knowledge. Prerequisite(s): FREN 3011 Minimum Grade of C and FREN 3021 Minimum Grade of C and FREN 3031 Minimum Grade of C.

4501 - Capstone
1 Credit
Written or other presentational record of study abroad experience-alternative; externship research paper in French evaluated by department faculty.

4901 - Independent Study in French
**Subject - German (GERM)**

**1011 - Elementary German 1**  
3 Credits  
For beginners, introduction to basic characteristics of German. Builds on a foundation of vocabulary acquisition through listening and reading comprehension. Basic elements of speaking. Use of texts, stories, audio/visual materials. Offered fall semester.

**1021 - Elementary German 2**  
3 Credits  
Continuation of GERM 1011. Offered spring semester. Prerequisite(s): GERM 1011 Minimum Grade of D.

**2011 - Intermediate German 1**  
3 Credits  
Vocabulary building through listening and reading. Greater focus on writing and speaking practice with attention paid to high-frequency grammatical elements. Use of texts, stories, video and audio materials. Offered fall semester. Prerequisite(s): GERM 1021 Minimum Grade of D.

**2021 - Intermediate German 2**  
3 Credits  
Continuation of GERM 2011. Offered spring semester. Prerequisite(s): GERM 2011 Minimum Grade of D.

**3011 - German Language Studies**  
3 Credits  
Intensive overview of German grammatical structures. Emphasis on reading of more complex texts; vocabulary acquisition; training in composition. Offered alternate fall semesters. Prerequisite(s): GERM 2021 Minimum Grade of C.

**3021 - Using German**  
3 Credits  
Intensive practice of listening, reading and speaking skills. Some writing. Use of authentic materials. Offered alternate spring semesters. Prerequisite(s): GERM 2021 Minimum Grade of C.

**3111 - Culture of German-Speaking Europe**  
3 Credits  
A look at the roles played by political, social and cultural forces in Germany, Austria and Switzerland from the Middle Ages until the present. Readings and discussion in German, written composition. Formerly GRMN 338. Offered alternate fall semesters. Prerequisite(s): GERM 3011 Minimum Grade of C and GERM 3021 Minimum Grade of C.
**3121 - Studies in German Literature**  
3 Credits  
Readings and discussion in German of drama, poetry short stories and the Novelle from the 19th century to the present. Offered alternate spring semesters. Prerequisite(s): GERM 3011 Minimum Grade of C and GERM 3021 Minimum Grade of C.

**4501 - Capstone**  
1 Credit  
Written or other presentational record of study abroad experience. Alternative: extensive research paper in German, evaluated by department faculty.

**4901 - Independent Study in German**  
1 to 3 Credits  
For advanced students only; departmental permission required.

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**Subject - Japanese (JAPN)**

**1011 - Elementary Japanese 1**  
3 Credits  
For beginners. Basic listening and speaking skills; introduction to the Japanese writing system.

**1021 - Elementary Japanese 2**  
3 Credits  
Continuation of JAPN 1011. Offered fall and spring semesters. Prerequisite(s): JAPN 1011 Minimum Grade of D.

**2011 - Intermediate Japanese 1**  
3 Credits  
Builds upon basic skills through listening and speaking exercises. Further work with Japanese writing system and development of reading and writing skills. Offered fall semester. Prerequisite(s): JAPN 1021 Minimum Grade of D.

**2022 - Intermediate Japanese 2**  
3 Credits  
Continuation of JAPN 2011. Offered spring semester. Prerequisite(s): JAPN 2011 Minimum Grade of D.

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**Subject - Modern Languages (MLNG)**

**1901 - Individualized Language Study**  
1 to 3 Credits  
Study of a modern spoken language other than those regularly offered. Limited to motivated students
with a particular interest or need. Offerings depend on instructor availability. Does not meet any requirements. Departmental permission required. Offered spring semester. This course is repeatable for a total of 3 hours.

Subject - Russian (RUSS)

1011 - Elementary Russian 1
3 Credits
For beginners, introduction to basic characteristics of Russian and the Cyrillic alphabet. Builds on foundation of listening and reading comprehension. Use of texts, stories, audio/visual materials. Offered alternate fall semesters.

1021 - Elementary Russian 2
3 Credits
Continuation of RUSS 1011. Offered alternate spring semesters. Prerequisite(s): RUSS 1011 Minimum Grade of D.

2901 - Independent Study in Russian
1 to 3 Credits
Departmental permission required. Offered alternate fall semesters.

Subject - Spanish (SPAN)

1011 - Elementary Spanish 1
3 Credits
Basic proficiency in understanding, speaking, reading and writing Spanish with emphasis on listening, speaking, and pronunciation. Designed for students who have no previous exposure to the language. Verbal and written expression is limited to short, culturally appropriate communication. Students will acquire a panoramic knowledge of the regions and societies where Spanish is spoken and learn about Spanish-speaking communities in the United States. Formerly SPAN 140. Offered alternate spring semesters.

1021 - Elementary Spanish 2
3 Credits
Continuation of SPAN 1011. Prerequisite(s): SPAN 1011 Minimum Grade of D.

2011 - Intermediate Spanish 1
3 Credits
Continued development of proficiency in understanding, speaking, reading and writing Spanish with emphasis on pronunciation and speaking. Designed for students who have completed the Elementary
level or have previous exposure to Spanish. Acquisition of language skills and practice identifying ideas in written texts. Written expression with more incorporation of vocabulary as well as grammar structures compared to the Elementary level. Offered fall semester. Prerequisite(s): SPAN 1021 Minimum Grade of D.

2021 - Intermediate Spanish 2  
3 Credits  
Continuation of SPAN 2011. Offered spring semester. Prerequisite(s): SPAN 2011 Minimum Grade of D.

3011 - Spanish Conversation  
3 Credits  
Strengthening Spanish communication skills by regular guided oral practice. Building vocabulary, written exercises, and improving comprehension by listening to live speech, videos, audio recordings, and films. Formerly SPAN 370. Offered fall semester. Prerequisite(s): SPAN 2021 Minimum Grade of C.

3021 - Spanish Composition  
3 Credits  
Improvement of written communication skills. Emphasis on task-oriented writing in Spanish, including composing and editing several drafts. Topics based on Spanish speaking societies and cultures. Offered spring semester. Prerequisite(s): SPAN 2021 Minimum Grade of C.

3041 - Introduction to Spanish Literature  
3 Credits  
Discussion in Spanish of critical principles in the assessment of prose, fiction, poetry and drama as applied to selected readings in Spanish and Latin American literature. Prerequisite(s): SPAN 3011 Minimum Grade of C and SPAN 3021 Minimum Grade of C.

3101 - Spanish Film  
3 Credits  
Discussion in Spanish of historical development of Spanish cinema through significant directors, such as Buuel, Saura, Almodvar. Prerequisite(s): SPAN 3011 Minimum Grade of C and SPAN 3021 Minimum Grade of C.

3111 - Spanish Civilization  
3 Credits  
Discussion in Spanish of geographical, political, economic, social and cultural forces in Spain from prehistoric times to the present. Prerequisite(s): SPAN 3011 Minimum Grade of C and SPAN 3021 Minimum Grade of C.

3121 - Spanish Art, Music, Dance  
3 Credits
Discussion in Spanish of Spanish art, architecture, music and dance from prehistoric times to the present. Prerequisite(s): SPAN 3011 Minimum Grade of C and SPAN 3021 Minimum Grade of C.

3201 - Latin American Film
3 Credits
Viewing and analysis in Spanish of contemporary Latin American film, with emphasis on understanding the film industry and how films relate to social and political contexts. Prerequisite(s): SPAN 3011 Minimum Grade of C and SPAN 3021 Minimum Grade of C.

3211 - Latin American Civilization
3 Credits
Discussion in Spanish of geography, history and culture of Latin America from Mesoamerica to the present. Prerequisite(s): SPAN 3011 Minimum Grade of C and SPAN 3021 Minimum Grade of C.

3221 - Latin American Art, Music, Dance
3 Credits
Discussion in Spanish of Latin American art, architecture, music and dance from Mesoamerica to the present. Prerequisite(s): SPAN 3011 Minimum Grade of C and SPAN 3021 Minimum Grade of C.

3301 - Business Spanish
3 Credits
Development of oral and written proficiency of Spanish within a business context. Business vocabulary, readings, business and cultural concepts, situational practice and case studies. Prerequisite(s): SPAN 3011 Minimum Grade of C and SPAN 3021 Minimum Grade of C.

3311 - Contemporary Hispanic Culture
3 Credits
Comparative study in Spanish of socio-cultural attitudes, popular/folk traditions and lifestyles within Hispanic communities. Prerequisite(s): SPAN 3011 Minimum Grade of C and SPAN 3021 Minimum Grade of C.

4001 - Special Topics
3 Credits
May be repeated as topic varies. Prerequisite(s): SPAN 3011 Minimum Grade of C and SPAN 3021 Minimum Grade of C.

4111 - Medieval and Golden Age Spanish Literature
3 Credits
Discussion in Spanish of poetry, prose and drama from the origins of the Spanish language to 1681. Works may include selections from the epic of Mo Cid, El libro de buen amor, Don Quijote, Lope de Vega, Quevedo. Prerequisite(s): SPAN 3011 Minimum Grade of C and SPAN 3021 Minimum Grade of C and SPAN 3041 Minimum Grade of C.
4121 - 18th and 19th Century Spanish Literature
3 Credits
Discussion in Spanish of principles and works of Neoclassicism, Romanticism, Realism, the Generation of 1898. Works may include Don Juan Tenorio, narrative by Benito Pérez Galdós and Emilia Pardo Bazán, poetry by Antonio Machado. Formerly SPAN 452. Prerequisite(s): SPAN 3011 Minimum Grade of C and SPAN 3021 Minimum Grade of C and SPAN 3041 Minimum Grade of C.

4131 - 20th and 21st Century Spanish Literature
3 Credits
Discussion in Spanish of modern poetry from the Generation of 1927, tremendismo, the post-Franco reaction, contemporary trends. Works may include selections from Federico García Lorca, Nobel Prize winner Camilo José Cela, Antonio Muñoz Molina. Prerequisite(s): SPAN 3011 Minimum Grade of C and SPAN 3021 Minimum Grade of C and SPAN 3041 Minimum Grade of C.

4211 - Colonial and 19th Century Latin American Literature
3 Credits
Reading, discussion, and analysis in Spanish of Romanticism, Realism, and Modernism in representative works by Latin American authors. Prerequisite(s): SPAN 3011 Minimum Grade of C and SPAN 3021 Minimum Grade of C and SPAN 3041 Minimum Grade of C.

4221 - 20th and 21st Century Latin American Literature
3 Credits
Reading and discussion in Spanish of works by contemporary writers in Latin American countries. Prerequisite(s): SPAN 3011 Minimum Grade of C and SPAN 3021 Minimum Grade of C and SPAN 3041 Minimum Grade of C.

4501 - Capstone
1 Credit
Written or other presentational record of study abroad experience; alternative: extensive research paper in Spanish, evaluated by department faculty.

4901 - Independent Study in Spanish
1 to 3 Credits
Departmental permission required. This course is repeatable for a total of 3 hours.

Department of Music

Subject - Music (MUSC)

0011 - Concert and Recital Observation
0 Credits
Required number of concerts and recitals to be attended each semester, including some events with
mandatory attendance. Student must receive credit in six semesters to graduate. Limited to music majors. Graded S/U. Zero Credit. Offered fall and spring semesters. This course may be repeated 97 times.

1001 - Music Appreciation
3 Credits
Music and its basic elements, including culture, forms, styles and media associated with a variety of music. Emphasis on listening and understanding historical periods and respective stylistic characteristics. Includes concert attendance, knowledge of music fundamentals, instruments, composers and representative literature. Not available to music majors. Three credits. Offered fall and spring semesters.

1011 - Introduction to Study of Music
2 Credits
All aspects of the music major, including the development of a four-year plan for graduation that fulfills NASM competencies and ONU catalog requirements for each degree program. Includes survey of western art music with emphasis on musical terms, styles, composers and representative literature. Limited to music majors and/or minors. Two credits. Offered fall semester.

1021 - Technology for Musicians
1 Credit
The use of technology in the music professions. Emphasis on MIDI sequencing, music notation, and digital audio recording. Limited to music majors and minors. One credit. Offered fall and spring semesters.

1031 - Fundamentals of Music
3 Credits
Note names, clefs, scales, triads, inversions, intervals, key signatures. Three credits. Offered summers.

1041 - Fundamentals of Music for Musical Theatre Majors
3 Credits
Reading and writing musical notation including rhythms, note names, scales, chords, intervals, and interpretation. Three credits. Offered fall semester.

1051 - Musicianship for the Musical Theatre
3 Credits
Functional harmony and form analysis applied to musical theatre repertoire. Includes advanced sight-singing and techniques for notating melody and harmony. Three credits. Offered spring semester. Prerequisite(s): MUSC 1041 Minimum Grade of C.

1111 - Music Theory I
3 Credits
Foundational music theory and harmony including analysis, part-writing, and creative projects in
composition and arranging. Limited to music majors and/or minors. Formerly part of the first-year music theory sequence MUSC 121, 122 and 123. Offered fall semester. Corequisite(s): MUSC 1131.

1121 - Music Theory II  
3 Credits  
Continuation of MUSC 1111. Three credits. Formerly part of the first-year music theory sequence MUSC 121, 122 and 123. Offered spring semester. Prerequisite(s): MUSC 1111 Minimum Grade of C. Corequisite(s): MUSC 1141.

1131 - Aural Skills I  
1 Credit  
Introduction to sight-singing; melodic, rhythmic, and harmonic dictation; and keyboard skills. Includes basic counting exercises, conducting patterns, and coordination exercises to train basic musicianship skills in a skills/performance-based environment. One credit. Formerly part of the first-year sight-singing sequence MUSC 131, 132 and 133. Offered fall semester. Corequisite(s): MUSC 1111.

1141 - Aural Skills II  
1 Credit  
Continuation of MUSC 1211. One credit. Formerly part of the first year music theory sequence. Formerly part of the first-year sight-singing sequence MUSC 131, 132 and 133. Offered spring semester. Prerequisite(s): MUSC 1131. Minimum Grade of C Corequisite(s): MUSC 1121.

1331 - Singers Diction I  
1 Credit  
The proper pronunciation of vocal and choral texts in Italian and Latin. Introduction of the International Phonetic Alphabet as it applies to all languages. One credit. Offered fall semester.

1901 - Special Topics  
1 to 3 Credits  
Topics include, but are not limited to special areas in music theory, music history, and/or music education. Permission of department and instructor. May be repeated as topics vary. Variable credit. Offered on demand.

2111 - Music Theory III  
3 Credits  
Continuation of MUSC 1221. The study of 18th, 19th and 20th century compositional techniques, orchestration and counterpoint. Includes development of analytical skills. Three credits. Formerly part of the second-year music theory sequence MUSC 221, 222 and 223. Offered fall semester. Prerequisite(s): MUSC 1121 Minimum Grade of C Corequisite(s): MUSC 2131.
2121 - Music Theory IV
3 Credits
Continuation of MUSC 2111. Three credits. Formerly part of the second-year music theory sequence MUSC 221, 222 and 223. Offered spring semester. Prerequisite(s): MUSC 2111 Minimum Grade of C Corequisite(s): MUSC 2141.

2131 - Aural Skills III
1 Credit
Continuation of MUSC 1131. Advanced sight-singing; melodic, rhythmic, and harmonic dictation; and keyboard basic skills. Includes advanced counting exercises, conducting patterns, and coordination exercises to train advanced musicianship skills in a skills/performance based environment. One credit. Formerly part of the second-year sight-singing sequence MUSC 131, 132 and 133. Offered fall semester. Prerequisite(s): MUSC 1141 Minimum Grade of C Corequisite(s): MUSC 2111.

2141 - Aural Skills IV
1 Credit
Continuation for MUSC 2131. One credit. Formerly part of the second-year sight-singing sequence MUSC 131, 132 and 133. Offered spring semester. Prerequisite(s): MUSC 2131 Minimum Grade of C Corequisite(s): MUSC 2121.

2201 - Non-Western Music
3 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. Three credits. Offered spring semester. Prerequisite(s): MUSC 1121 Minimum Grade of C.

2311 - Basic Conducting
2 Credits
Basic baton technique applied to choral and instrumental conducting practices. Includes score reading and rehearsal techniques for various ensembles. Two credits. Offered spring semester. Prerequisite(s): MUSC 1121 Minimum Grade of C and MUSC 1141 Minimum Grade of C.

2331 - Singers Diction II
1 Credit
Continuation of MUSC 1331, with specialized work in German. One credit. Offered alternate spring semesters. Prerequisite(s): MUSC 1331 Minimum Grade of C.

2341 - Survey of Piano Literature
2 Credits
Major keyboard composers, including overviews of styles, keyboard music as it relates to music history, and how various styles influenced future composers and keyboard music. Performance practices and
recording artists emphasized. Two credits. Formerly MUSC 371 and 372. Permission of instructor required. Offered alternate fall semesters.

2351 - Piano Pedagogy
2 Credits
The role of the teacher in the learning process including observation and laboratory teaching; literature relevant to piano pedagogy and its practical application; presentation of a professional teaching demeanor; basic methods of teaching individual and group piano; technology applicable to the above. Two credits. Formerly MUSC 373. Permission of instructor. Offered alternate spring semesters.

2401 - Foundations of Music Education
1 Credit
Orientation to the profession of music education, including current issues; psychological, sociological, aesthetic, and historical foundations; current philosophies and learning theories; assessment; and an overview of instructional skills, knowledge, and dispositions, including national and state standards for music education. Limited to music education majors. One credit. Offered spring semester. Prerequisite(s): MUSC 1011 Minimum Grade of C.

2411 - Woodwind Methods
1 Credit
Elementary performance skills and pedagogy of woodwind instruments including literature and materials for school-aged performers. Limited to music education majors. One credit. Offered alternate spring semesters. Prerequisite(s): MUSC 1121 Minimum Grade of C and MUSC 1141 Minimum Grade of C.

2421 - Brass Methods
1 Credit
Elementary performance skills and pedagogy of brass instruments including literature and materials for school-aged performers. Limited to music education majors. One credit. Offered alternate fall semesters. Prerequisite(s): MUSC 1121 Minimum Grade of C and MUSC 1141 Minimum Grade of C.

2431 - String Methods
1 Credit
Elementary performance skills and pedagogy of string instruments including literature and materials for school-aged performers. Limited to music education majors. One credit. Offered alternate spring semesters. Prerequisite(s): MUSC 1121 Minimum Grade of C and MUSC 1141 Minimum Grade of C.

2441 - Percussion Methods
1 Credit
Elementary performance skills and pedagogy of percussion instruments including literature and materials for school-aged performers. Limited to music education majors. One credit. Offered alternate fall semesters. Prerequisite(s): MUSC 1121 Minimum Grade of C and MUSC 1141 Minimum Grade of C.
2901 - Special Topics
1 to 3 Credits
Topics include, but are not limited to special areas in music theory, music history, and/or music education. Permission of department and instructor. May be repeated as topics vary. Variable credit. Offered on demand.

3151 - Composition
2 Credits
Principles and practices general to all compositional styles applied to weekly composition projects. Includes score study of great works. Limited to music majors. May be repeated for credit. Two credits. Offered fall and spring semesters. Prerequisite(s): MUSC 2121 Minimum Grade of C and MUSC 2141 Minimum Grade of C.

3211 - Music History and Literature I
3 Credits
Survey of the history of Western music from the medieval, renaissance, and baroque eras. Study of the development of musical styles, genres and compositional devices. Includes score reading and musical analysis. Students will become familiar with the masterworks of Western music history. Limited to music majors and minors. Three credits. Formerly part of the music history sequence-MUSC 321, 322 and 324. Offered fall semester. Prerequisite(s): MUSC 1121 Minimum Grade of C.

3221 - Music History and Literature II
3 Credits
A survey of the history of Western music from the Classical, Romantic, and Modern eras of music. Study of the development of musical styles, genres and compositional devices. Course includes score reading and musical analysis. Students will become familiar with the masterworks of Western music history. Limited to music majors and minors. Three credits. Formerly part of the music history sequence-MUSC 321, 322 and 324. Offered spring semester. Prerequisite(s): MUSC 1121 Minimum Grade of C.

3231 - Jazz History and Literature
3 Credits
Jazz from African influences through present developments; personalities involved in stylistic change. Listening-based; experiential component. Three credits. Offered alternate spring semesters.

3241 - American Music
3 Credits
Music from colonial America to present day. Listening and recognition of styles and instruments, major composers and performers. Includes sacred music, pop, rock, band, jazz and music from the stage. Three credits. Offered alternate fall semesters.
3251 - African Music
3 Credits
Traditional and modern music from Africa. Includes music from western African and southern African countries as well as the African Diaspora. Listening, recognition of styles and musical instruments, dance, religious ceremonies. Offered alternate spring semesters.

3271 - Survey of Vocal Literature I
1 Credit
Study of recital vocal literature, focusing on the Lied, French melodie, and British and American art song. Some Russian and Czech literature included. One credit. Formerly part of Vocal Literature sequence MUSC 371, 372 and 373. Offered alternate fall semesters. Prerequisite(s): MUSL 2391 Minimum Grade of S.

3281 - Survey of Vocal Literature II
1 Credit
Continuation of MUSC 3271 One credit. Formerly part of Vocal Literature sequence MUSC 371, 372 and 373. Offered alternate spring semesters.

3311 - Choral Conducting
2 Credits
Adaption of basic conducting techniques to the choral ensemble including leadership, error detection, tonal development, historical and stylistic accuracy and analysis. Includes survey choral literature and programming for ensembles of every level. Two credits. Offered fall semester. Prerequisite(s): MUSC 2311 Minimum Grade of C.

3321 - Instrumental Conducting
2 Credits
Adaption of basic conducting techniques to the instrumental ensemble including formal analysis, score-marking, transpositions, rehearsal technique, error detection, program creation, historical and stylistic accuracy and analysis. Includes survey of literature for concert bands, wind ensembles, string orchestras and symphony orchestras in the schools at every level. Two credits. Offered spring semester. Prerequisite(s): MUSC 2311 Minimum Grade of C.

3331 - Singers Diction III
1 Credit
Continued development of the skills acquired in Diction I, with specialized work in French. Offered alternate spring semesters. Prerequisite(s): MUSC 1331 Minimum Grade of C.

3461 - Methods of Marching and Jazz Bands
2 Credits
Methods, materials, and techniques in the development and direction of marching and jazz bands. Marching band topics include show planning, drill writing, precision drill, rehearsal techniques, and
selection and rehearsal of music. Membership in Marching Band required in conjunction with the course. Jazz ensemble methods include seating, standard and alternative instrumentation, literature selection and preparation, style, and the development of a personal philosophy of jazz education. This course is not for developing Jazz musicians. Two credits. Offered fall semester. Prerequisite(s): MUSC 1121 Minimum Grade of C and MUSC 1141 Minimum Grade of C Corequisite(s): MUSE 1051.

3471 - Technology for Music Educators
2 Credits
Integration of technology into the music curriculum, effective use of technology in teaching and learning music, preparation of teaching and administrative materials, leading class activities, and student projects. Includes experiences with music notation software, audio amplification, recording and editing, video recording and editing, and website creation and management. Two credits. Offered spring semester. Prerequisite(s): MUSC 1121 Minimum Grade of C and MUSC 1141 Minimum Grade of C.

3901 - Special Topics
1 to 3 Credits
Topics include, but are not limited to special areas in music theory, music history, and/or music education. Permission of department and instructor. Variable credit. May be repeated as topics vary. Offered fall and spring semesters.

4111 - Analytical Techniques
2 Credits
Elements of form and analysis, and counterpoint. Musical forms and styles from the Baroque to the present. Theoretical and stylistic analysis of representative music with creative projects in contrapuntal writing. Two credits. Offered fall semester. Prerequisite(s): MUSC 2121 Minimum Grade of C and MUSC 2141 Minimum Grade of C.

4161 - Electronic Music
2 Credits
History, development, materials, and techniques of electronic music. Emphasis on composition in the medium. May be repeated for credit. Two credits. Offered alternate fall semesters. Prerequisite(s): MUSC 1121 Minimum Grade of C and MUSC 1141 Minimum Grade of C.

4171 - Instrumentation and Arranging
2 Credits
Basic characteristics of each orchestral instrument and instrument family, including range, transposition, timbre and technique. Students produce scores of arrangements for choir, band, and orchestra. Two credits. Offered fall semester. Prerequisite(s): MUSC 2121 Minimum Grade of C and MUSC 2141 Minimum Grade of C.

4291 - Applied Field Literature and Pedagogy for Instrumentalists
2 Credits
Study of the professional and pedagogical literature for each instrument. Two credits. Offered on demand. Formerly MUSC 371, 372 and 373. Prerequisite(s): MUSL 2391 Minimum Grade of S.

4481 - Instrumental Music Methods
3 Credits
Procedures and materials in the successful administration, development and direction of instrumental music programs at the elementary, middle and high school level. Includes the beginning instrumentalist, curriculum planning, repertoire, adjudicated events, behavior management, recruiting, and public relations. Requires laboratory experience in teaching beginning instrumental students individually, in small groups and larger classes during 20 hours of field experience. Admission to the Teacher Education Program or approval of the Director of Teacher Education required. Limited to music education majors. Three credits. Offered spring semester.

4491 - Choral Music Methods
3 Credits
Development of the middle school and high school choral ensemble, including philosophies, technologies, classroom management, vocal production and placement, rehearsal and organizational techniques, audition procedures, production of musicals, adjudicated events and festivals, booster/parent groups, selection of repertoire, concept-based and standards-based choral music education, and curriculum. Admission to the Teacher Education Program required. Limited to music education majors. Three credits. Offered fall semester.

4601 - Senior Research Project
3 Credits
Study of a specialized area of music directed by a member of the music faculty. Serves as capstone experience for the concentrations in the Bachelor of Arts degree program: music history and literature, music theory/composition, or applied studies. Three credits. Offered on demand. Prerequisite(s): MUSL 2391 Minimum Grade of C.

4901 - Special Topics
1 to 3 Credits
Topics include, but are not limited to, special areas in music theory, music history, and/or music education. Permission of department chair and instructor. Variable credit. Offered on demand. May be repeated as topics vary.

4911 - Independent Study
1 to 3 Credits
Independent Study in areas of student interest not Offered in the catalog. Offered on demand. Variable credit. May be repeated. Permission of department chair and instructor required. Formerly MUSC 497.
**Subject - Applied Music & Performance (MUSE)**

1011 - University Singers
1 Credit
A select group of men and women singers chosen to perform a wide variety of choral literature from various periods of music with the highest musical standards. Performances include concerts on and off campus and on tour as well as frequent appearances with various area symphony orchestras. Tours internationally every third year. Membership by audition. One credit. Offered fall and spring semesters.

1021 - Symphony Orchestra
1 Credit
The Symphony Orchestra studies and performs the great symphonic repertoire from Baroque to the 21st century. Membership is by audition only. One credit. Offered fall and spring semesters.

1031 - Wind Orchestra
1 Credit
Select ensemble performs standard professional and collegiate repertoire for winds and percussion. Tours internationally every third year. Membership is by audition. One credit. Offered fall and spring semesters.

1041 - Symphonic Band
1 Credit
A fully-instrumented performance based concert ensemble studying and performing the finest wind band literature with the highest musical standards. Open to all students with prior high school instrumental experience. Placement audition required. One credit. Offered spring semester.

1051 - Marching Band
1 Credit
The preparation and performance of music and field shows for home and selected away football games and tours internationally every third year. Open to all university students who play band instruments or are accepted for auxiliary groups. Requires successful completion of band camp prior to the start of fall semester. Placement audition required. One credit. Offered fall semester.

1111 - Opera Workshop
1 Credit
Instruction and experience in preparation for opera performances on and off campus. Singers will study operatic literature and be coached for specific roles in public performance of opera scenes and/or fully staged operas. Membership by audition. One credit. Offered fall and spring semesters.

1121 - Northernaires
1 Credit
Highly select vocal jazz ensemble with backup instrumental ensemble performing a wide variety of a cappella and accompanied vocal jazz literature. Performances include concerts on and off campus. Members are selected from the University Singers. One credit. Offered fall and spring semesters.
1131 - A Cappella Chamber Singers
1 Credit
A highly select choral ensemble of 12-16 members performing appropriate literature both a cappella and accompanied from Renaissance to Contemporary. Performances include concerts on and off campus. Membership by audition. One credit. Offered fall and spring semesters.

1141 - Barbershop Quartet
1 Credit
A highly select men's quartet performing varied a cappella Barbershop literature. Performances include concerts on and off campus. Members are selected from the Men's Chorus. One credit. Offered on demand.

1151 - Women's Chorus
1 Credit
Choral ensemble performing literature written and arranged for female voices. A wide variety of sacred and secular music is performed, both accompanied and a cappella. Open to all qualified women: students, faculty, staff, and community members. One credit. Offered fall and spring semesters.

1161 - Men's Chorus
1 Credit
A choral ensemble performing outstanding sacred and secular choral literature written and arranged for men's voices. On occasion the chorus may combine with other university choruses to perform major choral works. Performances include concerts on and off campus and on tour. Open to all qualified students. One credit. Offered fall and spring semesters.

1171 - Jazz Ensemble
1 Credit
The study and performance of characteristic jazz literature. Membership is by audition. One credit. Offered fall and spring semesters.

1181 - Steel Drum Band
1 Credit
Studies and performs music specific to the steel drum idiom. Includes music of the Caribbean, especially the island nations Guyana and Trinidad and Tobago. Performances are scheduled throughout the year, both on and off campus. One credit. Open to all qualified students. One credit. Offered fall and spring semesters.

1191 - Brass Ensemble
1 Credit
Studies and performs characteristic brass literature. Open to all qualified students. One credit. Offered fall and spring semesters.

1201 - Percussion Ensemble
1 Credit
Studies and performs music specific to the varied world of percussion. Includes chamber music performance opportunities for percussion majors. Performances are scheduled throughout the year, on and off campus. Open to all qualified students. One credit. Offered fall and spring semesters.
1211 - **String Ensemble**  
1 Credit  
Ensembles of string instrumentalists for the study and performance of characteristic strings literature. Open to all qualified students. One credit. Offered fall and spring semesters.

1221 - **Woodwind Ensemble**  
1 Credit  
A non-auditioned ensemble for all woodwinds. Open to all students and staff. Performs concerts on-campus. Open to all qualified students. One credit. Offered fall and spring semesters.

1231 - **Pep Band**  
1 Credit  
Athletic band provides spirited music for sports contests (men's and women's basketball games). One credit. Open to all students with prior high school instrumental experience. No formal audition required. Offered spring semester.

1241 - **Composer's Workshop Ensemble**  
1 Credit  
Rehearses and performs literature for smaller ensembles from the 20th and 21st centuries. Also, significant experimental music from previous centuries. Emphasis on landmark works by major composers of these eras. One credit. Open to all qualified students. Offered spring semester.

1251 - **Chamber Music**  
1 Credit  
Ensembles which perform without conductor. Includes standard trios, quartets and quintets for woodwinds, brass and strings as well as mixed ensembles with piano. One credit. Offered fall and spring semesters.

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**Subject - Applied Music (MUSL)**

**0011A - Applied Lessons for Non-Majors/Voice**  
1 Credit  
Development of musical skills at all ability levels. Skills include but are not limited to: repertoire; improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.

**0011B - Applied Lessons for Non-Majors/Piano**  
1 Credit  
Development of musical skills at all ability levels. Skills include but are not limited to: repertoire; improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.

**0011C - Applied Lessons for Non-Majors/Harpsichord**  
1 Credit
Development of musical skills at all ability levels. Skills include but are not limited to: repertoire; improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.

0011D - Applied Lessons for Non-Majors/Organ
1 Credit
Development of musical skills at all ability levels. Skills include but are not limited to: repertoire; improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.

0011E - Applied Lessons for Non-Majors/Guitar
1 Credit
Development of musical skills at all ability levels. Skills include but are not limited to: repertoire; improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.

0011F - Applied Lessons for Non-Majors/Harp
1 Credit
Development of musical skills at all ability levels. Skills include but are not limited to: repertoire; improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.

0011G - Applied Lessons for Non-Majors/Violin
1 Credit
Development of musical skills at all ability levels. Skills include but are not limited to: repertoire; improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.

0011H - Applied Lessons for Non-Majors/Viola
1 Credit
Development of musical skills at all ability levels. Skills include but are not limited to: repertoire; improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.

0011I - Applied Lessons for Non-Majors/Cello
1 Credit
Development of musical skills at all ability levels. Skills include but are not limited to: repertoire; improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.

0011J - Applied Lessons for Non-Majors/Double Bass
1 Credit
Development of musical skills at all ability levels. Skills include but are not limited to: repertoire; improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.
0011K - Applied Lessons for Non-Majors/Flute
1 Credit
Development of musical skills at all ability levels. Skills include but are not limited to: repertoire; improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.

0011L - Applied Lessons for Non-Majors/Oboe
1 Credit
Development of musical skills at all ability levels. Skills include but are not limited to: repertoire; improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.

0011M - Applied Lessons for Non-Majors/Clarinet
1 Credit
Development of musical skills at all ability levels. Skills include but are not limited to: repertoire; improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.

0011N - Applied Lessons for Non-Majors/Bassoon
1 Credit
Development of musical skills at all ability levels. Skills include but are not limited to: repertoire; improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.

0011O - Applied Lessons for Non-Majors/Saxophone
1 Credit
Development of musical skills at all ability levels. Skills include but are not limited to: repertoire; improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.

0011P - Applied Lessons for Non-Majors/French Horn
1 Credit
Development of musical skills at all ability levels. Skills include but are not limited to: repertoire; improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.

0011Q - Applied Lessons for Non-Majors/Trumpet
1 Credit
Development of musical skills at all ability levels. Skills include but are not limited to: repertoire;
improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.

**0011R - Applied Lessons for Non-Majors/Trombone**

1 Credit

Development of musical skills at all ability levels. Skills include but are not limited to: repertoire; improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.

**0011S - Applied Lessons for Non-Majors/Euphonium**

1 Credit

Development of musical skills at all ability levels. Skills include but are not limited to: repertoire; improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.

**0011T - Applied Lessons for Non-Majors/Tuba**

1 Credit

Development of musical skills at all ability levels. Skills include but are not limited to: repertoire; improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.

**0011U - Applied Lessons for Non-Majors/Percussion**

1 Credit

Development of musical skills at all ability levels. Skills include but are not limited to: repertoire; improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.

**0011V - Applied Lessons for Non-Majors/Recorder**

1 Credit

Development of musical skills at all ability levels. Skills include but are not limited to: repertoire; improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.

**0011W - Applied Lessons for Non-Majors/Jazz Improv**

1 Credit

Development of musical skills at all ability levels. Skills include but are not limited to: repertoire; improvisation; sight-reading; technique; and other skills pertinent to students profession and interest. One credit. Formerly APMU 001. Offered fall and spring semesters.

**0401 - Voice Class for Non-Voice Majors**

1 Credit
Introduction to a variety of technical exercises, improvisation and the basic concepts of vocal technique and song interpretation. One credit. Offered fall and spring semesters. This course may be repeated 97 times.

0421 - Piano Class for Non-Music Majors
1 Credit
Applied piano study for non-music majors with various levels of experience. Basic concepts for beginners and advanced concepts for experienced performers, according to individual skill level. One semester required for Musical Theatre majors. One credit. Formerly APMU 004. Offered fall and spring semesters. This course may be repeated 97 times.

1011 - Piano Skills for Music Majors I
1 Credit
Continuing course to develop functional keyboard skills and a working knowledge of piano in the music profession. Skills include: repertoire; pedaling; harmonizing; sight-reading; vocal/ instrumental open score reading; construction and maintenance of the piano; scales; arpeggios; choral warm ups; transpositions including alto and tenor clef; hymns; and improvising using appropriate accompaniment patterns. Limited to Music Majors. One credit. Offered fall and spring semesters.

1021 - Piano Skills for Music Majors II
1 Credit
Continuation of MUSL 1011. One credit. Offered fall and spring semesters. Prerequisite(s): MUSL 1011 Minimum Grade of C

1111A - Applied Lessons for Musical Theatre Majors/Voice
1 Credit
First-year study in applied voice for Musical Theatre majors. One credit. Offered fall and spring semesters.

1111B - Applied Lessons for Musical Theatre Majors/Piano
1 Credit
First-year study in applied piano for Musical Theatre majors. One credit. Offered fall and spring semesters.

1111C - Applied Lessons for Musical Theatre Majors/Harpsichord
1 Credit
First-year study in applied harpsichord for Musical Theatre majors. One credit. Offered fall and spring semesters.

1111D - Applied Lessons for Musical Theatre Majors/Organ
1 Credit
First-year study in applied organ for Musical Theatre majors. One credit. Offered fall and spring semesters.
1111E - Applied Lessons for Musical Theatre Majors/Guitar
1 Credit
First-year study in applied guitar for Musical Theatre majors. One credit. Offered fall and spring semesters.

1111F - Applied Lessons for Musical Theatre Majors/Harp
1 Credit
First-year study in applied harp for Musical Theatre majors. One credit. Offered fall and spring semesters.

1111G - Applied Lessons for Musical Theatre Majors/Violin
1 Credit
First-year study in applied violin for Musical Theatre majors. One credit. Offered fall and spring semesters.

1111H - Applied Lessons for Musical Theatre Majors/Viola
1 Credit
First-year study in applied viola for Musical Theatre majors. One credit. Offered fall and spring semesters.

1111I - Applied Lessons for Musical Theatre Majors/Cello
1 Credit
First-year study in applied cello for Musical Theatre majors. One credit. Offered fall and spring semesters.

1111J - Applied Lessons for Musical Theatre Majors/Double Bass
1 Credit
First-year study in applied double bass for Musical Theatre majors. One credit. Offered fall and spring semesters.

1111K - Applied Lessons for Musical Theatre Majors/Flute
1 Credit
First-year study in applied flute for Musical Theatre majors. One credit. Offered fall and spring semesters.

1111L - Applied Lessons for Musical Theatre Majors/Oboe
1 Credit
First-year study in applied oboe for Musical Theatre majors. One credit. Offered fall and spring semesters.
1111M - Applied Lessons for Musical Theatre Majors/Clarinet
1 Credit
First-year study in applied clarinet for Musical Theatre majors. One credit. Offered fall and spring semesters.

1111N - Applied Lessons for Musical Theatre Majors/Bassoon
1 Credit
First-year study in applied bassoon for Musical Theatre majors. One credit. Offered fall and spring semesters.

1111O - Applied Lessons for Musical Theatre Majors/Saxophone
1 Credit
First-year study in applied saxophone for Musical Theatre majors. One credit. Offered fall and spring semesters.

1111P - Applied Lessons for Musical Theatre Majors/French Horn
1 Credit
First-year study in applied French horn for Musical Theatre majors. One credit. Offered fall and spring semesters.

1111Q - Applied Lessons for Musical Theatre Majors/Trumpet
1 Credit
First-year study in applied trumpet for Musical Theatre majors. One credit. Offered fall and spring semesters.

1111R - Applied Lessons for Musical Theatre Majors/Trombone
1 Credit
First-year study in applied trombone for Musical Theatre majors. One credit. Offered fall and spring semesters.

1111S - Applied Lessons for Musical Theatre Majors/Euphonium
1 Credit
First-year study in applied euphonium for Musical Theatre majors. One credit. Offered fall and spring semesters.

1111T - Applied Lessons for Musical Theatre Majors/Tuba
1 Credit
First-year study in applied tuba for Musical Theatre majors. One credit. Offered fall and spring semesters.
1111U - Applied Lessons for Musical Theatre Majors/Percussion
 1 Credit
First-year study in applied percussion for Musical Theatre majors. One credit. Offered fall and spring semesters.

1121A - Applied Lessons for Musical Theatre Majors/Voice
 1 Credit
Continuation of MUSL 1111A. One credit. Offered fall and spring semesters.

1121B - Applied Lessons for Musical Theatre Majors/Piano
 1 Credit
Continuation of MUSL 1111B. One credit. Offered fall and spring semesters.

1121C - Applied Lessons for Musical Theatre Majors/Harpsichord
 1 Credit
Continuation of MUSL 1111C. One credit. Offered fall and spring semesters.

1121D - Applied Lessons for Musical Theatre Majors/Organ
 1 Credit
Continuation of MUSL 1111D. One credit. Offered fall and spring semesters.

1121E - Applied Lessons for Musical Theatre Majors/Guitar
 1 Credit
Continuation of MUSL 1111E. One credit. Offered fall and spring semesters.

1121F - Applied Lessons for Musical Theatre Majors/Harp
 1 Credit
Continuation of MUSL 1111F. One credit. Offered fall and spring semesters.

1121G - Applied Lessons for Musical Theatre Majors/Violin
 1 Credit
Continuation of MUSL 1111G. One credit. Offered fall and spring semesters.

1121H - Applied Lessons for Musical Theatre Majors/Viola
 1 Credit
Continuation of MUSL 1111H. One credit. Offered fall and spring semesters.

1121I - Applied Lessons for Musical Theatre Majors/Cello
 1 Credit
Continuation of MUSL 1111I. One credit. Offered fall and spring semesters.
1121J - Applied Lessons for Musical Theatre Majors/Double Bass
1 Credit
Continuation of MUSL 1111J. One credit. Offered fall and spring semesters.

1121K - Applied Lessons for Musical Theatre Majors/Flute
1 Credit
Continuation of MUSL 1111K. One credit. Offered fall and spring semesters.

1121L - Applied Lessons for Musical Theatre Majors/Oboe
1 Credit
Continuation of MUSL 1111L. One credit. Offered fall and spring semesters.

1121M - Applied Lessons for Musical Theatre Majors/Clarinet
1 Credit
Continuation of MUSL 1111M. One credit. Offered fall and spring semesters.

1121N - Applied Lessons for Musical Theatre Majors/Bassoon
1 Credit
Continuation of MUSL 1111N. One credit. Offered fall and spring semesters.

1121O - Applied Lessons for Musical Theatre Majors/Saxophone
1 Credit
Continuation of MUSL 1111O. One credit. Offered fall and spring semesters.

1121P - Applied Lessons for Musical Theatre Majors/French Horn
1 Credit
Continuation of MUSL 1111P. One credit. Offered fall and spring semesters.

1121Q - Applied Lessons for Musical Theatre Majors/Trumpet
1 Credit
Continuation of MUSL 1111Q. One credit. Offered fall and spring semesters.

1121R - Applied Lessons for Musical Theatre Majors/Trombone
1 Credit
Continuation of MUSL 1111R. One credit. Offered fall and spring semesters.

1121S - Applied Lessons for Musical Theatre Majors/Euphonium
1 Credit
Continuation of MUSL 1111S. One credit. Offered fall and spring semesters.

1121T - Applied Lessons for Musical Theatre Majors/Tuba
1 Credit
Continuation of MUSL 1111T. One credit. Offered fall and spring semesters.

1121U - Applied Lessons for Musical Theatre Majors/Percussion
1 Credit
Continuation of MUSL 1111U. One credit. Offered fall and spring semesters.
1211A - Applied Lessons for Music Majors/Voice
2 Credits
Applied lessons in voice to prepare for the respective proficiency exams and recitals required in the Bachelor of Arts and Bachelor of Music degree programs. Two credits. Offered fall and spring semesters.

1211B - Applied Lessons for Music Majors/Piano
2 Credits
Applied lessons in piano to prepare for the respective proficiency exams and recitals required in the Bachelor of Arts and Bachelor of Music degree programs. Two credits. Offered fall and spring semesters.

1211C - Applied Lessons for Music Majors/Harpsichord
2 Credits
Applied lessons in harpsichord to prepare for the respective proficiency exams and recitals required in the Bachelor of Arts and Bachelor of Music degree programs. Two credits. Offered fall and spring semesters.

1211D - Applied Lessons for Music Majors/Organ
2 Credits
Applied lessons in organ to prepare for the respective proficiency exams and recitals required in the Bachelor of Arts and Bachelor of Music degree programs. Two credits. Offered fall and spring semesters.

1211E - Applied Lessons for Music Majors/Guitar
2 Credits
Applied lessons in guitar to prepare for the respective proficiency exams and recitals required in the Bachelor of Arts and Bachelor of Music degree programs. Two credits. Offered fall and spring semesters.

1211F - Applied Lessons for Music Majors/Harp
2 Credits
Applied lessons in harp to prepare for the respective proficiency exams and recitals required in the Bachelor of Arts and Bachelor of Music degree programs. Two credits. Offered fall and spring semesters.

1211G - Applied Lessons for Music Majors/Violin
2 Credits
Applied lessons in violin to prepare for the respective proficiency exams and recitals required in the Bachelor of Arts and Bachelor of Music degree programs. Two credits. Offered fall and spring semesters.

1211H - Applied Lessons for Music Majors/Viola
2 Credits
Applied lessons in viola to prepare for the respective proficiency exams and recitals required in the Bachelor of Arts and Bachelor of Music degree programs. Two credits. Offered fall and spring semesters.

1211I - Applied Lessons for Music Majors/Cello
2 Credits
Applied lessons in cello to prepare for the respective proficiency exams and recitals required in the Bachelor of Arts and Bachelor of Music degree programs. Two credits. Offered fall and spring semesters.

1211J - Applied Lessons for Music Majors/Double Bass
2 Credits
Applied lessons in double bass to prepare for the respective proficiency exams and recitals required in the Bachelor of Arts and Bachelor of Music degree programs. Two credits. Offered fall and spring semesters.

**1211K - Applied Lessons for Music Majors/Flute**
2 Credits
Applied lessons in flute to prepare for the respective proficiency exams and recitals required in the Bachelor of Arts and Bachelor of Music degree programs. Two credits. Offered fall and spring semesters.

**1211L - Applied Lessons for Music Majors/Oboe**
2 Credits
Applied lessons in oboe to prepare for the respective proficiency exams and recitals required in the Bachelor of Arts and Bachelor of Music degree programs. Two credits. Offered fall and spring semesters.

**1211M - Applied Lessons for Music Majors/Clarinet**
2 Credits
Applied lessons in clarinet to prepare for the respective proficiency exams and recitals required in the Bachelor of Arts and Bachelor of Music degree programs. Two credits. Offered fall and spring semesters.

**1211N - Applied Lessons for Music Majors/Bassoon**
2 Credits
Applied lessons in bassoon to prepare for the respective proficiency exams and recitals required in the Bachelor of Arts and Bachelor of Music degree programs. Two credits. Offered fall and spring semesters.

**1211O - Applied Lessons for Music Majors/Saxophone**
2 Credits
Applied lessons in saxophone to prepare for the respective proficiency exams and recitals required in the Bachelor of Arts and Bachelor of Music degree programs. Two credits. Offered fall and spring semesters.

**1211P - Applied Lessons for Music Majors/French Horn**
2 Credits
 Applied lessons in French horn to prepare for the respective proficiency exams and recitals required in the Bachelor of Arts and Bachelor of Music degree programs. Two credits. Offered fall and spring semesters.

**1211Q - Applied Lessons for Music Majors/Trumpet**
2 Credits
Applied lessons in trumpet to prepare for the respective proficiency exams and recitals required in the Bachelor of Arts and Bachelor of Music degree programs. Two credits. Offered fall and spring semesters.

**1211R - Applied Lessons for Music Majors/Trombone**
2 Credits
Applied lessons in trombone to prepare for the respective proficiency exams and recitals required in the Bachelor of Arts and Bachelor of Music degree programs. Two credits. Offered fall and spring semesters.

**1211S - Applied Lessons for Music Majors/Euphonium**
2 Credits
Applied lessons in euphonium to prepare for the respective proficiency exams and recitals required in the Bachelor of Arts and Bachelor of Music degree programs. Two credits. Offered fall and spring semesters.

1211T - Applied Lessons for Music Majors/Tuba
2 Credits
Applied lessons in tuba to prepare for the respective proficiency exams and recitals required in the Bachelor of Arts and Bachelor of Music degree programs. Two credits. Offered fall and spring semesters.

1211U - Applied Lessons for Music Majors/Percussion
2 Credits
Applied lessons in percussion to prepare for the respective proficiency exams and recitals required in the Bachelor of Arts and Bachelor of Music degree programs. Two credits. Offered fall and spring semesters.

1221A - Applied Lessons for Music Majors/Voice
2 Credits
Continuation of MUSL 1211A. Two credits. Offered fall and spring semesters.

1221B - Applied Lessons for Music Majors/Piano
2 Credits
Continuation of MUSL 1211B. Two credits. Offered fall and spring semesters.

1221C - Applied Lessons for Music Majors/Harpsichord
2 Credits
Continuation of MUSL 1211C. Two credits. Offered fall and spring semesters.

1221D - Applied Lessons for Music Majors/Organ
2 Credits
Continuation of MUSL 1211D. Two credits. Offered fall and spring semesters.

1221E - Applied Lessons for Music Majors/Guitar
2 Credits
Continuation of MUSL 1211E. Two credits. Offered fall and spring semesters.

1221F - Applied Lessons for Music Majors/Harp
2 Credits
Continuation of MUSL 1211F. Two credits. Offered fall and spring semesters.

1221G - Applied Lessons for Music Majors/Violin
2 Credits
Continuation of MUSL 1211G. Two credits. Offered fall and spring semesters.

1221H - Applied Lessons for Music Majors/Viola
2 Credits
Continuation of MUSL 1211H. Two credits. Offered fall and spring semesters.

1221I - Applied Lessons for Music Majors/Cello
Continuation of MUSL 1211I. Two credits. Offered fall and spring semesters.

**1221J - Applied Lessons for Music Majors/Double Bass**
2 Credits
Continuation of MUSL 1211J. Two credits. Offered fall and spring semesters.

**1221K - Applied Lessons for Music Majors/Flute**
2 Credits
Continuation of MUSL 1211K. Two credits. Offered fall and spring semesters.

**1221L - Applied Lessons for Music Majors/Oboe**
2 Credits
Continuation of MUSL 1211L. Two credits. Offered fall and spring semesters.

**1221M - Applied Lessons for Music Majors/Clarinet**
2 Credits
Continuation of MUSL 1211M. Two credits. Offered fall and spring semesters.

**1221N - Applied Lessons for Music Majors/Bassoon**
2 Credits
Continuation of MUSL 1211N. Two credits. Offered fall and spring semesters.

**1221O - Applied Lessons for Music Majors/Saxophone**
2 Credits
Continuation of MUSL 1211O. Two credits. Offered fall and spring semesters.

**1221P - Applied Lessons for Music Majors/French Horn**
2 Credits
Continuation of MUSL 1211P. Two credits. Offered fall and spring semesters.

**1221Q - Applied Lessons for Music Majors/Trumpet**
2 Credits
Continuation of MUSL 1211Q. Two credits. Offered fall and spring semesters.

**1221R - Applied Lessons for Music Majors/Trombone**
2 Credits
Continuation of MUSL 1211R. Two credits. Offered fall and spring semesters.

**1221S - Applied Lessons for Music Majors/Euphonium**
2 Credits
Continuation of MUSL 1211S. Two credits. Offered fall and spring semesters.

**1221T - Applied Lessons for Music Majors/Tuba**
2 Credits
Continuation of MUSL 1211T. Two credits. Offered fall and spring semesters.

**1221U - Applied Lessons for Music Majors/Percussion**
2 Credits
Continuation of MUSL 1211U. Two credits. Offered fall and spring semesters.

1391 - First Year Applied Proficiency Exam
0 Credits
Comprehensive juried performance exam on the major applied instrument assessing competency in technique, musicality, sight reading at the appropriate level of literature. Zero credit. Required to register for 2000 level study. Zero credit. May be repeated only once. Offered fall and spring semesters. This course may be repeated 1 time.

2011 - Piano Skills/Music Majors III
1 Credit
Continuation of MUSL 1021. One credit. Offered fall and spring semesters. Prerequisite(s): MUSL 1021 Minimum Grade of C

2021 - Piano Skills/Music Majors IV
1 Credit
Continuation of MUSL 2011. One credit. Offered fall and spring semesters. Prerequisite(s): MUSL 2011 Minimum Grade of C

2041 - Piano Proficiency Exam
0 Credits
Comprehensive piano exam preparing music majors for keyboard use in music careers. Skills include but are not limited to sight reading, harmonization, improvisation, transposition, repertoire, choral warm ups. Zero credit. Registration occurs after passage of exam. Offered fall and spring semesters. This course is repeatable 1 time.

2111A - Applied Lessons for Musical Theatre Majors/Voice
1 Credit
Continuation of MUSL 1121A. One credit. Offered fall and spring semesters.

2111B - Applied Lessons for Musical Theatre Majors/Piano
1 Credit
Continuation of MUSL 1121B. One credit. Offered fall and spring semesters.

2111C - Applied Lessons for Musical Theatre Majors/Harpsichord
1 Credit
Continuation of MUSL 1121C. One credit. Offered fall and spring semesters.

2111D - Applied Lessons for Musical Theatre Majors/Organ
1 Credit
Continuation of MUSL 1121D. One credit. Offered fall and spring semesters.

2111E - Applied Lessons for Musical Theatre Majors/Guitar
1 Credit
Continuation of MUSL 1121E. One credit. Offered fall and spring semesters.
2111F - Applied Lessons for Musical Theatre Majors/Harp
1 Credit
Continuation of MUSL 1121F. One credit. Offered fall and spring semesters.

2111G - Applied Lessons for Musical Theatre Majors/Violin
1 Credit
Continuation of MUSL 1121G. One credit. Offered fall and spring semesters.

2111H - Applied Lessons for Musical Theatre Majors/Viola
1 Credit
Continuation of MUSL 1121H. One credit. Offered fall and spring semesters.

2111I - Applied Lessons for Musical Theatre Majors/Cello
1 Credit
Continuation of MUSL 1121I. One credit. Offered fall and spring semesters.

2111J - Applied Lessons for Musical Theatre Majors/Double Bass
1 Credit
Continuation of MUSL 1121J. One credit. Offered fall and spring semesters.

2111K - Applied Lessons for Musical Theatre Majors/Flute
1 Credit
Continuation of MUSL 1121K. One credit. Offered fall and spring semesters.

2111L - Applied Lessons for Musical Theatre Majors/Oboe
1 Credit
Continuation of MUSL 1121L. One credit. Offered fall and spring semesters.

2111M - Applied Lessons for Musical Theatre Majors/Clarinet
1 Credit
Continuation of MUSL 1121M. One credit. Offered fall and spring semesters.

2111N - Applied Lessons for Musical Theatre Majors/Bassoon
1 Credit
Continuation of MUSL 1121N. One credit. Offered fall and spring semesters.

2111O - Applied Lessons for Musical Theatre Majors/Saxophone
1 Credit
Continuation of MUSL 1121O. One credit. Offered fall and spring semesters.

2111P - Applied Lessons for Musical Theatre Majors/French Horn
1 Credit
Continuation of MUSL 1121P. One credit. Offered fall and spring semesters.

2111Q - Applied Lessons for Musical Theatre Majors/Trumpet
1 Credit
Continuation of MUSL 1121Q. One credit. Offered fall and spring semesters.
2111R - Applied Lessons for Musical Theatre Majors/Trombone
1 Credit
Continuation of MUSL 1121R. One credit. Offered fall and spring semesters.

2111S - Applied Lessons for Musical Theatre Majors/Euphonium
1 Credit
Continuation of MUSL 1121S. One credit. Offered fall and spring semesters.

2111T - Applied Lessons for Musical Theatre Majors/Tuba
1 Credit
Continuation of MUSL 1121T. One credit. Offered fall and spring semesters.

2111U - Applied Lessons for Musical Theatre Majors/Percussion
1 Credit
Continuation of MUSL 1121U. One credit. Offered fall and spring semesters.

2121A - Applied Lessons for Musical Theatre Majors/Voice
1 Credit
Continuation of MUSL 2111A. One credit. Offered fall and spring semesters.

2121B - Applied Lessons for Musical Theatre Majors/Piano
1 Credit
Continuation of MUSL 2111B. One credit. Offered fall and spring semesters.

2121C - Applied Lessons for Musical Theatre Majors/Harpsichord
1 Credit
Continuation of MUSL 2111C. One credit. Offered fall and spring semesters.

2121D - Applied Lessons for Musical Theatre Majors/Organ
1 Credit
Continuation of MUSL 2111D. One credit. Offered fall and spring semesters.

2121E - Applied Lessons for Musical Theatre Majors/Guitar
1 Credit
Continuation of MUSL 2111E. One credit. Offered fall and spring semesters.

2121F - Applied Lessons for Musical Theatre Majors/Harp
1 Credit
Continuation of MUSL 2111F. One credit. Offered fall and spring semesters.

2121G - Applied Lessons for Musical Theatre Majors/Violin
1 Credit
Continuation of MUSL 2111G. One credit. Offered fall and spring semesters.

2121H - Applied Lessons for Musical Theatre Majors/Viola
1 Credit
Continuation of MUSL 2111H. One credit. Offered fall and spring semesters.
2121I - Applied Lessons for Musical Theatre Majors/Cello
1 Credit
Continuation of MUSL 2111I. One credit. Offered fall and spring semesters.

2121J - Applied Lessons for Musical Theatre Majors/Double Bass
1 Credit
Continuation of MUSL 2111J. One credit. Offered fall and spring semesters.

2121K - Applied Lessons for Musical Theatre Majors/Flute
1 Credit
Continuation of MUSL 2111K. One credit. Offered fall and spring semesters.

2121L - Applied Lessons for Musical Theatre Majors/Oboe
1 Credit
Continuation of MUSL 2111L. One credit. Offered fall and spring semesters.

2121M - Applied Lessons for Musical Theatre Majors/Clarinet
1 Credit
Continuation of MUSL 2111M. One credit. Offered fall and spring semesters.

2121N - Applied Lessons for Musical Theatre Majors/Bassoon
1 Credit
Continuation of MUSL 2111N. One credit. Offered fall and spring semesters.

2121O - Applied Lessons for Musical Theatre Majors/Saxophone
1 Credit
Continuation of MUSL 2111O. One credit. Offered fall and spring semesters.

2121P - Applied Lessons for Musical Theatre Majors/French Horn
1 Credit
Continuation of MUSL 2111P. One credit. Offered fall and spring semesters.

2121Q - Applied Lessons for Musical Theatre Majors/Trumpet
1 Credit
Continuation of MUSL 2111Q. One credit. Offered fall and spring semesters.

2121R - Applied Lessons for Musical Theatre Majors/Trombone
1 Credit
Continuation of MUSL 2111R. One credit. Offered fall and spring semesters.

2121S - Applied Lessons for Musical Theatre Majors/Euphonium
1 Credit
Continuation of MUSL 2111S. One credit. Offered fall and spring semesters.

2121T - Applied Lessons for Musical Theatre Majors/Tuba
1 Credit
Continuation of MUSL 2111T. One credit. Offered fall and spring semesters.
2121U - Applied Lessons for Musical Theatre Majors/Percussion  
1 Credit  
Continuation of MUSL 2111U. One credit. Offered fall and spring semesters.

2211A - Applied Lessons for Music Majors/Voice  
2 Credits  
Continuation of MUSL 1221A. Two credits. Offered fall and spring semesters.

2211B - Applied Lessons for Music Majors/Piano  
2 Credits  
Continuation of MUSL 1221B. Two credits. Offered fall and spring semesters.

2211C - Applied Lessons for Music Majors/Harpsichord  
2 Credits  
Continuation of MUSL 1221C. Two credits. Offered fall and spring semesters.

2211D - Applied Lessons for Music Majors/Organ  
2 Credits  
Continuation of MUSL 1221D. Two credits. Offered fall and spring semesters.

2211E - Applied Lessons for Music Majors/Guitar  
2 Credits  
Continuation of MUSL 1221E. Two credits. Offered fall and spring semesters.

2211F - Applied Lessons for Music Majors/Harp  
2 Credits  
Continuation of MUSL 1221F. Two credits. Offered fall and spring semesters.

2211G - Applied Lessons for Music Majors/Violin  
2 Credits  
Continuation of MUSL 1221G. Two credits. Offered fall and spring semesters.

2211H - Applied Lessons for Music Majors/Viola  
2 Credits  
Continuation of MUSL 1221H. Two credits. Offered fall and spring semesters.

2211I - Applied Lessons for Music Majors/Cello  
2 Credits  
Continuation of MUSL 1221I. Two credits. Offered fall and spring semesters.

2211J - Applied Lessons for Music Majors/Double Bass  
2 Credits  
Continuation of MUSL 1221J. Two credits. Offered fall and spring semesters.

2211K - Applied Lessons for Music Majors/Flute  
2 Credits  
Continuation of MUSL 1221K. Two credits. Offered fall and spring semesters.
2211L - Applied Lessons for Music Majors/Oboe
2 Credits
Continuation of MUSL 1221L. Two credits. Offered fall and spring semesters.

2211M - Applied Lessons for Music Majors/Clarinet
2 Credits
Continuation of MUSL 1221M. Two credits. Offered fall and spring semesters.

2211N - Applied Lessons for Music Majors/Bassoon
2 Credits
Continuation of MUSL 1221N. Two credits. Offered fall and spring semesters.

2211O - Applied Lessons for Music Majors/Saxophone
2 Credits
Continuation of MUSL 1221O. Two credits. Offered fall and spring semesters.

2211P - Applied Lessons for Music Majors/French Horn
2 Credits
Continuation of MUSL 1221P. Two credits. Offered fall and spring semesters.

2211Q - Applied Lessons for Music Majors/Trumpet
2 Credits
Continuation of MUSL 1221Q. Two credits. Offered fall and spring semesters.

2211R - Applied Lessons for Music Majors/Trombone
2 Credits
Continuation of MUSL 1221R. Two credits. Offered fall and spring semesters.

2211S - Applied Lessons for Music Majors/Euphonium
2 Credits
Continuation of MUSL 1221S. Two credits. Offered fall and spring semesters.

2211T - Applied Lessons for Music Majors/Tuba
2 Credits
Continuation of MUSL 1221T. Two credits. Offered fall and spring semesters.

2211U - Applied Lessons for Music Majors/Percussion
2 Credits
Continuation of MUSL 1221U. Two credits. Offered fall and spring semesters.

2221A - Applied Lessons for Music Majors/Voice
2 Credits
Continuation of MUSL 2211A. Two credits. Offered fall and spring semesters.

2221B - Applied Lessons for Music Majors/Piano
2 Credits
Continuation of MUSL 2211B. Two credits. Offered fall and spring semesters.
2221C - Applied Lessons for Music Majors/Harpsichord
2 Credits
Continuation of MUSL 2211C. Two credits. Offered fall and spring semesters.

2221D - Applied Lessons for Music Majors/Organ
2 Credits
Continuation of MUSL 2211D. Two credits. Offered fall and spring semesters.

2221E - Applied Lessons for Music Majors/Guitar
2 Credits
Continuation of MUSL 2211E. Two credits. Offered fall and spring semesters.

2221F - Applied Lessons for Music Majors/Harp
2 Credits
Continuation of MUSL 2211F. Two credits. Offered fall and spring semesters.

2221G - Applied Lessons for Music Majors/Violin
2 Credits
Continuation of MUSL 2211G. Two credits. Offered fall and spring semesters.

2221H - Applied Lessons for Music Majors/Viola
2 Credits
Continuation of MUSL 2211H. Two credits. Offered fall and spring semesters.

2221I - Applied Lessons for Music Majors/Cello
2 Credits
Continuation of MUSL 2211I. Two credits. Offered fall and spring semesters.

2221J - Applied Lessons for Music Majors/Double Bass
2 Credits
Continuation of MUSL 2211J. Two credits. Offered fall and spring semesters.

2221K - Applied Lessons for Music Majors/Flute
2 Credits
Continuation of MUSL 2211K. Two credits. Offered fall and spring semesters.

2221L - Applied Lessons for Music Majors/Oboe
2 Credits
Continuation of MUSL 2211L. Two credits. Offered fall and spring semesters.

2221M - Applied Lessons for Music Majors/Clarinet
2 Credits
Continuation of MUSL 2211M. Two credits. Offered fall and spring semesters.

2221N - Applied Lessons for Music Majors/Bassoon
2 Credits
Continuation of MUSL 2211N. Two credits. Offered fall and spring semesters.
2221O - Applied Lessons for Music Majors/Saxophone
2 Credits
Continuation of MUSL 2211O. Two credits. Offered fall and spring semesters.

2221P - Applied Lessons for Music Majors/French Horn
2 Credits
Continuation of MUSL 2211P. Two credits. Offered fall and spring semesters.

2221Q - Applied Lessons for Music Majors/Trumpet
2 Credits
Continuation of MUSL 2211Q. Two credits. Offered fall and spring semesters.

2221R - Applied Lessons for Music Majors/Trombone
2 Credits
Continuation of MUSL 2211R. Two credits. Offered fall and spring semesters.

2221S - Applied Lessons for Music Majors/Euphonium
2 Credits
Continuation of MUSL 2211S. Two credits. Offered fall and spring semesters.

2221T - Applied Lessons for Music Majors/Tuba
2 Credits
Continuation of MUSL 2211T. Two credits. Offered fall and spring semesters.

2221U - Applied Lessons for Music Majors/Percussion
2 Credits
Continuation of MUSL 2211U. Two credits. Offered fall and spring semesters.

2391 - Second Year Applied Proficiency Exam
0 Credits
Comprehensive juried performance exam on the major applied instrument assessing competency in technique, musicality, sight reading at the appropriate level of literature. Required to register for 3000 level study. Zero credit. Offered fall and spring semesters. This course may be repeated 1 time.

3111A - Applied Lessons for Musical Theatre Majors/Voice
1 Credit
Continuation of MUSL 2121A. One credit. Formerly APMU 225. Offered fall and spring semesters.

3111B - Applied Lessons for Musical Theatre Majors/Piano
1 Credit
Continuation of MUSL 2121B. One credit. Formerly APMU 225. Offered fall and spring semesters.

3111C - Applied Lessons for Musical Theatre Majors/Harpsichord
1 Credit
Continuation of MUSL 2121C. One credit. Formerly APMU 225. Offered fall and spring semesters.

3111D - Applied Lessons for Musical Theatre Majors/Organ
1 Credit
Continuation of MUSL 2121D. One credit. Formerly APMU 225. Offered fall and spring semesters.

3111E - Applied Lessons for Musical Theatre Majors/Guitar
1 Credit
Continuation of MUSL 2121E. One credit. Formerly APMU 225. Offered fall and spring semesters.

3111F - Applied Lessons for Musical Theatre Majors/Harp
1 Credit
Continuation of MUSL 2121F. One credit. Formerly APMU 225. Offered fall and spring semesters.

3111G - Applied Lessons for Musical Theatre Majors/Violin
1 Credit
Continuation of MUSL 2121G. One credit. Formerly APMU 225. Offered fall and spring semesters.

3111H - Applied Lessons for Musical Theatre Majors/Viola
1 Credit
Continuation of MUSL 2121H. One credit. Formerly APMU 225. Offered fall and spring semesters.

3111I - Applied Lessons for Musical Theatre Majors/Cello
1 Credit
Continuation of MUSL 2121I. One credit. Formerly APMU 225. Offered fall and spring semesters.

3111J - Applied Lessons for Musical Theatre Majors/Double Bass
1 Credit
Continuation of MUSL 2121J. One credit. Formerly APMU 225. Offered fall and spring semesters.

3111K - Applied Lessons for Musical Theatre Majors/Flute
1 Credit
Continuation of MUSL 2121K. One credit. Formerly APMU 225. Offered fall and spring semesters.

3111L - Applied Lessons for Musical Theatre Majors/Oboe
1 Credit
Continuation of MUSL 2121L. One credit. Formerly APMU 225. Offered fall and spring semesters.

3111M - Applied Lessons for Musical Theatre Majors/Clarinet
1 Credit
Continuation of MUSL 2121M. One credit. Formerly APMU 225. Offered fall and spring semesters.

3111N - Applied Lessons for Musical Theatre Majors/Bassoon
1 Credit
Continuation of MUSL 2121N. One credit. Formerly APMU 225. Offered fall and spring semesters.

3111O - Applied Lessons for Musical Theatre Majors/Saxophone
1 Credit
Continuation of MUSL 2121O. One credit. Formerly APMU 225. Offered fall and spring semesters.

3111P - Applied Lessons for Musical Theatre Majors/French Horn
1 Credit
Continuation of MUSL 2121P. One credit. Formerly APMU 225. Offered fall and spring semesters.

3111Q - Applied Lessons for Musical Theatre Majors/Trumpet
1 Credit
Continuation of MUSL 2121Q. One credit. Formerly APMU 225. Offered fall and spring semesters.

3111R - Applied Lessons for Musical Theatre Majors/Trombone
1 Credit
Continuation of MUSL 2121R. One credit. Formerly APMU 225. Offered fall and spring semesters.

3111S - Applied Lessons for Musical Theatre Majors/Euphonium
1 Credit
Continuation of MUSL 2121S. One credit. Formerly APMU 225. Offered fall and spring semesters.

3111T - Applied Lessons for Musical Theatre Majors/Tuba
1 Credit
Continuation of MUSL 2121T. One credit. Formerly APMU 225. Offered fall and spring semesters.

3111U - Applied Lessons for Musical Theatre Majors/Percussion
1 Credit
Continuation of MUSL 2121U. One credit. Formerly APMU 225. Offered fall and spring semesters.

3121A - Applied Lessons for Musical Theatre Majors/Voice
1 Credit
Continuation of MUSL 3111A. One credit. Formerly APMU 225. Offered fall and spring semesters.

3121B - Applied Lessons for Musical Theatre Majors/Piano
1 Credit
Continuation of MUSL 3111B. One credit. Formerly APMU 225. Offered fall and spring semesters.

3121C - Applied Lessons for Musical Theatre Majors/Harpsichord
1 Credit
Continuation of MUSL 3111C. One credit. Formerly APMU 225. Offered fall and spring semesters.

3121D - Applied Lessons for Musical Theatre Majors/Organ
1 Credit
Continuation of MUSL 3111D. One credit. Formerly APMU 225. Offered fall and spring semesters.

3121E - Applied Lessons for Musical Theatre Majors/Guitar
1 Credit
Continuation of MUSL 3111E. One credit. Formerly APMU 225. Offered fall and spring semesters.

3121F - Applied Lessons for Musical Theatre Majors/Harp
1 Credit
Continuation of MUSL 3111F. One credit. Formerly APMU 225. Offered fall and spring semesters.

3121G - Applied Lessons for Musical Theatre Majors/Violin
1 Credit
Continuation of MUSL 311G. One credit. Formerly APMU 225. Offered fall and spring semesters.

### 3121H - Applied Lessons for Musical Theatre Majors/Viola
1 Credit
Continuation of MUSL 3111H. One credit. Formerly APMU 225. Offered fall and spring semesters.

### 3121I - Applied Lessons for Musical Theatre Majors/Cello
1 Credit
Continuation of MUSL 3111I. One credit. Formerly APMU 225. Offered fall and spring semesters.

### 3121J - Applied Lessons for Musical Theatre Majors/Double Bass
1 Credit
Continuation of MUSL 3111J. One credit. Formerly APMU 225. Offered fall and spring semesters.

### 3121K - Applied Lessons for Musical Theatre Majors/Flute
1 Credit
Continuation of MUSL 3111K. One credit. Formerly APMU 225. Offered fall and spring semesters.

### 3121L - Applied Lessons for Musical Theatre Majors/Oboe
1 Credit
Continuation of MUSL 3111L. One credit. Formerly APMU 225. Offered fall and spring semesters.

### 3121M - Applied Lessons for Musical Theatre Majors/Clarinet
1 Credit
Continuation of MUSL 3111M. One credit. Formerly APMU 225. Offered fall and spring semesters.

### 3121N - Applied Lessons for Musical Theatre Majors/Bassoon
1 Credit
Continuation of MUSL 3111N. One credit. Formerly APMU 225. Offered fall and spring semesters.

### 3121O - Applied Lessons for Musical Theatre Majors/Saxophone
1 Credit
Continuation of MUSL 3111O. One credit. Formerly APMU 225. Offered fall and spring semesters.

### 3121P - Applied Lessons for Musical Theatre Majors/French Horn
1 Credit
Continuation of MUSL 3111P. One credit. Formerly APMU 225. Offered fall and spring semesters.

### 3121Q - Applied Lessons for Musical Theatre Majors/Trumpet
1 Credit
Continuation of MUSL 3111Q. One credit. Formerly APMU 225. Offered fall and spring semesters.

### 3121R - Applied Lessons for Musical Theatre Majors/Trombone
1 Credit
Continuation of MUSL 3111R. One credit. Formerly APMU 225. Offered fall and spring semesters.

### 3121S - Applied Lessons for Musical Theatre Majors/Euphonium
1 Credit
Continuation of MUSL 3111S. One credit. Formerly APMU 225. Offered fall and spring semesters.

3121T - Applied Lessons for Musical Theatre Majors/Tuba
1 Credit
Continuation of MUSL 3111T. One credit. Formerly APMU 225. Offered fall and spring semesters.

3121U - Applied Lessons for Musical Theatre Majors/Percussion
1 Credit
Continuation of MUSL 3111U. One credit. Formerly APMU 225. Offered fall and spring semesters.

3211A - Applied Lessons for Music Majors/Voice
2 to 3 Credits
Continuation of MUSL 2221A. Two-three credits. Offered fall and spring semesters.

3211B - Applied Lessons for Music Majors/Piano
2 to 3 Credits
Continuation of MUSL 2221B. Two-three credits. Offered fall and spring semesters.

3211C - Applied Lessons for Music Majors/Harpsichord
2 to 3 Credits
Continuation of MUSL 2221C. Two-three credits. Offered fall and spring semesters.

3211D - Applied Lessons for Music Majors/Organ
2 to 3 Credits
Continuation of MUSL 2221D. Two-three credits. Offered fall and spring semesters.

3211E - Applied Lessons for Music Majors/Guitar
2 to 3 Credits
Continuation of MUSL 2221E. Two-three credits. Offered fall and spring semesters.

3211F - Applied Lessons for Music Majors/Harp
2 to 3 Credits
Continuation of MUSL 2221F. Two-three credits. Offered fall and spring semesters.

3211G - Applied Lessons for Music Majors/Violin
2 to 3 Credits
Continuation of MUSL 2221G. Two-three credits. Offered fall and spring semesters.

3211H - Applied Lessons for Music Majors/Viola
2 to 3 Credits
Continuation of MUSL 2221H. Two-three credits. Offered fall and spring semesters.

3211I - Applied Lessons for Music Majors/Cello
2 to 3 Credits
Continuation of MUSL 2221I. Two-three credits. Offered fall and spring semesters.

3211J - Applied Lessons for Music Majors/Double Bass
2 to 3 Credits
Continuation of MUSL 2221J. Two-three credits. Offered fall and spring semesters.

3211K - Applied Lessons for Music Majors/Flute
2 to 3 Credits
Continuation of MUSL 2221K. Two-three credits. Offered fall and spring semesters.

3211L - Applied Lessons for Music Majors/Oboe
2 to 3 Credits
Continuation of MUSL 2221L. Two-three credits. Offered fall and spring semesters.

3211M - Applied Lessons for Music Majors/Clarinet
2 to 3 Credits
Continuation of MUSL 2221M. Two-three credits. Offered fall and spring semesters.

3211N - Applied Lessons for Music Majors/Bassoon
2 to 3 Credits
Continuation of MUSL 2221N. Two-three credits. Offered fall and spring semesters.

3211O - Applied Lessons for Music Majors/Saxophone
2 to 3 Credits
Continuation of MUSL 2221O. Two-three credits. Offered fall and spring semesters.

3211P - Applied Lessons for Music Majors/French Horn
2 to 3 Credits
Continuation of MUSL 2221P. Two-three credits. Offered fall and spring semesters.

3211Q - Applied Lessons for Music Majors/Trumpet
2 to 3 Credits
Continuation of MUSL 2221Q. Two-three credits. Offered fall and spring semesters.

3211R - Applied Lessons for Music Majors/Trombone
2 to 3 Credits
Continuation of MUSL 2221R. Two-three credits. Offered fall and spring semesters.

3211S - Applied Lessons for Music Majors/Euphonium
2 to 3 Credits
Continuation of MUSL 2221S. Two-three credits. Offered fall and spring semesters.

3211T - Applied Lessons for Music Majors/Tuba
2 to 3 Credits
Continuation of MUSL 2221T. Two-three credits. Offered fall and spring semesters.

3211U - Applied Lessons for Music Majors/Percussion
2 to 3 Credits
Continuation of MUSL 2221U. Two-three credits. Offered fall and spring semesters.

3221A - Applied Lessons for Music Majors/Voice
2 to 3 Credits
Continuation of MUSL 3211A. Two-three credits. Offered fall and spring semesters.

3221B - Applied Lessons for Music Majors/Piano
2 to 3 Credits
Continuation of MUSL 3211B. Two-three credits. Offered fall and spring semesters.

3221C - Applied Lessons for Music Majors/Harpsichord
2 to 3 Credits
Continuation of MUSL 3211C. Two-three credits. Offered fall and spring semesters.

3221D - Applied Lessons for Music Majors/Organ
2 to 3 Credits
Continuation of MUSL 3211D. Two-three credits. Offered fall and spring semesters.

3221E - Applied Lessons for Music Majors/Guitar
2 to 3 Credits
Continuation of MUSL 3211E. Two-three credits. Offered fall and spring semesters.

3221F - Applied Lessons for Music Majors/Harp
2 to 3 Credits
Continuation of MUSL 3211F. Two-three credits. Offered fall and spring semesters.

3221G - Applied Lessons for Music Majors/Violin
2 to 3 Credits
Continuation of MUSL 3211G. Two-three credits. Offered fall and spring semesters.

3221H - Applied Lessons for Music Majors/Viola
2 to 3 Credits
Continuation of MUSL 3211H. Two-three credits. Offered fall and spring semesters.

3221I - Applied Lessons for Music Majors/Cello
2 to 3 Credits
Continuation of MUSL 3211I. Two-three credits. Offered fall and spring semesters.

3221J - Applied Lessons for Music Majors/Double Bass
2 to 3 Credits
Continuation of MUSL 3211J. Two-three credits. Offered fall and spring semesters.

3221K - Applied Lessons for Music Majors/Flute
2 to 3 Credits
Continuation of MUSL 3211K. Two-three credits. Offered fall and spring semesters.

3221L - Applied Lessons for Music Majors/Oboe
2 to 3 Credits
Continuation of MUSL 3211L. Two-three credits. Offered fall and spring semesters.

3221M - Applied Lessons for Music Majors/Clarinet
2 to 3 Credits
Continuation of MUSL 3211M. Two-three credits. Offered fall and spring semesters.

3221N - Applied Lessons for Music Majors/Bassoon
2 to 3 Credits
Continuation of MUSL 3211N. Two-three credits. Offered fall and spring semesters.

3221O - Applied Lessons for Music Majors/Saxophone
2 to 3 Credits
Continuation of MUSL 3211O. Two-three credits. Offered fall and spring semesters.

3221P - Applied Lessons for Music Majors/French Horn
2 to 3 Credits
Continuation of MUSL 3211P. Two-three credits. Offered fall and spring semesters.

3221Q - Applied Lessons for Music Majors/Trumpet
2 to 3 Credits
Continuation of MUSL 3211Q. Two-three credits. Offered fall and spring semesters.

3221R - Applied Lessons for Music Majors/Trombone
2 to 3 Credits
Continuation of MUSL 3211R. Two-three credits. Offered fall and spring semesters.

3221S - Applied Lessons for Music Majors/Euphonium
2 to 3 Credits
Continuation of MUSL 3211S. Two-three credits. Offered fall and spring semesters.

3221T - Applied Lessons for Music Majors/Tuba
2 to 3 Credits
Continuation of MUSL 3211T. Two-three credits. Offered fall and spring semesters.

3221U - Applied Lessons for Music Majors/Percussion
2 to 3 Credits
Continuation of MUSL 3211U. Two-three credits. Offered fall and spring semesters.

3301 - Half Recital
0 Credits
Recital 30 minutes in length given typically in the fourth year of study. Zero credit. Required for music education majors. Offered fall and spring semesters.

3311 - Junior Recital
1 Credit
Full length (60 minutes) recital in the third year of study. One credit. Required for performance majors. Offered fall and spring semesters.

4211A - Applied Lessons for Music Majors/Voice
2 to 3 Credits
Continuation of MUSL 3221A. Two-three credits. Offered fall and spring semesters.
4211B - Applied Lessons for Music Majors/Piano
2 to 3 Credits
Continuation of MUSL 3221B. Two-three credits. Offered fall and spring semesters.

4211C - Applied Lessons for Music Majors/Harpsichord
2 to 3 Credits
Continuation of MUSL 3221C. Two-three credits. Offered fall and spring semesters.

4211D - Applied Lessons for Music Majors/Organ
2 to 3 Credits
Continuation of MUSL 3221D. Two-three credits. Offered fall and spring semesters.

4211E - Applied Lessons for Music Majors/Guitar
2 to 3 Credits
Continuation of MUSL 3221E. Two-three credits. Offered fall and spring semesters.

4211F - Applied Lessons for Music Majors/Harp
2 to 3 Credits
Continuation of MUSL 3221F. Two-three credits. Offered fall and spring semesters.

4211G - Applied Lessons for Music Majors/Violin
2 to 3 Credits
Continuation of MUSL 3221G. Two-three credits. Offered fall and spring semesters.

4211H - Applied Lessons for Music Majors/Viola
2 to 3 Credits
Continuation of MUSL 3221H. Two-three credits. Offered fall and spring semesters.

4211I - Applied Lessons for Music Majors/Cello
2 to 3 Credits
Continuation of MUSL 3221I. Two-three credits. Offered fall and spring semesters.

4211J - Applied Lessons for Music Majors/Double Bass
2 to 3 Credits
Continuation of MUSL 3221J. Two-three credits. Offered fall and spring semesters.

4211K - Applied Lessons for Music Majors/Flute
2 to 3 Credits
Continuation of MUSL 3221K. Two-three credits. Offered fall and spring semesters.

4211L - Applied Lessons for Music Majors/Oboe
2 to 3 Credits
Continuation of MUSL 3221L. Two-three credits. Offered fall and spring semesters.

4211M - Applied Lessons for Music Majors/Clarinet
2 to 3 Credits
Continuation of MUSL 3221M. Two-three credits. Offered fall and spring semesters.
4211N - Applied Lessons for Music Majors/Bassoon
2 to 3 Credits
Continuation of MUSL 3221N. Two-three credits. Offered fall and spring semesters.

4211O - Applied Lessons for Music Majors/Saxophone
2 to 3 Credits
Continuation of MUSL 3221O. Two-three credits. Offered fall and spring semesters.

4211P - Applied Lessons for Music Majors/French Horn
2 to 3 Credits
Continuation of MUSL 3221P. Two-three credits. Offered fall and spring semesters.

4211Q - Applied Lessons for Music Majors/Trumpet
2 to 3 Credits
Continuation of MUSL 3221Q. Two-three credits. Offered fall and spring semesters.

4211R - Applied Lessons for Music Majors/Trombone
2 to 3 Credits
Continuation of MUSL 3221R. Two-three credits. Offered fall and spring semesters.

4211S - Applied Lessons for Music Majors/Euphonium
2 to 3 Credits
Continuation of MUSL 3221S. Two-three credits. Offered fall and spring semesters.

4211T - Applied Lessons for Music Majors/Tuba
2 to 3 Credits
Continuation of MUSL 3221T. Two-three credits. Offered fall and spring semesters.

4211U - Applied Lessons for Music Majors/Percussion
2 to 3 Credits
Continuation of MUSL 3221U. Two-three credits. Offered fall and spring semesters.

4221A - Applied Lessons for Music Majors/Voice
2 to 3 Credits
Continuation of MUSL 4211A. Two-three credits. Offered fall and spring semesters.

4221B - Applied Lessons for Music Majors/Piano
2 to 3 Credits
Continuation of MUSL 4211B. Two-three credits. Offered fall and spring semesters.

4221C - Applied Lessons for Music Majors/Harpsichord
2 to 3 Credits
Continuation of MUSL 4211C. Two-three credits. Offered fall and spring semesters.

4221D - Applied Lessons for Music Majors/Organ
2 to 3 Credits
Continuation of MUSL 4211D. Two-three credits. Offered fall and spring semesters.
4221E - Applied Lessons for Music Majors/Guitar
2 to 3 Credits
Continuation of MUSL 4211E. Two-three credits. Offered fall and spring semesters.

4221F - Applied Lessons for Music Majors/Harp
2 to 3 Credits
Continuation of MUSL 4211F. Two-three credits. Offered fall and spring semesters.

4221G - Applied Lessons for Music Majors/Violin
2 to 3 Credits
Continuation of MUSL 4211G. Two-three credits. Offered fall and spring semesters.

4221H - Applied Lessons for Music Majors/Viola
2 to 3 Credits
Continuation of MUSL 4211H. Two-three credits. Offered fall and spring semesters.

4221I - Applied Lessons for Music Majors/Cello
2 to 3 Credits
Continuation of MUSL 4211I. Two-three credits. Offered fall and spring semesters.

4221J - Applied Lessons for Music Majors/Double Bass
2 to 3 Credits
Continuation of MUSL 4211J. Two-three credits. Offered fall and spring semesters.

4221K - Applied Lessons for Music Majors/Flute
2 to 3 Credits
Continuation of MUSL 4211K. Two-three credits. Offered fall and spring semesters.

4221L - Applied Lessons for Music Majors/Oboe
2 to 3 Credits
Continuation of MUSL 4211L. Two-three credits. Offered fall and spring semesters.

4221M - Applied Lessons for Music Majors/Clarinet
2 to 3 Credits
Continuation of MUSL 4211M. Two-three credits. Offered fall and spring semesters.

4221N - Applied Lessons for Music Majors/Bassoon
2 to 3 Credits
Continuation of MUSL 4211N. Two-three credits. Offered fall and spring semesters.

4221O - Applied Lessons for Music Majors/Saxophone
2 to 3 Credits
Continuation of MUSL 4211O. Two-three credits. Offered fall and spring semesters.

4221P - Applied Lessons for Music Majors/French Horn
2 to 3 Credits
Continuation of MUSL 4211P. Two-three credits. Offered fall and spring semesters.
4221Q - Applied Lessons for Music Majors/Trumpet
2 to 3 Credits
Continuation of MUSL 4211Q. Two-three credits. Offered fall and spring semesters.

4221R - Applied Lessons for Music Majors/Trombone
2 to 3 Credits
Continuation of MUSL 4211R. Two-three credits. Offered fall and spring semesters.

4221S - Applied Lessons for Music Majors/Euphonium
2 to 3 Credits
Continuation of MUSL 4211S. Two-three credits. Offered fall and spring semesters.

4221T - Applied Lessons for Music Majors/Tuba
2 to 3 Credits
Continuation of MUSL 4211T. Two-three credits. Offered fall and spring semesters.

4221U - Applied Lessons for Music Majors/Percussion
2 to 3 Credits
Continuation of MUSL 4211U. Two-three credits. Offered fall and spring semesters.

4311 - Senior Recital
1 Credit
Full length (60 minutes) recital in the fourth year of study. One credit. Required for performance majors. Offered fall and spring semesters.

Department of Nursing

Subject - Nursing (NURS)

1101 - Professional Concepts
1 Credit
An entry level course that introduces students to concepts, theories and issues relevant to the nursing profession. The dynamics of the evolving role of nursing professional ethics and selected historical events and figures are discussed. Introduces conceptual framework of the nursing curriculum. Enrollment is restricted to nursing majors. Offered spring semester. Must be enrolled in one of the following Fields of Study: Nursing.

2101 - Physical Assessment (2+3+0)
3 Credits
Aspects of routine well-adult health assessment and physical examination are presented and demonstrated. Nursing techniques of inspection, palpation, percussion and auscultation are demonstrated and practiced. Emphasis is placed on differentiating normal from abnormal findings. Therapeutic communication techniques and caring behaviors are integrated with assessment skills. Enrollment is restricted to nursing majors. A lab fee is charged. Offered fall semester. Prerequisite(s): (
NURS 1101 Minimum Grade of C and BIOL 2311 Minimum Grade of C and CHEM 1201 Minimum Grade of C) Corequisite(s): BIOL 2321. Must be enrolled in one of the following Fields of Study: Nursing.

2201 - Pathophysiology
3 Credits
The basis of human diseases and disorders and the interaction of environmental, biological, behavioral, and pharmacologic consequences to the disease process. Microbiological concepts applied to the understanding of normal and pathological body processes. Emphasis on the effects of degenerative, metabolic and neoplastic diseases and disorders occurring in the following body systems: immunologic, nervous, hematologic, cardiovascular, respiratory, endocrine, gastrointestinal, reproductive, skeletal, integumentary and special senses. Offered spring semester. Prerequisite(s): (NURS 2101 Minimum Grade of C and BIOL 2321 Minimum Grade of C). Corequisite(s): NURS 2301 and NURS 2501. Must be enrolled in one of the following Fields of Study: Nursing.

2301 - Fundamentals of Nursing (3+3+8)
6 Credits
Foundation of fundamental nursing skills and related concepts basic to safe clinical practice. Concepts will be applied to nursing care in selected settings. Application of the nursing process for beginning clinical practice will be emphasized. Documentation, use of concept maps, health adaptation, teaching, learning and therapeutic communication are emphasized to promote development of nursing judgment. Basic concepts of drug therapy are introduced. Evidence based practice is explored in the clinical experience. Enrollment is restricted to nursing majors. Offered spring semester. Prerequisite(s): (NURS 2101 Minimum Grade of C and BIOL 2321 Minimum Grade of C). Corequisite(s): BIOL 2151, NURS 2201, NURS 2501. Must be enrolled in one of the following Fields of Study: Nursing.

2501 - Pharmacology
3 Credits
Principles of pharmacology including pharmacokinetics, pharmacodynamics, drug interactions, common side effects and the misuse of medications. Selected drug classifications related to the neurological, circulatory, respiratory, endocrine, immune, gastrointestinal and urinary systems and processes. Offered spring semester. Prerequisite(s): (NURS 2101 Minimum Grade of C and BIOL 2321 Minimum Grade of C). Corequisite(s): NURS 2201, NURS 2301. Must be enrolled in one of the following Fields of Study: Nursing.

3001 - Mental Health Nursing (2+0+4)
3 Credits
The acquisition and application of new knowledge of mental health nursing. The use of the nursing process with clients experiencing mental health alterations in selected care environments. Gain skill and refine therapeutic communication techniques and work with clients and family members in promoting therapeutic interpersonal relationships. Evidence based practice is applied in this clinical experience. Offered spring semester. Prerequisite(s): (NURS 3101 Minimum Grade of C and NURS 3301 Minimum Grade of C and NURS 3601 Minimum Grade of C). Corequisite(s): NURS 3351 NURS 3501. Must be enrolled in one of the following Fields of Study: Nursing.

3011 - Foundations of the Discipline for the Registered Nurse
2 Credits
Aspects of historical, philosophical, theoretical and social influences on the science and professional practice of nursing is presented and examined. The conceptual framework of the nursing curriculum is
introduced. Enrollment restricted to RN-BSN Completion students. Offered in Term 1. Corequisite(s): NURS 3021, NURS 3061. Must be enrolled in one of the following Fields of Study: Nursing.

3021 - Physical Assessment for the Registered Nurse
3 Credits
Aspects of routine well-adult health assessment and physical examination are presented and demonstrated for the registered nurse student. Nursing techniques of inspection, palpation, percussion and auscultation are demonstrated and practiced. Emphasis is placed on differentiating normal from abnormal findings. Therapeutic communication techniques and caring behaviors are integrated with assessment skills. Enrollment restricted to RN-BSN Completion students. Offered in Term 1. Corequisite(s): NURS 3011, NURS 3061. Must be enrolled in one of the following Fields of Study: Nursing.

3051 - Leadership and Management in Nursing Care for the Registered Nurse
2 Credits
For the professional practice nurse and focuses on leadership and management theory/principles related to contemporary nursing trends and emphasizes practice applications. Emphasis will be placed on the coordination of nursing services and care management in relation to client/patient care, peers, superiors, or subordinates. Enrollment is restricted to RN-BSN Completion students. Offered in Term 2. Prerequisite(s): (NURS 3011 Minimum Grade of C and NURS 3021 Minimum Grade of C and NURS 3061 Minimum Grade of C). Corequisite(s): NURS 3221. Must be enrolled in one of the following Fields of Study: Nursing.

3061 - Transcultural Healthcare for the Registered Nurse
2 Credits
Course is designed to build upon the Registered Nurses understanding of health beliefs, attitudes, values and practices in relation to health, illness, and health-seeking behaviors of culturally diverse individuals/groups. Cultural assessment will focus on tools, methods, nursing care adaptations. Students apply the nursing process to clients with respect for diversity and individual differences. Critical analysis of issues and trends in international health are discussed. Enrollment restricted to RN-BSN Completion students. Offered in Term 1. Corequisite(s): NURS 3011 NURS 3021. Must be enrolled in one of the following Fields of Study: Nursing.

3101 - Medical Surgical Nursing I (3+3+8)
6 Credits
Builds on the concepts of Fundamentals of Nursing. Acquisition and application of nursing knowledge and nursing skills with adult clients and their families who are experiencing acute and chronic health alterations in selected clinical settings. Clinical judgment, nursing process, health adaptation, teaching-learning and therapeutic communication are emphasized. Evidence based practice is integrated into this clinical experience. Offered fall semester. Prerequisite(s): (NURS 2301 Minimum Grade of C and NURS 2501 Minimum Grade of C and NURS 2201 Minimum Grade of C). Corequisite(s): NURS 3301, NURS 3601. Must be enrolled in one of the following Fields of Study: Nursing.

3221 - Pathophysiology for the Registered Nurse
3 Credits
Review and further exploration of the basis of human diseases and disorders and the interaction of environmental, biological, behavioral and pharmacological consequences to the disease process. The application of previous nursing knowledge, medical and nursing diagnoses, and interventions will be applied to current and emerging knowledge. Emphasis is placed on the effects of degenerative,
metabolic and neoplastic diseases and disorder occurring in the following body systems: immunologic, nervous, hematologic, cardiovascular, respiratory, endocrine, gastrointestinal, reproductive, skeletal, integumentary and special senses. Enrollment restricted to RN-BSN Completion students. Offered in Term 2. Prerequisite(s): (NURS 3011 Minimum Grade of C and NURS 3021 Minimum Grade of C and NURS 3061 Minimum Grade of C). Corequisite(s): NURS 3051. Must be enrolled in one of the following Fields of Study: Nursing.

3301 - Transcultural Healthcare  
2 Credits  
To broaden an understanding and perspective of health and illness of differing sociocultural populations. Transcultural health care will introduce cultural influences which affect an individual's attitude toward institutional health care and the use thereof, and will identify culturally competent nursing interventions for the professional nursing student. Examines culturally based beliefs and values, preventive and therapeutic health practices and caring behaviors in diverse cultural and ethnic groups. Classroom and experimental activities address cultural assessment, awareness and competence. Offered fall semester. Prerequisite(s): NURS 1101 Minimum Grade of C. Corequisite(s): NURS 3101, NURS 3601. Must be enrolled in one of the following Fields of Study: Nursing.

3351 - Nursing Research and Informatics  
2 Credits  
Historical developments and methodologies of nursing research as it relates to nursing practice. Development of an understanding of the research process and research proposals. Interpretation of research reports and critiquing research literature. Exploration and examination of computer technology, basic information systems, and the use of cyber technology as it relates to a variety of health care environments and nursing practice. The impact of these technologies on nursing clinical practice, nursing administration, education and research are discussed. Enrollment is restricted to nursing majors. Offered spring semester. Prerequisite(s): (NURS 3601 Minimum Grade of C and NURS 3101 Minimum Grade of C and NURS 3301 Minimum Grade of C) and (STAT 1561 Minimum Grade of C or STAT 1311 Minimum Grade of C). Corequisite(s): NURS 3001, NURS 3501. Must be enrolled in one of the following Fields of Study: Nursing.

3501 - Nursing Care of the Developing Child and Family (4+0+8)  
6 Credits  
Application and acquisition of knowledge development in the specialty area of maternity and pediatric nursing. Emphasis will be placed on nursing process, teaching/learning and health promotion and health maintenance in these populations. Students will care for clients in a variety of settings. Evidence based practice is applied in this clinical experience. Enrollment is restricted to nursing majors. Offered spring semester. Prerequisite(s): (NURS 3601 Minimum Grade of C and NURS 3101 Minimum Grade of C and NURS 3301 Minimum Grade of C). Corequisite(s): NURS 3001, NURS 3351. Must be enrolled in one of the following Fields of Study: Nursing.

3601 - Older Adult Nursing  
2 Credits  
This course applies knowledge and the nursing process in caring for the gerontological population in selected settings and focuses on issues related to the phenomenon of aging. Gerontological nursing models are explored. Exploration of ethical issues related to aging and concepts of research in aging. Evidence based practice is applied. Offered fall semester. Prerequisite(s): (NURS 2301 Minimum Grade
of C and NURS 2501 Minimum Grade of C and NURS 2201 Minimum Grade of C). Corequisite(s): NURS 3101, NURS 3301. Must be enrolled in one of the following Fields of Study: Nursing.

3801 - Topics in Nursing
1 to 4 Credits
The practice and principles of specialized topics in non-acute nursing care. Topics include but are not limited to: oncology, nursing care, end of life nursing care and neurological nursing care. May be repeated as the topic varies. Enrollment is restricted to nursing majors. Prerequisite(s): NURS 3101 Minimum Grade of C. Must be enrolled in one of the following Fields of Study: Nursing.

4101 - Community Health Nursing (2+0+8)
4 Credits
Nursing care and public health principles for families and communities. Introduction of health care policy. Epidemiology, health promotion and prevention strategies and interventions are presented. Health promotion (primary, secondary, tertiary prevention) is emphasized along with emerging community health issues and nursing interventions. Clinical leadership and management roles are explored. Evidence based practice is integrated into this clinical experience. Offered fall semester. Prerequisite(s): (NURS 3351 Minimum Grade of C and NURS 3501 Minimum Grade of C and NURS 3001 Minimum Grade of C). Corequisite(s): NURS 4201, NURS 4401. Must be enrolled in one of the following Fields of Study: Nursing.

4201 - Leadership and Management in Nursing
2 Credits
Leadership and management theory/principles for professional nursing practice in key leadership and management areas. Health care policy, finance and regulatory environments are discussed. Current issues and trends (national, state, and local) in nursing and health care illustrate the practical application of leadership/management theory to practice and create a framework to identify, explore and analyze issues. Offered fall semester. Prerequisite(s): (NURS 3351 Minimum Grade of C and NURS 3501 Minimum Grade of C and NURS 3001 Minimum Grade of C). Corequisite(s): NURS 4101, NURS 4401. Must be enrolled in one of the following Fields of Study: Nursing.

4251 - Community Health Nursing for the Registered Nurse (2.6+0+3.5)
4 Credits
Apply previous nursing knowledge and practice to individuals, families, groups and the practice setting of the community to promote optimal health behaviors. Review nursing care and current public health theories and principles as they relate to families, groups, and communities. Nursing process in public health nursing practice and common health problems encountered in community health nursing are studied. Enrollment restricted to RN-BSN Completion students. Offered in Term 3. Prerequisite(s): (NURS 3221 Minimum Grade of C and NURS 3051 Minimum Grade of C). Corequisite(s): NURS 4751. Must be enrolled in one of the following Fields of Study: Nursing.

4401 - Medical Surgical Nursing II (3+3+8)
6 Credits
Builds on concepts on previous clinical courses. Emphasizes the role of the Baccalaureate nurse in the care of the adult with acute and chronic illness across the lifespan. This course will combine complex medical surgical topics specific to the adult client. Uses the nursing process, clinical judgment principles and leadership experiences to coordinate and plan care for patients in acute care settings. Evidence based practice is integrated into this clinical experience. Offered fall semester. Prerequisite(s): (NURS
3501 Minimum Grade of C and NURS 3001 Minimum Grade of C and NURS 3351 Minimum Grade of C).
Corequisite(s): NURS 4101, NURS 4201. Must be enrolled in one of the following Fields of Study: Nursing.

4751 - Nursing Research and Informatics for the Registered Nurse
3 Credits
Major components of the research process are addressed with a focus on the professional nurse as a consumer of research. Critical thinking skills are emphasized in the analysis of current nursing research. Historical developments and the methodologies of nursing research; and study findings as it relates to patient evaluation and care. Emphasis on developing an understanding of the research process and research proposals. The interpretation of research reports and critiquing research literature to support evidence-based nursing practice is examined. Explore and examine computer technology, basic information systems, and the use of cyber technology as it relates to a variety of health care environments and nursing practice. Further discussion regarding the impact of these technologies on nursing clinical practice, nursing administration, education and research will be examined. Enrollment restricted to RN-BSN Completion students. Offered in Term 3. Prerequisite(s): ( NURS 3221 Minimum Grade of C and NURS 3051 Minimum Grade of C and STAT 1561 Minimum Grade of C or STAT 1311 Minimum Grade of C). Corequisite(s): NURS 4251. Must be enrolled in one of the following Fields of Study: Nursing.

4801 - Topics in Nursing
1 to 4 Credits
The practice and principles of specialized topics in nursing care in acute settings. Topics to be covered include but are not limited to: emergency/urgent nursing care and ICU nursing care. May be repeated as the topic varies. Enrollment is restricted to nursing majors. Prerequisite(s): NURS 4401 Minimum Grade of C. Must be enrolled in one of the following Fields of Study: Nursing.

4981 - Transition to Professional Practice: Nursing Capstone (2.5+0+14)
6 Credits
Students evaluate achievement of graduate outcomes. Integration of theory and practice. Provides direct nursing care and makes clinical judgments based on thorough assessment and evidence based practice. Synthesis of content from previous courses. A scholarly project is required. Offered spring semester. Prerequisite(s): ( NURS 4101 Minimum Grade of C and NURS 4201 Minimum Grade of C and NURS 4401 Minimum Grade of C). Must be enrolled in one of the following Fields of Study: Nursing.

4991 - Transition to Professional Nursing Practice for Registered Nurses: Clinical Capstone (2.6+0+7)
5 Credits
Integration of theory and practice as in the approach to completion of the nursing major. A clinical area will be selected to carry out nursing activities that promote health potential. Assist in the decision-making process about delivery of nursing care based on a thorough assessment, analysis and exploration of potential consequences while utilizing therapeutic communication. Enhance skills needed to continue with professional role development. Clinical experiences are based on objectives developed with RN preceptor and faculty and may be chosen from a variety of settings. Enrollment is restricted to RN-BSN Completion students. Offered in Term 4. Prerequisite(s): ( NURS 4251 Minimum Grade of C and NURS 4751 Minimum Grade of C). Must be enrolled in one of the following Fields of Study: Nursing.

Department of Philosophy and Religion
Subject - Philosophy (PHIL)

1001 - Theories of Human Nature
3 Credits
Philosophical inquiry into rival theories of human nature with reference to religion, psychology, and science. Consideration of the various philosophical problems, such as the role of reason, free-will and determinism, the relationship between the individual and the universe/God (as well as society), moral psychology, and gender differences.

1011 - Plato
3 Credits
Plato's early to middle dialogues, including the Republic.

1021 - Philosophy of Science
3 Credits
Explores the logical and philosophical foundations that underlie science. Specific issues include: what is the difference between science and pseudo-science, what are scientific explanations, laws and theories, and what are science's limits?

1031 - Philosophy of Identity
3 Credits
Explores the question of who we are by examining questions related to our social identity, specifically how our identity is affected by attributes such as race, gender, and class and by the societal reaction to those attributes.

1041 - Philosophy and Film
3 Credits
An exploration of perennial philosophical questions: What is real? What can I know? What is life's meaning? through classic and modern films and traditional philosophical treatises. Question concerning whether film is an appropriate medium in which to pursue philosophical issues.

1051 - Ethics, Justice and Law
3 Credits
An exploration of challenging and controversial issues such as euthanasia, the meaning of equality, and the role of religious beliefs in a society with multiple religious traditions, starting with issues at the level of personal ethical beliefs, then moving to broader issues of social justice, and concluding with the role of law in a pluralistic society.

1901 - Special Topics in Philosophy
1 to 3 Credits
May be repeated for credit, depending on content.

2021 - Ancient Philosophy
3 Credits
Greek philosophical traditions against the background of the Pre-Socratics and Socrates, with a special emphasis on Plato and Aristotle.
2251 - Philosophy of Religion
3 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.

2281 - Philosophy of Law
3 Credits
Major philosophical theories of law, from legal positivism to originalism. Application to topics such as criminal law, contract law, and constitutional interpretation. Specific applications include but are not limited to: free speech, the insanity defense, and surrogate mother contracts.

2341 - Logic
3 Credits
Logical fallacies and the principles of correct reasoning. The application of formal logical analysis to arguments encountered in ordinary language.

2401 - Professional Ethics
3 Credits
Major ethical theories and their application to the professions and topics that arise in the professional setting. The nature of professions and responsibilities to clients and the public. Offered fall and spring semesters.

2431 - Asian Philosophies
3 Credits
Asian philosophical traditions on the metaphysical, epistemological, logical, and ethical questions about the universe's and human beings' origins, natures and purposes, including the historical origins of these traditions, their development, and interactions.

2901 - Special Topics in Philosophy
1 to 3 Credits
May be repeated for credit, depending on content.

3101 - Environmental Ethics
3 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.

3201 - Political Philosophy
3 Credits
Theories of political philosophy, such as social contract, libertarianism, utilitarianism, feminist, and political liberalism. Prerequisite(s): One course in PHIL excluding PHIL 2341.

3401 - Metaphysics
3 Credits
Classical metaphysical questions about human nature and the world, such as the nature of reality, essence, existence, and causation. Prerequisite(s): One course in PHIL excluding PHIL 2341.
3441 - Ethical Theory
3 Credits
Major ethical theories, such as utilitarianism, deontology, and virtue theory. Additional topics, such as ethical egoism, moral realism, and ethical relativism. Prerequisite(s): One course in PHIL excluding PHIL 2341.

3551 - Epistemology
3 Credits
Knowledge, its origins, structure, scope, justification and limitations, with reference to such problems as skepticism, realism, sense perception, mental representation, opinion and truth. Prerequisite(s): One course in PHIL excluding PHIL 2341.

3901 - Special Topics in Philosophy
1 to 3 Credits
May be repeated for credit, depending on content.

4801 - Philosophy Senior Essay
3 Credits
A critical essay on a topic selected in consultation with a faculty advisor. Enrollment in the semester during which the paper is to be completed. However, preliminary work on this project commences no later than the beginning of the senior year.

4971 - Independent Study in Philosophy
1 to 3 Credits
Departmental permission required. May be repeated for credit, depending on content.

Subject - Religion (RELG)

1001 - Death and Beyond in World Religions
3 Credits
An examination of distinct religious perspectives on individuals' dying, afterlife, and additional goals beyond the experience of physical death.

1011 - Encountering the Other
3 Credits
The diversity of religious and cultural worldviews and practices, with primary focus on the phenomenon of 'otherness,' or 'difference,' and its personal and social ramifications.

1021 - Christianity and Natural World
3 Credits
Christian theological and ethical responses to nature. Discussion of how Christianity has historically understood the doctrine of creation. The diverse ways that contemporary Christianity interprets the material world
1031 - Religion and Culture
3 Credits
The relationship between religious worldviews and culture, including fine arts, technology, and popular media. Different theological models that can be used to understand how culture challenges and influences religion.

1041 - Women in the Bible
3 Credits
The portrayal of women in the Old and New Testaments with secondary readings of feminist theory.

1071 - Religions East and West
3 Credits
Representative major religions of the world, their origins, sacred writings, basic beliefs, and life practices, with special attention to non-Western religious traditions.

1911 - Special Topics in Religion
1 to 3 Credits
May be repeated for credit, depending on content.

2001 - Introduction to Old Testament
3 Credits
Critical reading of the Old Testament (Hebrew Bible): its historical background, literary features, and theological claims.

2011 - Introduction to New Testament
3 Credits

2021 - Islam
3 Credits
The ideas and practices of the Muslim tradition, with emphasis on Islam's scriptural base, historical development, societal impact, and encounter with the West and with other religious traditions.

2031 - Eastern Religious Traditions
3 Credits
Major religions of Asia: their origins, sacred writings, basic beliefs, life practices, and, where applicable, presence in the West.

2041 - Western Religious Traditions
3 Credits
Major Semitic/Western religions: their origins, sacred writings, basic beliefs, life practices, and variations around the world.

2051 - Hinduism
3 Credits
The ideas and practices of the Hindu tradition, with emphasis on historical development, varied literatures, societal influence, and encounters with the contemporary West.

**2061 - Issues in Science & Religion**  
1 Credit  
Investigation of the work of a major figure in the contemporary science and religion dialogue. Students are required to attend annual weekend Goshen Conference on Religion and Science, where students will have the opportunity to interact with the author being studied. Fee required.

**2711 - Biblical Hebrew 1**  
3 Credits  
Biblical Hebrew with heavy emphasis on grammar and vocabulary.

**2731 - Biblical Hebrew 2**  
3 Credits  
Biblical Hebrew with an emphasis on grammar and vocabulary as well as readings from the Hebrew Bible. Prerequisite(s): RELG 2711 Minimum Grade of C.

**2811 - Biblical Greek 1**  
3 Credits  
Biblical Greek with heavy emphasis on grammar and vocabulary and readings from the Greek New Testament.

**2831 - Biblical Greek 2**  
3 Credits  
Biblical Greek with heavy emphasis on grammar and vocabulary and readings from the Greek New Testament. Prerequisite(s): RELG 2811 Minimum Grade of C.

**2911 - Special Topics in Religion**  
1 to 3 Credits  
May be repeated for credit, depending on content.

**3001 - Christian Thought to 1500**  
3 Credits  
Christian history, theology and ethics from the formative period of the Church to the late Middle Ages. Emphasis on the Christian response to cultural settings, efforts to define orthodoxy, philosophers, theologians and mystics.

**3011 - Christian Thought 1500 to the Present**  
3 Credits  
Christian history, theology and ethics from the Reformation to the present. The rise of confessions, Enlightenment challenges to religion, and representative theologians and issues from the past two centuries.

**3021 - Buddhism**  
3 Credits  
The ideas and practices of the Buddhist tradition in Asia as well as in the West, with emphasis on the life and teachings of the Buddha and the evolution of extremely diverse forms of Buddhism.
3911 - Special Topics in Religion  
1 to 3 Credits  
May be repeated for credit, depending on content.

4811 - Religion Senior Essay  
4 Credits  
A critical essay on a topic selected in consultation with a faculty advisor. Enrollment in the semester during which the paper is to be completed. However, preliminary work on this project commences no later than the beginning of the senior year.

4981 - Independent Study in Religion  
1 to 3 Credits  
Departmental permission required. May be repeated for credit, depending on content.

Subject - Youth Ministry (YMIN)

0011 - Youth Ministry Observation 1  
0 Credits  
Observation of and reflection on youth ministry in a congregational setting related to one's own denominational tradition. Must be enrolled in one of the following Fields of Study: Youth Ministry.

0021 - Youth Ministry Observation 2  
0 Credits  
Observation of and reflection on youth ministry in a congregational setting different from one's own denominational tradition. Must be enrolled in one of the following Fields of Study: Youth Ministry.

0031 - Youth Ministry Observation 3  
0 Credits  
Observation and reflection on ministry to youth in a culturally, racially, and/or socioeconomically diverse setting. Must be enrolled in one of the following Fields of Study: Youth Ministry.

0041 - Internship: Group Reflection  
0 Credits  
Group reflection on issues pertaining to students' internships. Must be enrolled in one of the following Fields of Study: Youth Ministry.

2531 - Youth Ministry Issues and Settings  
3 Credits  
Exploration of various settings for youth ministry, including weekly youth meetings, camps, mission trips, Sunday School, and community service. Offered alternate years.

2901 - Special Topics in Youth Ministries  
1 to 3 Credits  
May be repeated for credit depending on course content.
**3901 - Special Topics in Youth Ministries**  
1 to 3 Credits  
May be repeated for credit, depending on content.

**4101 - Youth Ministry Internship**  
1 to 3 Credits  
Internship in youth ministry in various possible settings: congregation, camp, mission trip, etc. Each credit hour requires 25 hours in internship. Corequisite(s): YMIN 0041. This course is repeatable for a total of 6 hours.

**4531 - Principles of Christian Education**  
3 Credits  
The philosophy, theory, and current methods of Christian education. The relationship of Christian education to other areas of ministry (e.g., worship). Offered alternate years. Prerequisite(s): ( YMIN 253 Minimum Grade of C and YMIN 410 Minimum Grade of C).

**4991 - Independent Study in Youth Ministries**  
1 to 3 Credits  
Departmental permission required. May be repeated for credit depending on course content.

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**Department of Physics and Astronomy**

**Subject - Physics (PHYS)**

**0001 - Orientation**  
1 Credit  
Familiarization with the department, requirements for majors, planning a program of courses. Required of department majors. Graded S/U. Offered fall semester.

**1001 - Conceptual Physics**  
3 Credits  
Issues involving science and society, classical physics, relativity, atomic and nuclear physics. Students may not receive credit for PHYS 1001 after completion of either PHYS 2121 or 2321.

**1051 - Planetary Astronomy**  
3 Credits  
Introduction to solar system science, history of astronomy, telescopes, basic earth science.

**1061 - Stars and Galaxies**  
3 Credits  
Structure, motions and evolution of stars, interstellar material, galaxies and the universe as a whole.
1081 - Planetary Astronomy Laboratory
   1 Credit
Laboratory and mathematical companion to PHYS 1051.

1091 - Stars and Galaxies Laboratory
   1 Credit
Laboratory and mathematical companion to PHYS 1061.

1901 - Special Topics in Physics
   1 to 3 Credits
This course may be repeated 4 times. This course is repeatable for a total of 6 hours.

1911 - Special Topics in Summer Honors Institute
   1 to 3 Credits
Topics in Physics. Enrollment is restricted to attendees of the Summer Honors Institute. May be repeated as the topic varies. Graded S/U.

2051 - Physics with Health Science Applications
   3 Credits
Selected basic physical principles and their application to health science. Topics include levers and torques, fluid dynamics, electrical conduction, magnetism, optics, and radiation.

2111 - General Physics 1
   3 Credits
Classic Newtonian mechanics and thermodynamics. The corresponding laboratory is PHYS 2341. Offered fall semester.

2121 - General Physics 2
   3 Credits
Electrical and magnetic phenomena. Oscillations and sound. Optics. The corresponding laboratory is PHYS 2351. Offered spring semester. Prerequisite(s): PHYS 2111 Minimum Grade of D or PHYS 2311 Minimum Grade of D.

2311 - Physics 1
   3 Credits
Classic Newtonian mechanics and thermodynamics. Differential and integral calculus are used. The corresponding laboratory is PHYS 2341. Offered fall and spring semesters. Prerequisite(s): MATH 1611 Minimum Grade of D or MATH 1631 Minimum Grade of D.

2321 - Physics 2
   3 Credits
Electrical and magnetic phenomena. Oscillations and sound. Optics. Differential and integral calculus are used. The corresponding laboratory is PHYS 2351. Offered fall and spring semesters. Prerequisite(s): PHYS 2311 Minimum Grade of D or PHYS 231 Minimum Grade of D.

2341 - Physics Laboratory 1
   1 Credit
Experiments in Newtonian mechanics and thermodynamics. PHYS 2111 or 2311 should be taken
concurrently, or instructor's permission must be obtained. Offered fall and spring semesters. Prerequisite(s): PHYS 2111 Minimum Grade of D or PHYS 2111 Minimum Grade of D.

2351 - Physics Laboratory 2
1 Credit
Experiments in electricity and magnetism, sound and optics. PHYS 2121 or 2321 should be taken concurrently, or instructor's permission must be obtained. Offered fall and spring semesters. Prerequisite(s): PHYS 2121 Minimum Grade of D or PHYS 2321 Minimum Grade of D.

2901 - Special Topics in Physics
1 to 3 Credits
This course may be repeated 4 times. This course is repeatable for a total of 6 hours.

3011 - Advanced Physics Lab
2 Credits
Statistical analysis of data and error propagation. Linear and non-linear curve fitting. Design and construction of scientific apparatus. Signal conditioning. Optical techniques. Vacuum systems. Offered alternate spring semesters. Prerequisite(s): PHYS 2121 Minimum Grade of D or PHYS 2321 Minimum Grade of D.

3051 - Modern Physics
3 Credits
General and special relativity, quantum and wave mechanics, atomic and nuclear physics. Offered spring semester. Prerequisite(s): PHYS 2121 Minimum Grade of D or PHYS 2321 Minimum Grade of D.

3111 - Nuclear Physics
3 Credits
Nuclear structure, nuclear reactions, nuclear constituents, fundamentals of nuclear reactor theory and design, shielding and safety principles in nuclear physics. Offered alternate spring semesters.

3411 - Optics
3 Credits
The laws of geometrical and physical optics. Image formation by mirrors and lenses and optical aberrations. Interference and diffraction. Prerequisite(s): PHYS 2121 Minimum Grade of D or PHYS 2321 Minimum Grade of D.

3451 - Math Methods
3 Credits
Vector algebra, vector calculus in arbitrary coordinate systems, Fourier analysis, contour integration in complex plane, special functions. Offered alternate fall semesters. Prerequisite(s): PHYS 2121 Minimum Grade of D or PHYS 2321 Minimum Grade of D.

3471 - Introductory Astrophysics
3 Credits
Motions and physical nature of objects in the solar system, electromagnetic radiation, telescopes and astronomical detectors. Prerequisite(s): PHYS 2121 Minimum Grade of D or PHYS 2321 Minimum Grade of D.
3511 - Solid State
3 Credits
Structure of solids. Quantum and statistical mechanics are used to develop theories of internal stress and strain in crystals, conductivity of electricity in metals, semiconductors and superconductors, magnetism, the thermal properties of solids and imperfections in solids. Prerequisite(s): PHYS 3051 Minimum Grade of D.

3531 - Statistical Mechanics
3 Credits
Properties of gases, thermal properties of solids and liquids. Thermodynamic laws. Heat transfer. Kinetic thermodynamic laws. Prerequisite(s): PHYS 2121 Minimum Grade of D or PHYS 2321 Minimum Grade of D.

3551 - Electronics
3 Credits
Theory of solid state devices, rectifier circuits, transistor amplifiers, oscillators and modulators, instrumentation applications. Prerequisite(s): PHYS 2121 Minimum Grade of D or PHYS 2321 Minimum Grade of D.

3571 - Computational Physics
3 Credits
Methods and problems in computational physics. Prerequisite(s): PHYS 3451 Minimum Grade of D and ECCS 4611 Minimum Grade of D.

3731 - Analytical Mechanics
3 Credits
Vector analysis, kinematics, conservative forces, planetary motion, pendulum, free and forced oscillations, coupled systems and normal coordinates, angular momentum, rigid bodies. Offered alternate fall semesters. Prerequisite(s): PHYS 2121 Minimum Grade of D or PHYS 2321 Minimum Grade of D.

3751 - Quantum Mechanics
3 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. Offered alternate fall semesters. Prerequisite(s): PHYS 2121 Minimum Grade of D or PHYS 2321 Minimum Grade of D.

3901 - Special Topics in Physics
1 to 3 Credits
This course may be repeated 4 times. This course is repeatable for a total of 6 hours.

3951 - Independent Research
1 to 2 Credits
1 to 2 Credits.
This course may be repeated 4 times. This course is repeatable for a total of 8 hours.
4111 - Electricity and Magnetism 1
3 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. Offered alternate fall semesters. Prerequisite(s): PHYS 2321 Minimum Grade of D.

4121 - Electricity and Magnetism 2
3 Credits
Advanced electric and magnetic fields; electric and magnetic properties of solids, electromagnetic radiation. Offered alternate spring semesters. Prerequisite(s): PHYS 4111 Minimum Grade of D.

4151 - Plasma Physics
3 Credits

4901 - Special Topics in Physics
1 to 3 Credits
Part of the Physics major program and offered when needed. This course may be repeated 4 times. This course is repeatable for a total of 6 hours.

4951 - Senior Thesis Seminar
1 Credit
Written and oral presentation of the complete Capstone Research Project. The Research Project is written in the format of a scientific manuscript and presented during a formal seminar. This course will be the culmination of the Capstone experience. Offered spring semester. Prerequisite(s): PHYS 3951 Minimum Grade of D.

4971 - Independent Research
1 to 3 Credits
1 to 3 Credits. Part of the Physics major program and offered when needed. This course may be repeated 4 times. This course is repeatable for a total of 8 hours.

Institute for Social Research

Subject - Institute for Social Research (ISR)

1861 - Social Research Practicum 1
1 Credit
Participation in the Institute for Social Research under the direction of a Research Fellow. Permission required. Offered fall and spring semesters.

2531 - Research Methods
3 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. Offered fall semester. Prerequisite(s): ( STAT 1311 Minimum Grade of C).

2541 - Data Analysis
4 Credits
Empirical concepts and tools for analyzing and explaining political and social phenomena. Hands-on experience in applying and developing concepts and tools for modern qualitative and quantitative analysis. Formerly PLSC 254 and SOC 254. Offered spring semester. Prerequisite(s): ( STAT 1311 Minimum Grade of C).

2861 - Social Research Practicum 2
1 Credit
Participation in the Institute for Social Research. Work as part of a team, under the direction of a Research Fellow in the Institute of Social Research. Offered fall and spring semesters. Prerequisite(s): ( ISR 1861 Minimum Grade of C).

3861 - Social Research Practicum 3
1 Credit
Participation in the Institute for Social Research, including some leadership responsibilities under the direction of a Research Fellow. Offered fall and spring semesters. Prerequisite(s): ( ISR 2861 Minimum Grade of C).

4861 - Social Research Practicum 4
1 Credit
Participation in the Institute for Social Research under the direction of a Research Fellow. Student assumes responsibility as a project director or assistant project director. Offered fall and spring semesters.

Department of Psychology and Sociology

Subject - Psychology (PSYC)

1001 - Psychology
3 Credits
Introduction to the scientific approach to understanding human behavior and mental processes. Topics may include human development, learning and memory, personality, social and environmental factors, biological aspects of behavior, the experience of emotion and psychological disorders. Offered fall and spring semesters.

2101 - Motivation and Emotion
3 Credits
Examination of how motivational factors, including emotion, affect the behavior of human and non-human organisms. Theoretical and empirical evidence addressing the biological, behavioral and mental
events that trigger and direct behavior will be covered. Offered alternate fall semesters. Prerequisite(s): ( PSYC 1001 Minimum Grade of C).

2151 - Development across the Lifespan  
3 Credits  
Basic theories in human development from conception through old age using a biopsychosocial model; contemporary research at each age level. Offered fall and spring semesters. Prerequisite(s): ( PSYC 1001 Minimum Grade of C).

2161 - Child Psychology  
3 Credits  
Survey of the basic theories and research relative to human growth and development from conception through late childhood with an emphasis on the physiological, cognitive, socioemotional and cultural changes associated with human life. Offered spring semester. Prerequisite(s): ( PSYC 1001 Minimum Grade of C).

2171 - Adolescent Psychology  
3 Credits  
Survey of the basic theories and research relative to human growth and development from preadolescence through young adulthood with an emphasis on the physiological, cognitive, socioemotional and cultural changes associated with human life. Offered fall semester. Prerequisite(s): ( PSYC 1001 Minimum Grade of C).

2201 - Health Psychology  
3 Credits  
Examination health using a bio-psycho-social model and investigation of the relation between psychology, health-promoting behaviors, wellness, sickness, and the health care system. Offered alternate spring semesters. Prerequisite(s): ( PSYC 1001 Minimum Grade of C).

2261 - Human Sexual Behavior  
3 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. Offered spring semester. Prerequisite(s): ( PSYC 1001 Minimum Grade of C).

2301 - Introduction to Counseling  
3 Credits  
Discusses the basic skills involved in the counseling relationship, including attending, client observation, paraphrasing, summarization, confrontation, and reflection of feeling; explores basic skills and emphasizes skill development as well as counseling theory. Offered fall semester. Prerequisite(s): ( PSYC 1001 Minimum Grade of C).

2401 - Statistics for the Behavioral Sciences  
3 Credits  
Provides an introduction to statistical methods in the behavioral sciences and stresses understanding when and why certain statistical procedures are used. Topics include descriptive and inferential statistics, including measures of central tendency and dispersion, correlation, hypothesis testing, t-tests, analysis of variance, and chi square. This course may be used to fulfill a math/stat distributional
requirement. Offered fall and spring semesters. Prerequisite(s): ( PSYC 1001 Minimum Grade of C) or PSYC 100 Minimum Grade of C). Must be enrolled in one of the following Major fields of study: Psychology.

2901 - Special Topics in Psychology
3 Credits
Coverage of special topics in psychology. Offered fall and spring semesters. Prerequisite(s): ( PSYC 1001 Minimum Grade of C).

2921 - Topics in Psychology
3 Credits
Coverage of topics in psychology. Offered fall and spring semesters. Prerequisite(s): ( PSYC 1001 Minimum Grade of C).

3011 - Social Psychology
3 Credits
The effects 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. Offered fall semester. Prerequisite(s): ( PSYC 1001 Minimum Grade of C).

3111 - Psychology of Personality
3 Credits
The major theories of personality from Freud to contemporary theoretical approaches. Offered alternate fall semesters. Prerequisite(s): ( PSYC 1001 Minimum Grade of C).

3121 - Psychological Assessment
3 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. Offered spring semester. Prerequisite(s): ( PSYC 1001 Minimum Grade of C).

3151 - Learning and Behavior with Lab
4 Credits
The major theories and empirical issues related to common forms of learning, such as classical and instrumental conditioning. Current research in learning is covered on both the human and non-human animal level. Laboratory component involves application of learning principles to modify the behavior of organisms. Offered fall semester. Prerequisite(s): ( PSYC 1001 Minimum Grade of C).

3201 - Psychology and the Law
3 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 course cases involving psychology and the law, research in the areas of jury selection, eye witness testimony and psychologists' licensing procedures. Offered alternate fall semesters. Prerequisite(s): ( PSYC 1001 Minimum Grade of C).

3211 - Psychology of the Criminal Mind
3 Credits
Focus on forensic psychology utilizing criminal justice and psychological theoretical approaches. Specific attention is paid to the processes of identifying personality traits, behavioral tendencies, geographical location and demographic variables of an offender based on characteristics of a crime. Offered alternate fall semesters. Prerequisite(s): (PSYC 1001 Minimum Grade of C).

3251 - Cognitive Psychology with Lab
4 Credits
An introduction to the complex system of mental abilities. Theoretical and empirical approaches to the role of pattern recognition, attention, memory, problem-solving and decision making in human thinking will be explored. Laboratory component involves participation in experiments designed to facilitate student understanding of cognition phenomena. Offered spring semester. Prerequisite(s): (PSYC 1001 Minimum Grade of C).

3301 - Sensation and Perception with Lab
4 Credits
Biological and psychological mechanisms responsible for internalizing the external world. In-depth discussion of the relationship between physical and psychological events based on theoretical and empirical evidence. Laboratory component will use laboratory techniques to illustrate the biological and psychological mechanisms underlying sensation and perception. Offered alternate fall semesters. Prerequisite(s): (PSYC 1001 Minimum Grade of C).

3351 - Physiological Psychology with Lab
4 Credits
Psychology as a biological science. Physiological events underlying behavior, including sensory, neural, and glandular involvement in such topics as motivation, emotion, and learning. Laboratory component involves dissections and experiments used to illustrate the role of biological processes in behavior. Offered spring semester. Prerequisite(s): (PSYC 1001 Minimum Grade of C and BIOL 1311 Minimum Grade of C).

3401 - Experimental Psychology with Lab
4 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. Extensive instruction in scientific communication and the APA Publications Manual. Laboratory component involves use of computer simulation and research experience to facilitate student understanding of the processes involved in experimental psychological investigations. Offered fall and spring semesters. Prerequisite(s): (PSYC 1001 Minimum Grade of C and PSYC 2401 Minimum Grade of C).

3901 - Special Topics in Psychology
3 Credits
Coverage of special topics in psychology. Offered fall and spring semesters. Prerequisite(s): (PSYC 1001 Minimum Grade of C).

3921 - Topics in Psychology
3 Credits
Coverage of topics in psychology. Offered fall and spring semesters. Prerequisite(s): (PSYC 1001
Minimum Grade of C).

4201 - Abnormal Psychology
3 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. Offered spring semester. Prerequisite(s): (PSYC 1001 Minimum Grade of C).

4261 - Internship Practicum in Psychology
1 to 12 Credits
A field experience in the area of psychology. Only 3 practicum credits may be applied to the major. Offered fall and spring semesters. Prerequisite(s): (PSYC 1001 Minimum Grade of C). This course may be repeated 1 time.

4271 - Research Practicum in Psychology
1 to 12 Credits
A research experience in the field of psychology supervised by a faculty member. Only 3 research practicum credits may be applied to the major. Offered fall and spring semesters. Prerequisite(s): (PSYC 1001 Minimum Grade of C). This course may be repeated 1 time.

4281 - Teaching Practicum in Psychology
3 Credits
A mentoring experience in conducting undergraduate psychology laboratories. Practicum students work with a supervising professor in preparation and presentation of instruction and laboratory exercises and providing feedback to students. Ethical, organizational and practical issues will be discussed. Only 3 practicum credits may be applied to the major. Offered fall and spring semesters. Prerequisite(s): (PSYC 1001 Minimum Grade of C). This course may be repeated 1 time.

4351 - Psychopharmacology
3 Credits
An advanced examination of pharmacological agents and their effects on neuronal function, with a particular emphasis on the alteration of behavioral states. Major drug classes, their pharmacological properties and their use to treat various psychological disorders will be covered. Offered alternate fall semesters. Prerequisite(s): (PSYC 1001 Minimum Grade of C and BIOL 1311 Minimum Grade of C).

4901 - Special Topics in Psychology
3 Credits
Coverage of special topics in psychology. Offered fall and spring semesters. Prerequisite(s): (PSYC 1001 Minimum Grade of C).

4921 - Topics in Psychology
3 Credits
Coverage of topics in psychology. Offered fall and spring semesters. Prerequisite(s): (PSYC 1001 Minimum Grade of C).

4951 - Senior Capstone in Psychology I
1 Credit
Use of developed skills in the field of psychology to prepare students for graduate studies in psychology or careers in psychology. Students will be exposed to the Psychology GRE subject test, graduate school interview process, preparation of a curriculum vitae, preparation of a personal statement, reviewing psychological journal articles, and preparation of literature review or experimental study proposal. Offered fall semester. Prerequisite(s): ( PSYC 1001 Minimum Grade of C and PSYC 3401 Minimum Grade of C).

4961 - Senior Capstone in Psychology II
1 Credit
Continuation of PSYC 4951. Offered spring semester. Prerequisite(s): ( PSYC 1001 Minimum Grade of C and PSYC 3401 Minimum Grade of C and PSYC 4951 Minimum Grade of C).

4971 - Independent Study in Psychology
1 to 4 Credits
Offered fall and spring semesters.

Subject - Sociology (SOC)

1001 - Introduction to Sociology
3 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. Offered fall and spring semesters.

2301 - Sociology of Religion
3 Credits
Survey of the sociological study of religion as a social institution within a social system. Trends and patterns of individual, group, and organizational religious behavior are assessed using critical and empirical analysis, sociological theories, ideas and concepts. Offered alternate spring semesters.

2401 - Sociology of the Family
3 Credits
Historical, cross cultural, and analytical study of family with emphasis on ideology and the effects of social structures and agencies on family composition and roles. Offered fall semester.

2431 - Deviant Behavior
3 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. Offered alternate fall semesters. Prerequisite(s): ( SOC 1001 Minimum Grade of C).

2501 - Cultural Anthropology
3 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. Offered fall and spring semesters. Prerequisite(s): (SOC 1001 Minimum Grade of C).

2601 - Social Problems
3 Credits
Sociological perspectives on contemporary problems and the process by which these issues come to be socially constructed as problems. Offered alternate spring semesters. Prerequisite(s): (SOC 1001 Minimum Grade of C).

2611 - Criminology
3 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. Offered spring semester. Prerequisite(s): (SOC 1001 Minimum Grade of C).

2631 - Victimology
3 Credits
The history of victimology, patterns of victimization, the role of the victim in crime, the victim in the criminal justice system (including jury perceptions of victims), victim assistance programs, and victim/offender reconciliation programs. Offered alternate fall semesters. Prerequisite(s): (SOC 1001 Minimum Grade of C).

2901 - Special Topics
1 Credit
Coverage of topics in sociology. Offered fall and spring semesters.

3461 - Social Stratification
3 Credits
The origins, institutionalization and change of class, status, prestige, power, and other forms of social inequality with attention to the effects of stratification on the individual. Offered alternate fall semesters. Prerequisite(s): (SOC 1001 Minimum Grade of C).

3471 - Race, Class, and Gender
3 Credits
Analysis of the structural interplay and social ramifications of race, social class, and gender. The course focuses on power relationships, intra and intergroup conflict, and minority relations. Offered spring semester. Prerequisite(s): (SOC 1001 Minimum Grade of C).

3481 - Sociology of Health and Health Care
3 Credits
This course introduces students to the social dimensions of health, illness, and health care. The sociology of health and health care, often referred to as medical sociology, examines a broad range of topics relevant to those in many fields of study. These topics include the social distribution of disease, social stress, health and illness behaviors, medical professions, the doctor-patient relationship, and health care systems. Offered alternate fall semesters.
3491 - Sociology of Mental Health and Illness
3 Credits
Sociological perspectives on the definition, causes, patterning, and responses to mental health and illness. Topics include sociological (versus psychological or biological) theories of mental health and illness, the stress process, and the differential distribution of mental health and illness by race/ethnicity, gender, socioeconomic status, age, and marital status. Also covers the labeling or social construction of mental illness, as well as how society and various social institutions respond to those in need of treatment. Offered alternate spring semesters.

3501 - Self and Identity
3 Credits
The theories of and research done on the self, self-concept, and identities in humans from both sociological and psychological perspectives. Offered alternate fall semesters. Prerequisite(s): (SOC 1001 Minimum Grade of C).

3551 - Advanced Data Analysis
3 Credits
Constructing measurement scales, cleaning data, factor analysis and assessing reliability. Association between nominal and ordinal variables and correlation, simple, multiple, and logistic regression. Offered alternate fall semesters. Prerequisite(s): (ISR 2541 Minimum Grade of C or PSYC 2401 Minimum Grade of C).

3611 - Delinquency & Juvenile Justice
3 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. Offered alternate spring semesters. Prerequisite(s): (SOC 1001 Minimum Grade of C).

3621 - Occupational Crime & Deviance
3 Credits
The various forms of criminal and deviant behavior that occur in the occupational context. A discussion of the natures, extent, consequences, and strategies to control this behavior. Major theoretical perspectives on occupational crime and deviance are considered. Topics covered include: white-collar crime, organized crime, employee theft, career criminality, and workplace violence. Offered alternate spring semesters.

3631 - Sociology of Substance Abuse
3 Credits

3901 - Special Topics in Sociology
1 Credit
Coverage of topics in sociology. Offered fall and spring semesters.
4461 - Classical Sociological Theory
3 Credits
Traces sociological theorizing from sociology's historical origins. Major theorists covered include Marx, Durkheim, Weber, Simmel, and Chicago School sociologists. Emphasis on building an understanding of the roots of contemporary social theory. Senior status. Offered fall semester. Prerequisite(s): (SOC 1001 Minimum Grade of C). Corequisite(s): SOC 4881.

4471 - Contemporary Sociological Theory
3 Credits
The major sociological theories developed since 1950. An examination of the critical debates in contemporary social theory. Senior status. Offered spring semester. Prerequisite(s): (SOC 1001 Minimum Grade of C). Corequisite(s): SOC 4891.

4811 - Sociology Internship
4 to 16 Credits
Supervised placement in an agency which involves work experience related to sociology or criminology or work experience on a research project. Senior status, 2.75 GPA, consent of instructor, and approval of Department Chair. Offered fall and spring semesters.

4881 - Senior Capstone Research 1
2 Credits
Development of research topic and/or question, literature review, and outline of research project directed by faculty advisor. Capstone Research does not count toward Sociology elective hours. Senior status, sociology primary major, and permission of advisor. Offered fall and spring semesters. Corequisite(s): SOC 4461.

4891 - Senior Capstone Research 2
3 Credits
Research design, data collection, data analysis, and writing of the research paper directed by faculty advisor. Capstone Research does not count toward Sociology elective hours. Offered fall and spring semesters. Prerequisite(s): (SOC 4881 Minimum Grade of C). Corequisite(s): SOC 4471.

4981 - Independent Study in Sociology
1 to 4 Credits
Approval of Chairperson. Offered fall and spring semesters.

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Department of Technological Studies

Subject - Technology (TECH)

1001 - Technology and Society
3 Credits
An overview of the development and design of technical systems in society, their impact throughout
history, and procedures for making choices of appropriate technology to apply in the future. Lab activities and visitations utilized to reinforce concepts. Offered fall semester.

1201 - Intro to Computer Aided Design
3 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 CAD software for solid modeling and orthographic projection, sections, auxiliary views, file conversion, and size description. Offered spring semester.

1301 - Materials Science
3 Credits
An investigation into major industrial materials and their properties using industry standard testing formulas and equipment. 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. Offered fall semester.

1401 - Intro to Information Systems
3 Credits
Fundamental computer literacy skills in Windows environment. Basic computer terminologies. Productivity software applications such as word processing, spreadsheets, database and presentation tools with an emphasis on organizing, accessing, managing and presenting data for personal and professional communication. Offered fall semester.

1421 - Web Design
3 Credits
The development of computing skills focusing on web site design. Site structure, site planning, multimedia authoring, and the use of computer peripherals. Developing web sites using XHTML, DHTML, CSS, and web authoring software applications. Designing web based computer graphics and publishing web sites to the WWW. Offered fall and spring semesters.

1601 - Fundamentals of Electronics
3 Credits
The fundamentals of alternating and direct current will be explored in the context of changing technological advances. Basic electrical circuits and electronic components will be studied and utilized in the laboratory. MATH 1401 or above required. Offered fall and spring semesters. Prerequisite(s): MATH 1401 Minimum Grade of C.

1901 - Special Topics in Technology
1 to 3 Credits
May be repeated as the topic varies.

2211 - Construction Design
4 Credits
Pre-construction planning, scheduling, design, engineering and layout. Residential and commercial construction principles, print reading, architectural details, plot surveying and layout, scheduling, creation of architectural working drawings and introductory cost estimating using the latest software and technology available. Offered spring semester. Prerequisite(s): TECH 1201 Minimum Grade of C.
2231 - Product Design and Analysis
4 Credits
Technical sketching, product design processes and the components/variables of good design. Use of
CAD solids modeling software to create part models and assemblies. Product designs will be designed
and analyzed for manufacturability, performance, and potential for profitability for a company. Oral
presentations, patent searches, and prototype development. Offered fall semester. Prerequisite(s):
TECH 1201 Minimum Grade of C.

2301 - Materials and Processes
3 Credits
Materials and processes involved in machining and fabricating of consumer products. Machining
technologies include traditional and nontraditional material removal equipment, tooling and processes.
Fabrication operations include welding, fastening and adhesives. Offered spring semester.

2311 - Custom Woodworking
3 Credits
Basic processes, tools, and materials employed in the production of custom, individually designed, and
crafted wood projects. May be repeated twice. Offered summers.

2401 - Computer Networking
3 Credits
Introduction to network terminologies, infrastructure (wired topologies), network functions and models
of internet. Description of the OSI and TCP/IP layered models. Overview of applications and services of
Application, Network, Data Link and Physical Layers. Simulation of LAN topology, configuration of
routers and switches, implementation of cable selection and IP addressing schemes. Offered fall and
spring semesters.

2501 - Construction Materials & Methods
4 Credits
Basic concepts of construction techniques used today; including the methods and materials involved in
framing, enclosing, and finishing residential and light commercial buildings. Financing, contracting,
procuring, supervising, site-operation, foundation, structural elements, utilities, landscaping and
personnel associated with construction activities. Offered fall semester.

2701 - Fluid and Mechanical Systems
3 Credits
Concepts of fluid power transmission, mechanical applications, and its control. Methods of maintaining,
troubleshooting, and repairing energy conversion and transmission devices. Hydraulic and pneumatic
power concepts, components, and their symbols. Control techniques experienced with hardware, and
simulated with software based PLC ladder logic that is used in fluid and mechanical systems. Offered
spring semester.

2901 - Special Topics
1 to 3 Credits
May be repeated as the topic varies.
3211 - Digital Manufacturing
4 Credits
Design of mechanical parts and products for manufacturing using 3D CAD solid modeling. Overview of digital manufacturing technologies, and product data and product lifecycle management systems, including Internet applications. Introduction to computer simulation for analysis of assembly processes and ergonomic improvements. Offered fall semester. Prerequisite(s): ( TECH 1201 Minimum Grade of C and TECH 2231 Minimum Grade of C).

3221 - Manufacturing Simulation
4 Credits
Application of discrete event computer simulation software for analysis of manufacturing operations and processes. Specific applications include robotics, factory layouts, and product flows. Manufacturing Simulation team project with a local industrial company. Offered fall semester. Prerequisite(s): TECH 3411 Minimum Grade of C.

3411 - Wide Area Networking
3 Credits
The equipment and procedures for selecting hardware and configuring networking equipment and control software for network communication. Overview of WAN protocols, routing protocols, network management, and physical connections. Offered spring semester. Prerequisite(s): TECH 2401 Minimum Grade of C.

3421 - Database Management and Applications
3 Credits
Comprehensive introduction to database concepts, design and applications. Database terminologies, relational database, database models, data normalization, and Structured Query Language (SQL). Constructing and maintaining of databases and objects in databases. Implementation of data sharing in applications. Offered fall and spring semesters.

3461 - Digital Photography
3 Credits
Techniques of digital photographic composition, camera types, uses and accessories, photographic optics, Photoshop software applications, special effects, image formats, media types, equipment and accessory use, laboratory methods, materials for the collection and manipulation of digital images, and methods of processing. Reference to, and experiences of chemical photography and the shift to digital photographic methods. Offered fall and spring semesters.

3511 - Applications of Soils and Foundations
3 Credits
Principles of soil mechanics as it relates to general construction and foundation systems including footings, piles, caissons, cofferdams, and other substances. Includes applications with properties of soils, soil exploration, compaction, water in soil, consolidation and settlement, soil strength, foundation design, and slope stability. Offered spring semester. Prerequisite(s): TECH 2501 Minimum Grade of C.

3611 - Applied Controls 1
4 Credits
Combinational digital logic and logic design will lay down a framework from which programmable logic controllers are presented. The concepts of inputs, outputs, relay logic and ladder logic will be
addressed. Industrial robots will also be introduced and on-line programming will include tasks such as pick and place, finish application, and robot integration. Offered fall semester. Prerequisite(s): TECH 1601 Minimum Grade of C.

3631 - Applied Controls 2  
3 Credits  
A further investigation into automation systems dealing with automated manufacturing practices in CNC machines, PLCs, vision systems, RFID, and industrial robotics. Activities include such things as automated handling and processing of materials using conveyors, positioners/work-holders, industrial robots, and CNC machines. Computer Integrated Manufacturing techniques including technologies such as sensing, vision, automated product identification, and storage and retrieval. Offered spring semester. Prerequisite(s): TECH 3611 Minimum Grade of C.

3641 - Industrial Instrumentation  
3 Credits  
Presents the fundamental scientific principles of process control including calibration, measurement, and actuation. Topics will include pressure, temperature, level, flow, motors, heaters, other actuators, power supplies for control, and common malfunctions of instrumentation. Offered spring semester. Prerequisite(s): TECH 3611 Minimum Grade of C.

3651 - Applied Controls 3  
3 Credits  
An introduction to the concepts and techniques of feedback and control systems as well as a brief introduction to the concepts of digital control. There is heavy emphasis on the application of feedback and control while providing a firm foundation of understanding of those principles. Offered fall semester. Prerequisite(s): TECH 3641 Minimum Grade of C.

3801 - Professional Practice in Technological Studies  
1 Credit  
Study and professional experience in a technological studies related occupation in an industrial enterprise, consulting firm, or governmental agency. A midterm and final report on the assignment and employer’s evaluation are required. Sophomore standing and minimum 2.50 cumulative GPA. Graded S/U. This course may be repeated 3 times.

3901 - Special Topics  
1 to 3 Credits  
May be repeated as the topic varies.

4111 - Product Manufacturing  
4 Credits  
Application of operations management principles and practices in the manufacture of various types of products into consumer products. Creation, management, and dissolution of a simulated company to produce and sell a tangible product. Emphasis on process design, material handling, organization of work, division of labor, distribution and sales practices relating to mass production industries. Offered fall semester. Prerequisite(s): TECH 2301 Minimum Grade of C and TECH 2231 Minimum Grade of C.

4121 - Manufacturing Management  
3 Credits
Methods applied in mass production industries. Quality topics include Statistical Process Control, TQM, Lean Mfg. and Six Sigma, ISO/QS/TS quality systems, and automatic identification and data capture. Work measurement topics include methods engineering, traditional time studies, predetermined time measurement and work sampling. Offered spring semester. Prerequisite(s): TECH 4111 Minimum Grade of C.

4341 - Advanced Robotics 1
2 Credits
The first half of a two course capstone sequence. An advanced investigation of robotics and automated equipment. Topics of investigation will include robot and automated system design, construction, programming and troubleshooting in a team based environment. Offered spring semester. Prerequisite(s): TECH 3611 Minimum Grade of C.

4351 - Advanced Robotics 2
2 Credits
The second half of a two course capstone sequence. An advanced investigation of robotics and automated equipment. Topics of investigation will include robot and automated system design, construction, programming and troubleshooting in a team based environment. Offered spring semester. Prerequisite(s): TECH 4341 Minimum Grade of C.

4521 - Construction Estimating and Scheduling
3 Credits
Methods and techniques in construction estimating, scheduling, and bidding to include quantity take-off, labor costs, material costs, overhead, profits, and bidding using industry standard software packages. Includes extended practice in scheduling and submittal activities from pre-construction to completion. Practical applications emphasized. Offered fall semester. Prerequisite(s): TECH 3511 Minimum Grade of C.

4621 - Programming in Embedded Systems
4 Credits
Exploration of programming applications in an embedded environment using various microcontroller functions including I/O, memory, and interface techniques. Offered fall semester. Prerequisite(s): TECH 3611 Minimum Grade of C.

4661 - Applied Controls 4
3 Credits
A continuation of TECH 3651 with an emphasis on the design and application of computer-controlled systems and the digital approximation of continuous-time controllers. Offered spring semester. Prerequisite(s): TECH 3651 Minimum Grade of C.

4671 - Robotic Systems
3 Credits
An introduction to digitally-controlled robotic manipulators. Topics include coordinate frames, coordinate frame transformations, forward and inverse kinematic solutions, and control of robot manipulators. Offered spring semester. Prerequisite(s): TECH 3651 Minimum Grade of C.

4841 - Internship
6 to 12 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. Six hours of credit for one summer term or 12 hours for one full-time semester. Graded (A, B, C, D, F). A maximum of 12 hours to count toward graduation. Junior standing and minimum 2.50 cumulative GPA. This course may be repeated 1 time.

4901 - Special Topics
1 to 3 Credits
May be repeated as the topic varies.

4951 - Senior Project
1 Credit
Individual research project expanding upon and applying content learned in a Technological Studies major. Course must be repeated 2 times to fulfill the senior capstone requirement unless the student participates in a specific major capstone requirement in one of the majors in the department. This course is repeatable for a total of 2 hours.

4961 - Tour of Industries
1 Credit
Participation in the annual department sponsored comprehensive tour of industries including the submission of a written technical report pertaining to one or more facets of the experience. May be repeated up to a total of 4 hours. Graded S/U. Offered spring semester.

4971 - Independent Study
1 to 3 Credits
Individual research project of content not normally included in regular coursework of the department. May be repeated as the topic varies.

4991 - Senior Capstone
1 Credit
Report, presentation, and culmination of the senior capstone experience. Presentation of the project management planning, researching, developing, fabricating, assembling, testing, and evaluating processes completed in the senior capstone activity. Offered spring semester. Prerequisite(s): TECH 4841 Minimum Grade of C or TECH 3801 Minimum Grade of C or TECH 435 Minimum Grade of C or TECH 484 Minimum Grade of C or TECH 495 Minimum Grade of C or EDUC 4721 Minimum Grade of S or TECH 4351 Minimum Grade of C.
**Subject - General Business (ABUS)**

1901 - Special Topics in Business  
**1 to 3 Credits**  
Can be repeated as the topic varies. Offered fall and spring semesters.

2011 - Personal Computer Applications for Business  
**3 Credits**  
Business applications for microcomputers. Introductory level use of software for word processing, file management, spreadsheets, and graphics. Offered fall and spring semesters.

2221 - Principles of Entrepreneurship  
**3 Credits**  
Entrepreneurship and new venture creation. Offered fall and spring semesters.

2901 - Special Topics in Business  
**1 to 3 Credits**  
Can be repeated as the topic varies. Offered fall and spring semesters.

3051 - Basics of Expert Testimony  
**3 Credits**  
Legal aspects of the forensic engagement, including rules of evidence and procedure. Offered fall semester.

3901 - Special Topics in Business  
**1 to 3 Credits**  
Can be repeated as the topic varies. Offered fall and spring semesters.

4441 - New Venture Creation  
**3 Credits**  
Capstone course for the Entrepreneurship minor. Develop a business plan to support the launch of a new business venture. Offered fall and spring semesters. Prerequisite(s): ABUS 2221 Minimum Grade of D.

4901 - Special Topics in Business  
**1 to 3 Credits**  
Can be repeated as the topic varies. Offered fall and spring semesters.

**Subject - Accounting (ACCT)**

1901 - Special Topics in Accounting  
**1 to 3 Credits**
Can be repeated as the topic varies. Offered fall and spring semesters.

**2901 - Special Topics in Accounting**  
*1 to 3 Credits*  
Can be repeated as the topic varies. Offered fall and spring semesters.

**3011 - Intermediate Accounting 1**  
*3 Credits*  
Financial accounting functions and basic theory. Preparation of financial statements. Offered fall semester. Prerequisite(s): BIZ 2121 Minimum Grade of D.

**3021 - Intermediate Accounting 2**  
*3 Credits*  
Preparation of financial statements, working capital, operational assets, long-term liabilities, leases and owners equity. Offered spring semester. Prerequisite(s): ACCT 3011 Minimum Grade of D.

**3061 - Business Valuation**  
*3 Credits*  
Assessment of organizational health and value via business strategy analysis, accounting analysis, financial analysis, and prospective analysis. Case studies and financial statement analysis applications. Offered fall semester. Prerequisite(s): BIZ 2121 Minimum Grade of D and BIZ 2031 Minimum Grade of D.

**3071 - Fraud Examination**  
*3 Credits*  
Survey of the types of occupational fraud with the goal of understanding how and why people commit fraud, how fraudulent conduct might be deterred, and how allegations of fraud should be investigated and resolved. Offered spring semester. Prerequisite(s): BIZ 2121 Minimum Grade of D.

**3141 - Intermediate Managerial Accounting 1**  
*3 Credits*  

**3151 - Intermediate Managerial Accounting 2**  
*3 Credits*  

**3871 - Taxation 1**  
*3 Credits*  
Tax concepts in the taxation of individuals and entities. The role of taxation in business decisions, how to conduct basic tax research, tax planning, and professional standards and ethics. Interrelationships and
differences between financial and tax accounting. Offered spring semester. Prerequisite(s): BIZ 2121 Minimum Grade of D.

3901 - Special Topics in Accounting
1 to 3 Credits
Can be repeated as the topic varies. Offered fall and spring semesters.

4031 - Auditing 1
3 Credits
Auditor’s professional ethics and legal liability. Business processes and internal control structure, including current AIS topics. 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. Offered fall semester. Prerequisite(s): ACCT 3021 Minimum Grade of D.

4041 - Auditing 2
3 Credits
Continuation of ACCT 4031, including statistical sampling in auditing, computer technology in auditing, auditor’s responsibility for detecting fraud, and current issues and problems in auditing. Offered spring semester. Prerequisite(s): ACCT 4031 Minimum Grade of D.

4351 - International Financial Accounting
3 Credits
Guiding principles behind international financial reporting standards (IFRS): commonalities, substantial divergences between US GAAP and IFRS. Financial Accounting from a multinational viewpoint involving foreign currency transactions and translation of financial statements denominated in a foreign currency. Also listed as IBEC 4351. Offered spring semester. Prerequisite(s): ACCT 3021 Minimum Grade of D.

4901 - Special Topics in Accounting
1 to 3 Credits
Can be repeated as the topic varies. Offered fall and spring semesters.

4991 - Independent Study in Accounting
1 to 3 Credits
An in-depth exploration of a subject of special interest. 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. Offered fall and spring semesters.

Subject - Business Planning (BIZ)

0001 - Biz Lab 1
1 Credit
Familiarization with the college, requirements of majors and general education, student portfolio requirements, planning sequences of courses, university catalog and library. Activities include college required program assessment. Offered fall semester. Must be enrolled in one of the following Colleges: Business Administration.
1001 - Free Enterprise and Business Planning
3 Credits
Integrative business survey course designed to introduce students to the free enterprise system via a business planning model. An overview of the key functions of business including accounting, finance, management, marketing, operations and human resources and career opportunities pertaining to each. Business majors only. Offered fall semester. Must be enrolled in one of the following Colleges: Business Administration.

1201 - Ethics for Business Planning
3 Credits
Systematic examination of alternative ethical decision making approaches necessary to business planning. Provides a critical thinking framework for analysis and discussion of alternative ethical decision making approaches. Case analysis provides experience in the implementation of the ethical decision making framework. Formerly ABUS 120. Offered spring semester. Must be enrolled in one of the following Colleges: Business Administration.

2021 - Microeconomic Foundations for Business Planning
3 Credits
Economics of the individual firm in the free market economy; competitive and monopolistic markets with a business planning focus. 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. Offered fall semester.

2031 - Macroeconomic Foundations for Business Planning
3 Credits
Forces that determine the behavior of national income and output, unemployment, and the price level with a business planning focus. Rudiments of money and banking, monetary and fiscal policy, growth and development. The dynamics between macroeconomy and business. Formerly IBEC 203. Offered spring semester. Prerequisite(s): BIZ 2021 Minimum Grade of D.

2111 - Financial Accounting Foundations for Business Planning
3 Credits
Analysis and recording of business transactions and accumulating data on the results of economic activity to support business planning. Concepts and issues of financial reporting for business entities, including basic theory of the report writing model. Basic financial statement analysis. Formerly ACCT 211. Offered fall semester.

2121 - Managerial Accounting Tools for Business Planning
3 Credits
Uses of accounting data to support business planning and management decision-making and control of business operations, determination of costs and cost behavior. Formerly ACCT 212. Offered spring semester. Prerequisite(s): BIZ 2111 Minimum Grade of D.

2131 - Legal Environment for Business Planning
3 Credits
Legal environment for business planning; business ethics, international business transactions, the American legal system, methods of dispute resolution, constitutional law, business torts, business crimes, and the basic laws regulating contracts, agency, the workplace, business organizations, purchase
and sale of securities, anticompetitive activities, consumer transactions, and actions affecting the environment. Formerly ABUS 312. Offered fall and spring semesters.

2331 - Behavioral Management for Business Planning
3 Credits
Modern management concepts with emphasis on the human factors involved in a successful business plan. Historical foundations, individual, group, and organizational processes including current management issues. Formerly MGMT 333. Offered fall and spring semesters.

2401 - Information Systems for Business Planning
3 Credits
The development, design and implementation of information systems for business planning. Terminology, concepts, and trends in computer hardware and software. Formerly ABUS 240. Offered fall and spring semesters.

2511 - Marketing for Business Planning
3 Credits
Principles of marketing strategy in the business planning process. Product design and planning, promotional activities, pricing strategy, aspects of physical distribution, retailing, market research, buyer behavior, ethics and global marketing. Formerly MRKT 351. Offered fall and spring semesters.

2801 - Career Planning and Preparedness
3 Credits
Career development from résumé writing to negotiating job offers. Development of written, electronic, and verbal communication skills in employment search. Critiques of résumés, cover letters, and interview styles. Career and industry exercises. Offered fall and spring semesters.

3001 - Global Environment for Business Planning
3 Credits
Functional and environmental features of global business in the business planning process. Analysis of economic, cultural, legal and political forces affecting global business operations. Examination of organizational responses to the challenges of global business organizations. Formerly IBEC 300. Offered fall and spring semesters. Prerequisite(s): BIZ 2031 Minimum Grade of D.

3621 - Financial Analysis for Business Planning
3 Credits
The role of financial analysis within the business planning process. Time value of money and risk/return concepts serve as the foundation for valuing (analyzing) the firm's sources of capital (debt and equity) and effectively allocating these funds through the capital budgeting process. Formerly FINC 362. Offered fall and spring semesters. Prerequisite(s): BIZ 2111 Minimum Grade of D.

3641 - Quantitative Management for Business Planning
3 Credits
Major issues and analytical problem solving techniques in the field of operations management that are used to successfully control the transformation of resources into products and services as established in a business plan. Junior standing. Formerly MGMT 364. Offered fall and spring semesters. Prerequisite(s): ( STAT 1561 Minimum Grade of D and BIZ 2331 Minimum Grade of D).
3991 - Biz Lab 2
1 Credit
Preparation for senior capstone. Activities cultivate synthesis of BIZ core curriculum courses, initial selection of senior capstone project, and college required program assessment activities. Must be enrolled in one of the following Colleges: Business Administration.

4851 - Integrated Business Planning 1
3 Credits
Capstone course integrates tools and concepts from Business core courses. Develops strategic thinking and analysis for business planning. Case study is emphasized. Offered fall semester. Prerequisite(s): ( BIZ 1001 Minimum Grade of D and BIZ 1201 Minimum Grade of D and BIZ 2021 Minimum Grade of D and BIZ 2031 Minimum Grade of D and BIZ 2111 Minimum Grade of D and BIZ 2121 Minimum Grade of D and BIZ 2331 Minimum Grade of D and BIZ 2401 Minimum Grade of D and BIZ 2511 Minimum Grade of D and BIZ 2801 Minimum Grade of D and BIZ 3001 Minimum Grade of D and BIZ 2131 Minimum Grade of D and BIZ 3621 Minimum Grade of D and BIZ 3641 Minimum Grade of D).

4861 - Integrated Business Planning 2
3 Credits
Continuation of BIZ 4851. Completion of a strategic business plan for an applied business case. Offered spring semester. Prerequisite(s): BIZ 4851 Minimum Grade of D.

4911 - Internship in Accounting
1 to 15 Credits
Field experience in accounting. Can be repeated for a maximum of 16 credit hours. Up to 4 hours can be used to satisfy the accounting major requirement. Additional hours can be used as general elective hours and cannot be used to satisfy either accounting or business elective requirements. Consult advisor. Formerly ACCT 427. Offered fall and spring semesters. This course may be repeated for a total of 15 hours.

4921 - Internship in Finance
1 to 15 Credits
Field experience in Finance. Up to 4 hours can be used to satisfy the finance major requirement. Additional hours can be used as general elective hours and cannot be used to satisfy either finance or business elective requirements. Consult advisor. Formerly FINC 421. Offered fall and spring semesters. This course may be repeated for a total of 16 hours.

4931 - Internship in International Business and Economics
1 to 15 Credits
Field experience in international business and economics. Up to 4 hours can be used to satisfy the international business and economics major requirement. Additional hours can be used as general elective hours and cannot be used to satisfy either international business and economics or business elective requirements. Open only to international business and economics majors. Consult advisor. Formerly IBEC 426. Offered fall and spring semesters. This course may be repeated for a total of 16 hours.

4941 - Internship in Management
1 to 15 Credits
Field experience in Management. Can be repeated for a maximum of 16 credit hours. Up to 4 hours can be used to satisfy the management major requirement. Additional hours can be used as general elective hours and cannot be used to satisfy either management or business elective requirements. Consult advisor. Formerly MGMT 425. Offered fall and spring semesters. This course may be repeated for a total of 16 hours.

4951 - Internship in Marketing
1 to 15 Credits
Field experience in marketing. Up to 4 hours can be used to satisfy the marketing major requirement. Additional hours can be used as general elective hours and cannot be used to satisfy either marketing or business elective requirements. Consult advisor. Formerly MRKT 420. Offered fall and spring semesters. This course may be repeated for a total of 16 hours.

4961 - Internship in Pharmaceutical Business
1 to 15 Credits
Field experience in pharmaceutical business. Up to 4 hours can be used to satisfy the pharmaceutical business major requirement. Additional hours can be used as general elective hours and cannot be used to satisfy either pharmaceutical business or business elective requirements. Consult advisor. Formerly PHBU 495. Offered fall and spring semesters. This course may be repeated for a total of 16 hours.

Subject - Forensic Accounting & Auditing (FAAS)

5101 - Professional Ethics and Sarbanes Oxley Compliance
3 Credits
Ethical reasoning, integrity, objectivity, independence and other core values as defined by the American Institute of Certified Public Accountants are discussed. A discussion of the provisions of the Sarbanes-Oxley Act provides the students with an appreciation of the legal constraints that result from lapses in ethical reasoning, integrity and objectivity in the accounting profession. Also listed as TAX 5101. Offered fall semester.

5201 - Corporate Governance
3 Credits
The structured system of policies and processes established and maintained by the board of directors to oversee an organization's strategic activities, accountability and openness in conducting its activities for the long-term. Focus on board size, structure, membership, member nomination, election and tenure; committee structure and the nature, composition and duties of the committees; rights, responsibilities and relationship of directors, management, and shareholders; policies and procedures related to accounting, auditing, executive compensations and financial reporting. Also listed as TAX 5201. Offered spring semester.

5341 - Fraud Examination
3 Credits
Survey of the types of occupational fraud with the goal of understanding how and why people commit fraud, how fraudulent conduct might be deterred, and how allegations of fraud should be investigated and resolved. Also listed as ACCT 3071. Offered fall semester.
5381 - Information Technology Auditing and Risk Management
3 Credits
This course covers management's role in controlling information technology and addressing the major risks related to technology. Topics include information security, contingency planning, desktop computer controls, systems development controls, computer center operation controls, assurance of information related to on-line, client-server, web-based, internet and other advanced computer systems. Students will learn approaches to evaluating and addressing technology risk throughout the organization from the perspective of internal and external audit in addition to the view of every end user. Topics included in the class will include coverage of all areas to prepare students to take the Certified Information Systems Auditor (CISA) examination. Offered fall semester.

5421 - Internal Auditing
3 Credits
The course will cover internal audit from a broad perspective that includes information technology, business processes, and accounting systems. Topics include internal auditing standards, risk assessment, governance, ethics, audit techniques, and emerging issues. The course covers the design of business processes and the implementation of key control concepts and will use a case study approach that addresses tactical, strategic, systems, and operational areas. Improvement in effectiveness and efficiency will be covered in the areas of operations, finance and technology. This course's content follows the recommended curriculum of the Institute of Internal Auditors' Internal Auditing Educational Partnership program. Topics included in the class will assist students in preparing to take the Certified Internal Auditor examination. Offered fall semester.

5601 - Business Valuation
3 Credits
Assessment of organizational health and value via business strategy, accounting, financial, and prospective analysis. Calculation of values using the income and market approaches. Selection of appropriate standard of value. Financial statement adjustments and calculation of premiums, discounts, and capitalization rates. Use of research and database resources. The curriculum of this course follows recommendations set forth by the National Association of Certified Valuation Analysts. Students passing the final examination in this course will earn 16 credit hours toward the training requirement necessary to sit for the NACVA's Accredited Valuation Analyst (AVA) certification examination. Ohio Northern University is an educational partner with the NACVA. Also listed as TAX 5601. Offered spring semester.

5701 - Basics of Expert Testimony
3 Credits
Legal aspects of the forensic engagement, including rules of evidence and procedure. Also listed as TAX 5701. Offered fall semester.

5801 - Internship in Forensic Accounting and Auditing
1 to 15 Credits
Offered fall and spring semesters.

5841 - Computer Forensics and Investigation
3 Credits
This course introduces students to the techniques and tools of computer forensics investigations. Students will receive step-by-step explanations on how to use the most popular forensic tools. The
course maps to the objectives of the International Association of Computer Investigative Specialists (IACIS) certificate, and includes coverage of the latest technology including PDAs, cell phones, and thumb drives. Many hands-on activities are included, which allow students to practice skills as they are learned. Offered spring semester.

5881 - Advanced Topics in Auditing  
3 Credits  
This is a seminar course which covers current issues in auditing. Content varies each year. Offered spring semester.

Subject - Finance (FINC)

1101 - Personal Finance  
3 Credits  
Personal and family financial planning with an emphasis on financial recordkeeping, budgeting, tax planning, consumer credit, housing, insurance, investments and retirement and estate planning. Offered fall and spring semesters.

1901 - Special Topics in Finance  
1 to 3 Credits  
Can be repeated as the topic varies. Offered fall and spring semesters.

2901 - Special Topics in Finance  
1 to 3 Credits  
Can be repeated as the topic varies. Offered fall and spring semesters.

3651 - Introduction to Health Care Systems Finance and Economics  
3 Credits  
Basic concepts, principles, and practices associated with the economic and financial aspects of the U. S. health care delivery system. Also listed as PHBU 3651. Offered fall semester. Prerequisite(s): (BIZ 2021 Minimum Grade of D and BIZ 3621 Minimum Grade of C).

3681 - Working Capital Management  
3 Credits  
Planning for and management of short term funds within the firm. Topics include cash management, short term investments, receivables management, and short term borrowings. Globalization of financial services delivery, and international cash management and foreign exchange risk emphasized. Techniques used to manage short term surplus funds and hedge for short term foreign exchange risk exposures discussed. Offered spring semester. Prerequisite(s): BIZ 3621 Minimum Grade of C.

3691 - Intermediate Financial Management  
3 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. Offered fall semester. Prerequisite(s): BIZ 3621 Minimum Grade of C.
3901 - Special Topics in Finance
1 to 3 Credits
Can be repeated as the topic varies. Offered fall and spring semesters.

4601 - Financial Markets and Institutions
3 Credits
Policies and decisions regarding asset, liability, and capital management of a variety of financial institutions such as banks, insurance companies, pension funds, mutual funds and others within the legal, competitive and economic environment. Offered spring semester. Prerequisite(s): (BIZ 2031 Minimum Grade of D and BIZ 3621 Minimum Grade of C).

4611 - Investments
3 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. Offered fall and spring semesters. Prerequisite(s): BIZ 3621 Minimum Grade of C.

4621 - Insurance
3 Credits
Principles of personal risk management and insurance. Topics include property and liability insurance, life and health insurance, employee benefits, and social security. Discussion of the functional and financial aspects of insurers. Offered spring semester. Prerequisite(s): BIZ 3621 Minimum Grade of C.

4671 - International Finance
3 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. Also listed as IBEC 4671. Offered spring semester. Prerequisite(s): (BIZ 3001 Minimum Grade of D and BIZ 3621 Minimum Grade of C).

4901 - Special Topics in Finance
1 to 3 Credits
Can be repeated as the topic varies. Offered fall and spring semesters.

5001 - Independent Study in Finance
1 to 3 Credits
An in-depth exploration of a subject of special interest. 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. Offered fall and spring semesters.

Subject - International Business/Economics (IBEC)
1901 - Special Topics in International Business and Economics
1 to 3 Credits
Can be repeated as the topic varies. Offered fall and spring semesters.

2901 - Special Topics in International Business and Economics
1 to 3 Credits
Can be repeated as the topic varies. Offered fall and spring semesters.

3521 - Money and Banking
3 Credits
Theories of money and credit; commercial banking practices; reserve banking; monetary and banking laws; money market; money and credit in the world economy. (Discipline: Economics.) Offered fall semester. Prerequisite(s): BIZ 2031 Minimum Grade of D.

3661 - Pharmaceutical Economics
3 Credits
Economic analysis of the pharmaceutical industry. Cost and benefit analysis of industry choices; drug therapy costs and health care outcomes; market structure analysis; patients and trademarks; and government policy impacts. (Discipline: Economics.) Also listed as PHBU 3661. Offered fall semester. Prerequisite(s): BIZ 2031 Minimum Grade of D.

3831 - Intermediate Microeconomic Theory
3 Credits
Special problems of pricing, production, and distribution under perfect competition, monopoly, oligopoly, and duopoly in the American economy. (Discipline: Economics.) Offered fall semester. Prerequisite(s): BIZ 2031 Minimum Grade of D.

3841 - Intermediate Macroeconomic Theory
3 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. (Discipline: Economics.) Prerequisite(s): BIZ 2031 Minimum Grade of D.

3851 - International Economics
3 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. (Discipline: Economics.) Offered spring semester. Prerequisite(s): BIZ 2031 Minimum Grade of D.

3871 - Exporting
3 Credits
Tools, mechanics, opportunities, key success factors, unique challenges of exporting successfully: global market, industry and product assessment, export controls, export intermediaries and distribution, export pricing and terms of sale including INCO terms, documentation requirements, shipping terminology, export financing and credit, risk sharing, modes of entry, government export support programs. Regional and specific industry emphases. Presented in applied fashion using industry level
export documentation/planning software, field trip, speakers, and an experiential project. Offered spring semester. Prerequisite(s): BIZ 300 Minimum Grade of D.

**3901 - Special Topics in International Business and Economics**  
*1 to 3 Credits*  
Can be repeated as the topic varies. Offered fall and spring semesters.

**4301 - Econometrics**  
*3 Credits*  
Introductory econometrics. Application of statistical methods to economic, business and social science topics. (Discipline: Economics.) Also listed as PHBU 4301. Offered spring semester. Prerequisite(s): BIZ 2031 Minimum Grade of D and (STAT 2561 Minimum Grade of D) or (MATH 1631 Minimum Grade of D and STAT 1561 Minimum Grade of D).

**4311 - Seminar in Pharmaceutical Economics**  
*3 Credits*  
In-depth analysis of the pharmaceutical industry. Topics will vary. Guest speakers to include industry leaders, researchers, and government officials. (Discipline: Economics.) Also listed as PHBU 4311. Prerequisite(s): (IBEC 3661 Minimum Grade of D or PHBU 3661 Minimum Grade of D).

**4351 - International Financial Accounting**  
*3 Credits*  
Guiding principles behind international financial reporting standards (IFRS): commonalities, substantial divergences between US GAAP and IFRS. Financial Accounting from a multinational viewpoint involving foreign currency transactions and translation of financial statements denominated in a foreign currency. Also listed as ACCT 4351. Offered spring semester. Prerequisite(s): ACCT 3021 Minimum Grade of D.

**4421 - Economic History of the United States**  
*3 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. (Discipline: Economics.) Prerequisite(s): BIZ 2031 Minimum Grade of D.

**4531 - International Marketing**  
*3 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. (Also listed as MRKT 4351.) Offered fall semester. Prerequisite(s): (BIZ 2511 Minimum Grade of D and BIZ 3001 Minimum Grade of D).

**4671 - International Finance**  
*3 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. Also listed as FINC 4671. Offered spring semester. Prerequisite(s): ( BIZ 3001 Minimum Grade of D and BIZ 3621 Minimum Grade of C).

4861 - International Management
3 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. Also listed as MGMT 4861. Offered spring semester. Prerequisite(s): ( BIZ 2331 Minimum Grade of D and BIZ 2511 Minimum Grade of D and BIZ 3001 Minimum Grade of D and BIZ 3621 Minimum Grade of C).

4901 - Special Topics in International Business and Economics
1 to 3 Credits
Can be repeated as the topic varies. Offered fall and spring semesters.

4971 - Independent Study in International Business and Economics
1 to 3 Credits
An in-depth exploration of a subject of special interest. 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. Offered fall and spring semesters.

Subject - Management (MGMT)

1901 - Special Topics in Management
1 to 3 Credits
Can be repeated as the topic varies. Offered fall and spring semesters.

2901 - Special Topics in Management
1 to 3 Credits
Can be repeated as the topic varies. Offered fall and spring semesters.

3251 - Employment Law
3 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. Offered fall semester. Prerequisite(s): BIZ 2131 Minimum Grade of D.

3341 - Cases and Exercises in Organizational Behavior
3 Credits
Experiential and case-based approach to managing organizational behavior. Offered spring semester. Prerequisite(s): BIZ 2331 Minimum Grade of D.

3631 - Human Resource Management
3 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. Offered fall and spring semesters. Prerequisite(s): BIZ 2331 Minimum Grade of D.

3751 - Management Decision Making
3 Credits
Qualitative and quantitative management tools and techniques used in problem solving and decision making. Qualitative tools include brainstorming, cause and effect diagrams, the nominal group technique, the Delphi technique, focus groups, force field analysis, competitive analysis, and value chain analysis. Quantitative methods concentrate on linear programming and forecasting. Also listed as PHBU 3751. Offered fall semester. Prerequisite(s): BIZ 3641 Minimum Grade of D.

3901 - Special Topics in Management
1 to 3 Credits
Can be repeated as the topic varies. Offered fall and spring semesters.

4001 - Current Labor Relations
3 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. Prerequisite(s): MGMT 3631 Minimum Grade of D.

4101 - Business and Society
3 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. Offered spring semester. Prerequisite(s): BIZ 2331 Minimum Grade of D.

4121 - Health Care Management
3 Credits
Special management issues in the health sector: governance, human resources, financial statements and resource seeking, and performance assessments. Also listed as PHBU 4121. Offered spring semester. Prerequisite(s): BIZ 2331 Minimum Grade of D.

4151 - Compensation Management
3 Credits
Compensation and benefits fundamentals, strategies, practices, and current issues, including wage level determinants, job requirements, wage and salary structures, incentive systems, methods of job evaluation and wage payments, fringe benefits. Also listed as PHBU 4151. Offered spring semester. Prerequisite(s): MGMT 3631 Minimum Grade of D.

4571 - Project Management
3 Credits
Managerial planning and control. Tools and techniques involved in managing projects. Exercises in decision making and critical thinking. Also listed as PHBU 4571. Offered spring semester. Prerequisite(s): BIZ 2331 Minimum Grade of D.
4741 - Small Business Management
3 Credits
The importance of small business, its current status, problems encountered and requirements for successful operations. Emphasis on problem solving techniques for small business. Prerequisite(s): BIZ 100 or BIZ 1001.

4771 - Nonprofit Management
3 Credits
Special management issues in the nonprofit sector: governance, human resources, financial statements and resource seeking, performance assessment, and current issues of concern to nonprofit managers. Offered fall semester. Prerequisite(s): BIZ 2331 Minimum Grade of D.

4861 - International Management
3 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. Offered spring semester. Prerequisite(s): (BIZ 2331 Minimum Grade of D and BIZ 2511 Minimum Grade of D and BIZ 3001 Minimum Grade of D and BIZ 3621 Minimum Grade of C).

4901 - Special Topics in Management
1 to 3 Credits
Can be repeated as the topic varies. Offered fall and spring semesters.

4981 - Independent Study in Management
1 to 3 Credits
An in-depth exploration of a subject of special interest. 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. Offered fall and spring semesters.

Subject - Marketing (MRKT)

1901 - Special Topics in Marketing
1 to 3 Credits
Can be repeated as the topic varies. Offered fall and spring semesters.

2901 - Special Topics in Marketing
1 to 3 Credits
Can be repeated as the topic varies. Offered fall and spring semesters.

3341 - Marketing Research
3 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. Also listed as PHBU 3341. Offered fall semester. Prerequisite(s): (BIZ 2511 Minimum Grade of D and STAT 1561 Minimum Grade of D).

3521 - Consumer Behavior  
3 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. Also listed as PHBU 3521. Offered spring semester. Prerequisite(s): BIZ 2511 Minimum Grade of D.

3631 - Product Development  
3 Credits  
Issues in the development and marketing of new products and services. Also listed as PHBU 3631. Offered fall semester. Prerequisite(s): BIZ 2511 Minimum Grade of D.

3901 - Special Topics in Marketing  
1 to 3 Credits  
Can be repeated as the topic varies. Offered fall and spring semesters.

4531 - International Marketing  
3 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. Also listed as IBEC 4531. Offered fall semester. Prerequisite(s): (BIZ 2511 Minimum Grade of D and BIZ 3001 Minimum Grade of D).

4601 - Integrated Marketing Communication  
3 Credits  
Management of the promotion mix and how its elements can be integrated to solve marketing communication problems. Specific topics include: advertising, personal selling, sales promotion, direct marketing, internet marketing and public relations.

4701 - Retailing  
3 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. Offered fall semester.

4711 - Sales and Customer Relationship Management  
3 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. Also listed as PHBU 4711. Offered fall semester. Prerequisite(s): BIZ 2511 Minimum Grade of D.

4731 - Supply Chain Management
3 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. Also listed as PHBU 4731. Offered spring semester. Prerequisite(s): (BIZ 2331 Minimum Grade of D and BIZ 2511 Minimum Grade of D).

4761 - Business to Business Marketing
3 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.

4901 - Special Topics in Marketing
1 to 3 Credits
Can be repeated as the topic varies. Offered fall and spring semesters.

4961 - Independent Study in Marketing
1 to 3 Credits
An in-depth exploration of a subject of special interest. 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. Offered fall and spring semesters.

4991 - Advanced Marketing
3 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. Also listed as PHBU 4991. Offered spring semester.

Subject - Pharmaceutical Business (PHBU)

1901 - Special Topics in Pharmaceutical Business
1 to 3 Credits
Can be repeated as the topic varies. Offered fall and spring semesters.

2901 - Special Topics in Pharmaceutical Business
1 to 3 Credits
Can be repeated as the topic varies. Offered fall and spring semesters.

3051 - Introduction to Pharmaceutical Science
3 Credits
Basic and pharmaceutical sciences including medical terminology, pharmacology, toxicology, medicinal chemistry, pharmacokinetics and pharmaceutics. The role of pharmaceutical sciences in the health care system. Offered spring semester. Prerequisite(s): (BIOL 1101 Minimum Grade of D and BIOL 2311 Minimum Grade of D and CHEM 1201 Minimum Grade of D).
3171 - Pharmaceutical Industry Legal Environment
3 Credits
Law and regulations related to the pharmaceutical industry. Offered spring semester. Prerequisite(s): BIZ 2131 Minimum Grade of D.

3341 - Marketing Research
3 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. (Also listed as MRKT 3341.) Offered fall semester. Prerequisite(s): ( BIZ 2511 Minimum Grade of D and STAT 1561 Minimum Grade of D).

3521 - Consumer Behavior
3 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. Also listed as MRKT 3521. Offered spring semester. Prerequisite(s): BIZ 2511 Minimum Grade of D.

3631 - Product Development
3 Credits
Issues in the development and marketing of new products and services. Also listed as MRKT 3631. Offered fall semester. Prerequisite(s): BIZ 2511 Minimum Grade of D.

3651 - Introduction to Health Care Systems Finance and Economics
3 Credits
Basic concepts, principles, and practices associated with the economic and financial aspects of the U. S. health care delivery system. Also listed as FINC 3651. Offered fall semester. Prerequisite(s): ( BIZ 2021 Minimum Grade of D and BIZ 3621 Minimum Grade of C).

3661 - Pharmaceutical Economics
3 Credits
Economic analysis of the pharmaceutical industry. Cost and benefit analysis of industry choices; drug therapy costs and health care outcomes; market structure analysis; patients and trademarks; and government policy impacts. (Discipline: Economics.) Also listed as IBEC 3661. Offered fall semester. Prerequisite(s): BIZ 2031 Minimum Grade of D.

3751 - Management Decision Making
3 Credits
Qualitative and quantitative management tools and techniques used in problem solving and decision making. Qualitative tools include brainstorming, cause and effect diagrams, the nominal group technique, the Delphi technique, focus groups, force field analysis, competitive analysis, and value chain analysis. Quantitative methods concentrate on linear programming and forecasting. Also listed as MGMT 3751. Offered fall semester. Prerequisite(s): BIZ 3641 Minimum Grade of D.

3901 - Special Topics in Pharmaceutical Business
1 to 3 Credits
Can be repeated as the topic varies. Offered fall and spring semesters.

4121 - Health Care Management
3 Credits
Special management issues in the health sector: governance, human resources, financial statements and resource seeking, and performance assessments. Also listed as MGMT 4121. Offered spring semester. Prerequisite(s): BIZ 2331 Minimum Grade of D.

4151 - Compensation Management
3 Credits
Compensation and benefits fundamentals, strategies, practices, and current issues, including wage level determinants, job requirements, wage and salary structures, incentive systems, methods of job evaluation and wage payments, fringe benefits. Also listed as MGMT 4151. Offered spring semester. Prerequisite(s): MGMT 3631 Minimum Grade of D.

4301 - Econometrics
3 Credits
Introductory econometrics. Application of statistical methods to economic, business and social science topics. Also listed as IBEC 4301. Offered spring semester. Prerequisite(s): BIZ 2031 Minimum Grade of D and ( STAT 2561 Minimum Grade of D) or ( MATH 1631 Minimum Grade of D and STAT 1561 Minimum Grade of D).

4311 - Seminar in Pharmaceutical Economics
3 Credits
In-depth analysis of the pharmaceutical industry. Topics will vary. Guest speakers to include industry leaders, researchers, and government officials. Also listed as IBEC 4311. Prerequisite(s): ( IBEC 3661 Minimum Grade of D or PHBU 3661 Minimum Grade of D).

4571 - Project Management
3 Credits
Managerial planning and control. Tools and techniques involved in managing projects. Exercises in decision making and critical thinking. Also listed as MGMT 4571. Offered spring semester. Prerequisite(s): BIZ 2331 Minimum Grade of D.

4711 - Sales and Customer Relationship Management
3 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. Also listed as MRKT 4711. Offered fall semester. Prerequisite(s): BIZ 2511 Minimum Grade of D.

4731 - Supply Chain Management
3 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. Also listed as MRKT 4731.
Offered spring semester. Prerequisite(s): (BIZ 2331 Minimum Grade of D and BIZ 2511 Minimum Grade of D).

**4901 - Special Topics in Pharmaceutical Business**  
*1 to 3 Credits*  
Can be repeated as the topic varies. Offered fall and spring semesters.

**4991 - Advanced Marketing**  
*3 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. Also listed as MRKT 4991. Offered spring semester.

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**Subject - Taxation (TAX)**

**5101 - Professional Ethics and Sarbanes Oxley Compliance**  
*3 Credits*  
Ethical reasoning, integrity, objectivity, independence and other core values as defined by the American Institute of Certified Public Accountants are discussed. A discussion of the provisions of the Sarbanes-Oxley Act provides the students with an appreciation of the legal constraints that result from lapses in ethical reasoning, integrity and objectivity in the accounting profession. Also listed as FAAS 5101. Offered fall semester.

**5201 - Corporate Governance**  
*3 Credits*  
The structured system of policies and processes established and maintained by the board of directors to oversee an organization’s strategic activities, accountability and openness in conducting its activities for the long-term. Focus on board size, structure, membership, member nomination, election and tenure; committee structure and the nature, composition and duties of the committees; rights, responsibilities and relationship of directors, management, and shareholders; policies and procedures related to accounting, auditing, executive compensations and financial reporting. Also listed as FAAS 5201. Offered spring semester.

**5331 - Federal Income Tax**  
*3 Credits*  
The fundamentals of federal income taxation, emphasizing its application to individuals. Gross income (inclusions and exclusions); adjusted gross income; deductions; taxable income; taxable credits; identification of the taxpayer; general tax accounting principles; and basic federal tax procedure. The application of the income tax law to business and investment property, including capital gains and losses, depreciation, and recapture. A consideration of the non-recognition and deferral of income, and other factors affecting the computation of tax liability. Offered fall semester.

**5371 - Research Methods**  
*3 Credits*  
Legal research methods with a focus on tax law, including distinctions between primary and secondary
sources and location of materials in electronic and printed form. Methodology to determine, research, resolve and communicate tax law issues. Offered fall semester.

5411 - Taxation of Partnerships and Partners
3 Credits
Taxation of partnerships and partners. The federal tax law applying to the relationship between the partnership and its partners. The formation, operation, and liquidation of partnerships, as well as the sale of a partnership, interest, and the retirement of a partner. Offered fall semester.

5431 - Taxation of Estates, Gifts, and Trusts
3 Credits
The operation and use of federal tax provisions applicable to inter vivos and testamentary dispositions of property with particular emphasis upon matters of federal estate and gift taxation. Offered fall semester.

5451 - Non-Profit Organizations
3 Credits
The rules affecting charitable organizations, including tax-exempt income, unrelated business income, lobbying and political activities, and the deduction of contributions. Offered fall semester.

5601 - Business Valuation
3 Credits
Assessment of organizational health and value via business strategy, accounting, financial, and prospective analysis. Calculation of values using the income and market approaches. Selection of appropriate standard of value. Financial statement adjustments and calculation of premiums, discounts, and capitalization rates. Use of research and database resources. The curriculum of this course follows recommendations set forth by the National Association of Certified Valuation Analysts. Students passing the final examination in this course will earn 16 credit hours toward the training requirement necessary to sit for the NACVA's Accredited Valuation Analyst (AVA) certification examination. Ohio Northern University is an educational partner with the NACVA. Also listed as FAAS 5601. Offered spring semester.

5701 - Basics of Expert Testimony
3 Credits
Legal aspects of the forensic engagement, including rules of evidence and procedure. Also listed as FAAS 5701. Offered fall semester.

5801 - Internship in Taxation
1 to 15 Credits
Offered fall and spring semesters.

5831 - Taxation of Corporations
3 Credits
Federal income taxation of corporate activities, with emphasis on consequences to individual shareholders. Offered spring semester.

5871 - Business Planning
3 Credits
State substantive law and securities and tax law in planning the formation and change of business
entities. Proposing solutions to the problems presented by the business client, the preparation of better explaining proposals to the client, and drafting documents that will carry out the proposed plan. Problems involving both incorporated and unincorporated business entities. Offered spring semester.

5891 - Estates, Wills & Trusts
3 Credits
The law of intestate and testate succession; formal requirements of wills, testamentary capacity, undue influence, fraud and mistake, holographic and nuncupative wills integration and incorporation by reference; revocation, republication, revival and amendment. The nature, creation, and elements of a trust; rights, liabilities and duties of settlor, trustee and beneficiary; creditors rights against trust property; modification and termination of a trust, charitable trusts; resulting and constructive trusts, and general fiduciary responsibilities and administrative problems. Offered spring semester.

5931 - International Taxation
3 Credits
Basic survey of international taxation law, including source of income and expense allocation rules, international tax credits, transfer pricing, antiddeferral rules, withholding taxes, income tax treaties, tax incentives, and expatriate issues. Offered spring semester.
The Thomas Jefferson Smull College of Engineering Courses

Department of Civil Engineering

Subject - Civil Engineering (CE)

2031 - Surveying
3 Credits
Plane surveying; use of level, distance measurement devices, data collectors, and total stations; traversing, roadway applications, and topographic mapping, and introduction to coordinate geometry, GIS and GPS applications. Offered fall semester. Prerequisite(s): ( MATH 1611 Minimum Grade of D or MATH 1631 Minimum Grade of D).

3031 - Advanced Surveying
3 Credits
A second surveying course that expands on the basic surveying skills presented in CE 2031. Topics include: history of Ohio land surveys, Ohio surveying law, boundary surveying fundamentals, gathering of surveying field data, and preparation of preliminary engineering site drawings. Offered spring semester. Prerequisite(s): ( CE 2031 Minimum Grade of D).

3131 - Numerical and Statistical Methods
3 Credits
Principles of numerical methods used in solving civil engineering problems. Topics include numerical solutions of single variable equations, systems of non-linear equations, integration and differentiation, differential and partial differential equations by finite differences, and statistical techniques. Offered spring semester. Prerequisite(s): MATH 2651 Minimum Grade of D.

3231 - Environmental Engineering and Science
3 Credits
Sources and characteristics of pollutants, their effects on the environment, humans, and animals. Emphasis placed on interdisciplinary approach to reduce and treat wastes. Offered spring semester. Prerequisite(s): CHEM 1501 Minimum Grade of D.

3251 - Environmental Systems Analysis
3 Credits
Introduction to principles of environmental systems analysis. Principles of optimization, mathematical simulation, uncertainty, economic analysis, risk and reliability are applied for decision support in human-altered environmental systems. Methods are demonstrated using case studies from environmental engineering within air, surface and subsurface pollution modeling and abatement. Some programming experience is recommended. Offered spring semester. Prerequisite(s): ( CE 3231 Minimum Grade of D).

3411 - Structural Analysis
4 Credits
Analyses of determinate beams, trusses and frames and indeterminate beams and frames. Topics include deflections, displacements, principle of superposition, moving loads, influence lines, cables and arches, slope deflection method, and moment distribution method. Offered fall semester. Prerequisite(s): ( ENGR 2231 Minimum Grade of D).

3431 - Reinforced Concrete Design
4 Credits
Mechanics of structural concrete and method for design of reinforced concrete (RC) beams, columns, slabs, and footing. In addition, laboratory on concrete testing. Offered spring semester. Prerequisite(s): ( CE 3411 Minimum Grade of D).

3511 - Highway Engineering and Traffic Analysis
3 Credits
Components of transportation systems, traffic flow modeling, geometric design of highways, horizontal and vertical curves, traffic control devices, the use of statistical analysis techniques in traffic engineering, principles of traffic engineering, capacity, and level of service, intersection analysis and design. Offered fall semester. Prerequisite(s): ( CE 2031 Minimum Grade of D).

3531 - Pavement Analysis and Design
3 Credits
Design of pavements for transportation facilities, material properties and their impact on pavement design. Offered spring semester. Prerequisite(s): ( ENGR 2231 Minimum Grade of D and CE 3511 Minimum Grade of D).

3551 - Highway Materials
3 Credits
Fundamental understanding of the behavior of highway materials including aggregates, asphalt binder, and asphalt mixes. Covers mix design, material testing procedures, and specifications. Offered spring semester. Prerequisite(s): ( ENGR 2231 Minimum Grade of D).

3611 - Engineering Fluid Mechanics
3 Credits
Principles of the mechanics of fluids; engineering properties of fluids, fluid statics, fluid dynamics by continuity, momentum and energy principles; steady flow in pipes, to include series and parallel pipes and pipe networks. A water distribution term project is required. ENGR 2141 is strongly recommended before you take this course. Offered fall semester. Prerequisite(s): ( ENGR 2131 Minimum Grade of D).

3631 - Water Resources Engineering
3 Credits
Pump design, and water hammer; flow measurement and dimensional analysis and similitude. Estimates of population, water usage and wastewater generation; the hydrologic cycle, precipitation and stream flow data measurement and analysis; runoff prediction, hydrographs, flood routing, and open channel flow. A design term project is required. Offered spring semester. Prerequisite(s): ( CE 3611 Minimum Grade of D).

3711 - Urban Planning
3 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. Junior standing. Offered spring semester.

3901 - Special Topics
1 to 3 Credits
Selected topics of current interest in civil engineering. Permission of instructor.

3951 - Independent Study
1 to 3 Credits
Independent study of a topic of particular interest to the student in civil engineering. Permission of instructor.

4101 - Civil Engineering Design Seminar
1 Credit
Engineering design process; selection of senior design project; oral and written presentation of project proposal. Civil Engineering senior standing. Offered fall semester. Must be enrolled in one of the following Colleges: Engineering. Must be enrolled in one of the following Fields of Study: Civil Engineering.

4141 - Project Management
3 Credits
Principles of organization, management, and control of civil engineering projects. Topics include present and emerging legal and technical issues, critical path methods, project estimating and engineering economics. Senior standing. Offered fall semester.

4151 - Civil Engineering Design Project
3 Credits
Capstone design project under the specific guidance of a civil engineering faculty member. Offered spring semester. Prerequisite(s): ( CE 4101 Minimum Grade of D) Must be enrolled in one of the following Colleges: Engineering. Must be enrolled in one of the following Fields of Study: Civil Engineering.

4241 - Water and Wastewater Engineering
4 Credits
Physical, chemical, and biological processes in drinking water and wastewater treatment systems. Offered fall semester. Prerequisite(s): CE 3231 Minimum Grade of D and CE 3631 Minimum Grade of D.

4251 - Watershed Water Quality Analysis
3 Credits
Integrated lecture and field laboratory course experience to delve more deeply into the mass balance and kinetic relationships in environmental processes presented in CE 3231 Environmental Engineering & Science. Students will participate in laboratory and field experiences to determine common environmental water quality parameters and their impacts on surface water quality. Report preparation included. Offered spring semester. Prerequisite(s): ( CE 3231 Minimum Grade of D).

4341 - Geotechnical Principles
3 Credits
Physical characteristics, index properties, classification, and compaction of soils. Principles of mechanics
of soils, settlement, and consolidation. Offered fall semester. Prerequisite(s): ( ENGR 2231 Minimum Grade of D).

**4351 - Geotechnical Design**  
3 Credits  
Analysis and design of structural foundations, retaining structures, and slope stability. Offered spring semester. Prerequisite(s): ( CE 4341 Minimum Grade of D).

**4441 - Structural Steel Design**  
3 Credits  
Load and resistance factor design concept (LRFD), and design of tension and compression members, beam, columns, beam-column members, and simple connections. Instability of steel members. Offered fall semester. Prerequisite(s): ( CE 3411 Minimum Grade of D).

**4451 - Structural Design**  
3 Credits  
Design of structural projects. Offered spring semester. Prerequisite(s): ( CE 3431 Minimum Grade of D and CE 4441 Minimum Grade of D).

**4661 - Advanced Open Channel Hydraulics and Ground Water**  
3 Credits  
Continuation of open channel flow analysis with sewer design and modeling water surface profiles. Groundwater topics of confined and unconfined aquifers, steady and unsteady groundwater hydraulics, aquifer pumping tests, and mathematical groundwater modeling. Offered spring semester. Prerequisite(s): CE 3631 Minimum Grade of D.

**4901 - Special Topics**  
1 to 3 Credits  
Selected topics of current interest in civil engineering. Permission of instructor.

**4951 - Independent Study**  
1 to 3 Credits  
Independent study of a topic of particular interest to the student in civil engineering. Permission of instructor.

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**Department of Electrical and Computer Engineering and Computer Sciences**

**Subject - Electrical & Computer Engineering & Computer Sciences (ECCS)**

**1101 - Computer Science Orientation**  
1 Credit  
Introduction to the ECCS Department with primary emphasis on the Computer Science Program. Understanding of the curriculum and the role played by Computer Scientists in society. A discussion about how the general education learning outcomes may relate to the students career with a focus on critical and creative thinking. All requirements of the General Education Transitions Experience are met.
by this course. Offered fall semester. Must be enrolled in one of the following Colleges: Engineering. Must be enrolled in one of the following Fields of Study: Computer Science.

1421 - Net-Centric Computing
3 Credits
Software development tools and techniques appropriate for application development on the World Wide Web. HTTP, HTML, Cascading Style Sheets, client-side scripting, server-side scripting, server-side data storage and retrieval, relational databases, and the use of commercial web hosting to support all of these technologies. Formerly ECCS 241. Offered spring semester.

1611 - Programming 1
4 Credits

1621 - Programming 2
4 Credits
Continuation of Programming 1. Focus on object-oriented programming paradigm: classes, objects, methods, information hiding, inheritance, polymorphism. Software engineering: tools, design, testing, validation. Graphical user interfaces and their fundamental widgets. Event-driven programming. Offered spring semester. Prerequisite(s): ECCS 1611 Minimum Grade of D or ECCS 164 Minimum Grade of D.

2311 - Electric Circuits
4 Credits
DC and AC circuits. Basic laws, analysis techniques, and circuit theorems. Op amps, first-order circuits, sinusoids and phasors, ac power analysis, ideal transformers and three phase circuits. Computer simulation. Integrated laboratory experience. Offered fall semester. Prerequisite(s): MATH 1641 Minimum Grade of D or MATH 164 Minimum Grade of D or MATH 159 Minimum Grade of D.

2321 - Signals and Systems
3 Credits
Signal and system analysis in the time domain. Frequency domain analysis using LaPlace transform, Fourier series, Fourier transform, and Discrete Fourier transform. Discrete-time signal analysis using Z-transform. Formerly ECCS 314, ECCS 414. Offered spring semester. Prerequisite(s): ECCS 2311 Minimum Grade of D or GE 202 Minimum Grade of D and MATH 2651 Minimum Grade of D or MATH 275 Minimum Grade of D.

2411 - Software Design Patterns
3 Credits
Named problems occurring in object-oriented designing featuring the 23 fundamental Gang of Four design patterns, applications and use. Offered fall semester. Prerequisite(s): ECCS 1621 Minimum Grade of D or ECCS 165 Minimum Grade of D.

2421 - Software Engineering
3 Credits
Requirements, design, implementation, testing, deployment, and maintenance. Discussion of social issues: team work, individual work, walkthroughs, constructive criticism (give and take) and workplace politics. Focusing on Agile Software Development Practices. Offered spring semester. Prerequisite(s): (MATH 3261 Minimum Grade of D or MATH 336 Minimum Grade of D) and (ECCS 2671 Minimum Grade of D or ECCS 268 Minimum Grade of D).

2431 - Programming Environments
3 Credits
Use of a software environment to build a large project. Solutions incorporate third party library code and student generated libraries. Students work independently. Offered fall semester. Prerequisite(s): ECCS 1621 Minimum Grade of D or ECCS 165 Minimum Grade of D.

2671 - Data Structures & Algorithms 1
3 Credits
Basics of algorithm analysis and creation. Standard sorting algorithms. Trade-offs of various algorithms. Classical data structures: arrays, heaps, queues, priority queues, hash tables, linked lists, binary trees. Offered fall semester. Prerequisite(s): ECCS 1621 Minimum Grade of D or ECCS 165 Minimum Grade of D.

2681 - Data Structures & Algorithms 2
3 Credits
Continuation of Data Structures and Algorithms 1. Advanced techniques for algorithm analysis and creation. Greedy algorithm. Amortized analysis. Dynamic programming. Fibonacci heaps. Graph-based data structures and algorithms. Offered spring semester. Prerequisite(s): ECCS 2671 Minimum Grade of D or ECCS 268 Minimum Grade of D.

2721 - Digital Logic
3 Credits
Analysis and design of combinational circuits. Analysis and design of sequential systems. Design using standard combinational and sequential modules. Application of VHDL and Xilinx software design tools. Verification of digital systems in FPGAs and ModelSim simulation. Offered spring semester. Prerequisite(s): MATH 3061 Minimum Grade of D or MATH 336 Minimum Grade of D.

2991 - External Research Experience
1 to 3 Credits
A planned learning experience involving participation in an approved off-campus research program. A paper and an oral presentation regarding the research experience are required. Department approval required prior to research experience. Graded S/U. Permission of instructor. Offered fall and spring semesters. Must be enrolled in one of the following Colleges: Engineering. Must be enrolled in one of the following Fields of Study: Computer Engineering, Computer Science, or Electrical Engineering.

3111 - Electromagnetics
3 Credits
The study of electrostatics, magnetostatics and time-varying fields in different coordinate systems using various laws and principles through the application of vector calculus and vector algebra. Analysis of transmission lines using both mathematical and graphical techniques. Offered fall semester.
### 3121 - Energy Systems 1  
4 Credits  
Electric machines and power electronics. Analysis, performance characteristics, operation principles, and applications of power transformers, rotating machines, converters, inverters, and switched-mode power supplies. Computer Simulation. Integrated laboratory experience. Offered spring semester.  
Prerequisite(s): ECCS 3111 Minimum Grade of D or ECCS 337 Minimum Grade of D.

### 3141 - Control Systems  
4 Credits  
Prerequisite(s): ECCS 2321 Minimum Grade of D or ECCS 414 Minimum Grade of D or ECCS 380 Minimum Grade of D.

### 3191 - Communication Systems  
4 Credits  
Analog and digital communication systems; modulation and demodulation techniques. Noise and bandwidth requirements. System design and performance analysis. Integrated laboratory experience.  
Offered spring semester.  
Prerequisite(s): ECCS 2321 Minimum Grade of D or ECCS 414 Minimum Grade of D or ECCS 380 Minimum Grade of D.

### 3221 - Operations Research  
3 Credits  
Linear programming simplex method, duality, sensitivity analysis, PERT/CPM. Standard O.R. applications including transportation, maximum flow, and shortest path problems, among others. Also listed as MATH 3221. Offered alternate spring semesters.  
Prerequisite(s): (MATH 2651 Minimum Grade of D or MATH 275 Minimum Grade of D or MATH 3061 Minimum Grade of D or MATH 272 Minimum Grade of D).

### 3241 - Embedded Systems  
3 Credits  
UML and model-based embedded system design, microprocessor/digital signal processor/network processor instruction sets, CPUs, bus-based system design, embedded computing platform, program design and analysis, real time operating systems and processes, hardware accelerators, networks and distributed embedded architectures, and systems design techniques, multicore embedded systems; integrated laboratory experimental activities.  
Offered spring semester.  
Prerequisite(s): (ECCS 3351 Minimum Grade of D or ECCS 362 Minimum Grade of D or ECCS 3611 Minimum Grade of D or ECCS 365 Minimum Grade of D).

### 3311 - Digital Signal Processing  
3 Credits  
Analog to digital and digital to analog conversions. Analysis of discrete-time signals and systems in both time domain and Z-domain. Design and implementation of FIR and IIR systems. Using MATLAB to
simulate and model discrete-time systems. Offered fall semester. Prerequisite(s): ECCS 2321 Minimum Grade of D or ECCS 314 Minimum Grade of D or ECCS 380 Minimum Grade of D.

3331 - Electronics
4 Credits
Analysis and design of analog and digital electronic circuits using semiconductor diodes, transistors and integrated circuits. Computer techniques will be combined with laboratory work for several projects. Offered fall semester. Prerequisite(s): (ECCS 2311 Minimum Grade of D or GE 202 Minimum Grade of D) and (ECCS 2321 Minimum Grade of D or ECCS 314 Minimum Grade of D or ECCS 380 Minimum Grade of D) and (ECCS 2721 Minimum Grade of D or ECCS 260 Minimum Grade of D or ECCS 360 Minimum Grade of D or ECCS 261 Minimum Grade of D).

3351 - Microprocessors
3 Credits
Microprocessors and microcontroller system design, microprocessor structure, registers, RAM and ROM addressing, machine and timing relationships, input and output ports and addressing, assembly level programming, embedded C programming, microcontroller structure, timer systems, analog-to-digital converters, serial and parallel communication, use of development systems and design simulators, embedded microcontroller design projects; integrated laboratory experimental activities. Offered fall semester. Prerequisite(s): (ECCS 1611 Minimum Grade of D or ECCS 164 Minimum Grade of D) and (ECCS 2721 Minimum Grade of D or ECCS 260 Minimum Grade of D or ECCS 360 Minimum Grade of D or ECCS 261 Minimum Grade of D).

3411 - Computer Security
3 Credits
Social engineering, cryptography, access control, protocols, software vulnerabilities, risk analysis, attack methodologies, legal and ethical issues. Junior standing. Offered fall semester.

3431 - Theory of Computation
3 Credits
A mathematical approach to the theory of computation with emphasis on rigorous arguments of various sorts. Regular and Context-Free Languages. Turing machines. The implications of these issues to the discipline of computing. Offered fall semester. Prerequisite(s): MATH 3061 Minimum Grade of D or MATH 336 Minimum Grade of D.

3451 - User Interface Design
3 Credits
Human-Computer Interaction topics as related to graphical user interfaces encountered in software applications and web sites. User-centered interface development methodology and life cycle. Style, structure, layout, and organizational design guidelines. Color, typography, accessibility, globalization, and personalization issues. Formerly ECCS 370. Offered fall semester. Prerequisite(s): ECCS 2671 Minimum Grade of D or ECCS 268 Minimum Grade of D.

3481 - Databases
3 Credits
Overview of data models and applications. Relational Algebra. Structured Query Language (SQL). Security issues. Offered spring semester. Prerequisite(s): ECCS 2671 Minimum Grade of D or ECCS 268 Minimum Grade of D.
3611 - Computer Architecture
4 Credits
Aspects of computer hardware; computer arithmetic, micro-architecture design (both datapath and control unit), instruction sets, storage hierarchies. Current families of microprocessors illustrating design tradeoffs. Offered spring semester. Prerequisite(s): ECCS 2721 Minimum Grade of D or ECCS 260 Minimum Grade of D or ECCS 360 Minimum Grade of D or ECCS 261 Minimum Grade of D.

3631 - Networks & Data Communications
3 Credits
The Internet Protocol Stack. Coverage of the application, transport, network, data link and physical layers with project assignments. Fundamental protocols used to implement communication over the Internet. Offered fall semester. Prerequisite(s): ECCS 2671 Minimum Grade of D or ECCS 268 Minimum Grade of D.

3651 - Computer Vision
3 Credits
Extraction of useful information from captured images to make decisions about the real world modeling cameras, calibration, feature extraction, feature synthesis, segmentation, still and video image processing. Define and produce an individualized course-long project that utilizes computer vision to solve a problem of the student's choice. Recommended: MATLAB and/or C++ experience. Offered spring semester. Prerequisite(s): (ECCS 1621 Minimum Grade of D or ECCS 165 Minimum Grade of D) and (MATH 1641 Minimum Grade of D or MATH 164 Minimum Grade of D).

3661 - Operating Systems
3 Credits

3901 - Special Topics
1 to 3 Credits
Selected topics in electrical or computer engineering or computer science of current interest. May be repeated for credit. Permission of instructor. Offered fall and spring semesters. Must be enrolled in one of the following Colleges: Engineering. Must be enrolled in one of the following Fields of Study: Computer Engineering, Computer Science, or Electrical Engineering.

3951 - Independent Study
1 to 3 Credits
Individual study of topic in electrical or computer engineering or computer science of particular interest to the ECCS student. Permission of instructor. Offered fall and spring semesters. Must be enrolled in one of the following Colleges: Engineering. Must be enrolled in one of the following Fields of Study: Computer Engineering, Computer Science, or Electrical Engineering.

3991 - External Research Experience
1 to 3 Credits
A planned learning experience involving participation in an approved off-campus research program. A
paper and an oral presentation regarding the research experience are required. Department approval required prior to research experience. Graded S/U. Permission of instructor. Offered fall and spring semesters. Must be enrolled in one of the following Colleges: Engineering. Must be enrolled in one of the following Fields of Study: Computer Engineering, Computer Science, or Electrical Engineering.

4111 - Energy Systems 2
3 Credits
Power systems fundamentals, single line diagrams and per unit calculations, transmission lines modeling, load flow techniques, economic dispatch, fault analysis, and power systems control. Computer simulation. Team-oriented design cases. Offered fall semester. Prerequisite(s): (ECCS 2311 Minimum Grade of D or GE 202 Minimum Grade of D) and ECCS 3121 Minimum Grade of D or ECCS 338 Minimum Grade of D).

4121 - Advanced Power
3 Credits
Selected advanced topics in power engineering. Senior standing. Offered spring semester.

4131 - Advanced Communications
3 Credits
Selected advanced topics in communications. Offered spring semester. Prerequisite(s): (ECCS 3191 Minimum Grade of D or ECCS 459 Minimum Grade of D).

4191 - System Design
1 Credit
Integration of different areas of electrical engineering in the design of a complete practical system. The process of defining the architecture, components, modules, and interfaces for a system to satisfy specified requirements. Senior standing. Offered fall semester.

4211 - VLSI System Design
3 Credits
VLSI Fabrication Process, CMOS logic gate implementations, combination logic networks, clocking, subsystem design, floorplanning and layout, architecture design, FPGA technology, high level synthesis, testing and verification. Industry standard computer-aided design tools will be used to simulate, design and layout VLSI/FPGA circuits in the laboratory. Offered fall semester. Prerequisite(s): (ECCS 2721 Minimum Grade of D or ECCS 260 Minimum Grade of D or ECCS 360 Minimum Grade of D or ECCS 261 Minimum Grade of D) and (ECCS 3331 Minimum Grade of D or ECCS 321 Minimum Grade of D).

4311 - Advanced DSP
3 Credits
Selected topics in Digital Signal Processing techniques and their applications in 1-D and 2-D spaces. Offered fall semester. Prerequisite(s): ECCS 3311 Minimum Grade of D or ECCS 411 Minimum Grade of D.

4321 - Computer Networks
3 Credits
Select Topics in computer/wireless networks. Offered spring semester. Prerequisite(s): (ECCS 3631 Minimum Grade of D or ECCS 366 Minimum Grade of D or ECCS 3191 Minimum Grade of D or ECCS 459 Minimum Grade of D).
4341 - Advanced Electronics
3 Credits
Advanced topics in electronics. Offered spring semester. Prerequisite(s): ECCS 3331 Minimum Grade of D or ECCS 321 Minimum Grade of D.

4391 - Engineering Economy
1 Credit
Decision making based on criteria of economic factors including present worth, future worth, internal rate of return, cost benefit ratio, depreciation, and taxes. Formerly ECCS 472. Offered fall semester. Corequisite(s): ECCS 4711.

4411 - Programming Languages
3 Credits
Constructs of programming languages in different programming paradigms: syntax analysis, semantic analysis. Offered fall semester. Prerequisite(s): ECCS 2671 Minimum Grade of D or ECCS 268 Minimum Grade of D).

4471 - Computer Science Capstone 1
2 Credits
Team-based design or research project in computer science. Application of design and development principles and methods as appropriate to a project featuring a relevant and current subject. Development and delivery of project proposal. Senior standing in Computer Science. Offered fall semester.

4481 - Computer Science Capstone 2
3 Credits
Continuation of Computer Science Capstone 1. Delivery of a project featuring a relevant and current subject. Demonstration and verification of project capabilities as appropriate to project. Development and delivery of documentation as appropriate to project. Offered spring semester. Prerequisite(s): ECCS 4471 Minimum Grade of D.

4611 - Numerical Analysis
3 Credits
Review of programming concepts using MATLAB or other programming software. Errors that occur in representing numbers on a computer and approximating solutions; methods for locating roots of a non-linear equation; interpolation, numerical differentiation; and numerical integration. Numerical solution of differential equations and of systems of linear algebraic equations. Splines. Also listed as MATH 4611. Offered alternate spring semesters. Prerequisite(s): (MATH 2651 Minimum Grade of D or MATH 275 Minimum Grade of D) and (MATH 3601 Minimum Grade of D or MATH 360 Minimum Grade of D).

4711 - Senior Design 1
2 Credits
Team-based design project in area in or related to computer engineering, computer science, and/or electrical engineering. Utilization of project management standards. Establishment of project capabilities, requirements, and constraints. Fundamentals of economics and entrepreneurship as applied to projects. Development of project proposal. Prototyping. Issues regarding effective teamwork and conflict resolution. Senior standing. Offered fall semester. Must be enrolled in one of the following
Colleges: Engineering. Must be enrolled in one of the following Fields of Study: Computer Engineering, Computer Science, or Electrical Engineering.

4721 - Senior Design 2
3 Credits
Continuation of Senior Design 1. Demonstration of project capabilities. Acceptance testing. Project deliverables. Offered spring semester. Prerequisite(s): ECCS 4711 Minimum Grade of D. Must be enrolled in one of the following Colleges: Engineering. Must be enrolled in one of the following Fields of Study: Computer Engineering, Computer Science, or Electrical Engineering.

4901 - Special Topics
1 to 3 Credits
Selected topics in electrical or computer engineering or computer science of current interest. May be repeated for credit. Permission of instructor. Formerly ECCS 480. Offered fall and spring semesters. Must be enrolled in one of the following Colleges: Engineering. Must be enrolled in one of the following Fields of Study: Computer Engineering, Computer Science, or Electrical Engineering.

4951 - Independent Study
1 to 3 Credits
Individual study of topic in electrical or computer engineering or computer science of particular interest to the ECCS student. Permission of instructor. Offered fall and spring semesters. Must be enrolled in one of the following Colleges: Engineering. Must be enrolled in one of the following Fields of Study: Computer Engineering, Computer Science, or Electrical Engineering.

4991 - External Research Experience
1 to 3 Credits
A planned learning experience involving participation in an approved off-campus research program. A paper and an oral presentation regarding the research experience are required. Department approval required prior to research experience. Graded S/U. Permission of instructor. Offered fall and spring semesters. Must be enrolled in one of the following Colleges: Engineering. Must be enrolled in one of the following Fields of Study: Computer Engineering, Computer Science, or Electrical Engineering.

General Engineering Courses

Subject - Engineering (ENGR)

1001 - Engineering Orientation
0 Credits
Student introduction to the College of Engineering, introduction to the profession, and a forum for first-year advising. Offered fall semester. Must be enrolled in one of the following Colleges: Engineering. Must be enrolled in one of the following Fields of Study: Civil Engineering, Computer Engineering, Electrical Engineering, or Mechanical Engineering.

1041 - Introduction to Engineering 1
3 Credits
The engineering profession and application of the engineering design and analysis processes: problem solving with consideration of assumptions, criteria and constraints, generation of solutions through the application of standard engineering techniques; communication of results in standard formats. Engineering ethics. Offered fall semester. Must be enrolled in one of the following Colleges: Pharmacy, Engineering, Arts and Sciences, or Business Administration. Must be enrolled in one of the following Fields of Study: Civil Engineering, Computer Engineering, Electrical Engineering, or Mechanical Engineering.

1051 - Introduction to Engineering 2
3 Credits
A team-based conceptual design project based on the engineering design method: preparation of proposal, analysis of design alternatives, constraints and criteria, testing and verification by prototyping, preparation and presentation of project report. Offered spring semester. Prerequisite(s): ENGR 1041 Minimum Grade of D. Must be enrolled in one of the following Colleges: Pharmacy, Engineering, Arts and Sciences, or Business Administration. Must be enrolled in one of the following Fields of Study: Civil Engineering, Computer Engineering, Electrical Engineering, or Mechanical Engineering.

1901 - Special Topics
1 to 3 Credits
Selected topics of current interest in general engineering. May be repeated as topic varies. Permission of instructor. Offered fall and spring semesters. Must be enrolled in one of the following Colleges: Pharmacy, Engineering, Arts and Sciences, or Business Administration. Must be enrolled in one of the following Fields of Study: Civil Engineering, Computer Engineering, Computer Science, Electrical Engineering, or Mechanical Engineering.

1911 - Special Topics
1 to 3 Credits
Topics in engineering. Enrollment is restricted to student with specific engineering experiences, such as attendees of programs such as Summer Honors Institute or Project Lead The Way. May be repeated as topics or experiences vary. Graded S/U. Offered fall and spring semesters. Must be enrolled in one of the following Colleges: Engineering. Must be enrolled in one of the following Fields of Study: Civil Engineering, Computer Engineering, Computer Science, Electrical Engineering, or Mechanical Engineering.

1951 - Independent Study
1 to 3 Credits
Individual study of topic of particular interest to the student and instructor in general engineering. Permission of instructor. Offered fall and spring semesters. Must be enrolled in one of the following Colleges: Pharmacy, Engineering, Arts and Sciences, or Business Administration. Must be enrolled in one of the following Fields of Study: Civil Engineering, Computer Engineering, Computer Science, Electrical Engineering, or Mechanical Engineering.

2131 - Statics
3 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. Offered fall and
spring semesters. Prerequisite(s): ( MATH 1631 Minimum Grade of D and PHYS 2311 Minimum Grade of D).

2141 - Dynamics
3 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. Offered spring semester. Prerequisite(s): ( ENGR 2131 Minimum Grade of D and MATH 1641 Minimum Grade of D) or ( MATH 159 Minimum Grade of D or MATH 164 Minimum Grade of D and GE 113 Minimum Grade of D).

2231 - Strength of Materials
3 Credits
Elastic analysis of deformable bodies using concepts of stress and strain. Topics include: members subjected to tension, compression, torsion, and flexure; development and application of Mohr's circle, determinate beam deflection, material properties, pressure vessels, and composite beams. Offered spring semester. Prerequisite(s): ( ENGR 2131 Minimum Grade of D).

2501 - Introduction to Career Development
1 Credit
An introduction to career development including an introduction to industry, the industrial work environment, resume writing, interviewing and job search techniques. Course is designed to prepare a sophomore engineering or computer science student for the industrial experience. Sophomore standing required. Graded S/U. Formerly GE 250. Offered fall semester. Must be enrolled in one of the following Colleges: Engineering. Must be enrolled in one of the following Fields of Study: Civil Engineering, Computer Engineering, Computer Science, Electrical Engineering, or Mechanical Engineering.

2901 - Special Topics
1 to 3 Credits
Selected topics of current interest in general engineering. May be repeated as topic varies. Permission of instructor. Formerly GE 280. Offered fall and spring semesters. Must be enrolled in one of the following Colleges: Pharmacy, Engineering, Arts and Sciences, or Business Administration. Must be enrolled in one of the following Fields of Study: Civil Engineering, Computer Engineering, Computer Science, Electrical Engineering, or Mechanical Engineering.

2951 - Independent Study
1 to 3 Credits
Individual study of topic of particular interest to the student and instructor in general engineering. Permission of instructor. Formerly GE 290. Offered fall and spring semesters. Must be enrolled in one of the following Colleges: Pharmacy, Engineering, Arts and Sciences, Business Administration. Must be enrolled in one of the following Fields of Study: Civil Engineering, Computer Engineering, Computer Science, Electrical Engineering, or Mechanical Engineering.

3501 - Professional Practice
1 Credit
Cooperative education (co-op) employment in a semi-professional capacity. Students work full-time (40 hours per week) in the research, development, manufacturing, or engineering department of an industrial company, consulting firm or governmental agency. A student report on the assignment and
an employer's evaluation are required. Course may be repeated up to a total of five hours. Junior standing required, as well as successful completion of GE 2501 and CUM GPA of 2.5 minimum. Graded S/U. Formerly GE 350. Offered fall, spring and summer semesters. Prerequisite(s): (ENGR 2501 Minimum Grade of S or GE 250 Minimum Grade of S) Must be enrolled in one of the following Colleges: Engineering. Must be enrolled in one of the following Fields of Study: Civil Engineering, Computer Engineering, Computer Science, Electrical Engineering, or Mechanical Engineering. This course may be repeated 5 times.

Department of Mechanical Engineering

Subject - Mechanical Engineering (ME)

1411 - Engineering Material Science
3 Credits
Fundamental physical and microstructural characteristics of materials and how these relate to their mechanical properties. Evaluation of these properties for material selection. Metallurgical aspects including equilibrium diagrams. Includes hands-on experiences in material science. Offered spring semester.

1901 - Special Topics
1 to 3 Credits
Selected topics of current interest in mechanical engineering. Permission of instructor. Must be enrolled in one of the following Fields of Study: Mechanical Engineering.

1951 - Independent Study
1 to 3 Credits
Independent study of a topic of particular interest to the student in mechanical engineering. Permission of instructor. Must be enrolled in one of the following Fields of Study: Mechanical Engineering.

2311 - Thermodynamics
3 Credits
Fundamentals of classical thermodynamics. Work, heat transfer, and thermodynamic properties. The First and Second Law of Thermodynamics. Application to power and refrigeration cycles. Offered fall and spring semesters. Prerequisite(s): (PHYS 2311 Minimum Grade of D or PHYS 232 Minimum Grade of D).

2511 - Computer Applications
3 Credits
Mechanical engineering problem solving using computer software, including MATLAB.

2901 - Special Topics
1 to 3 Credits
Selected topics of current interest in mechanical engineering. Permission of instructor. Must be enrolled in one of the following Fields of Study: Mechanical Engineering.
2951 - Independent Study
1 to 3 Credits
Independent study of a topic of particular interest to the student in mechanical engineering. Permission of instructor. Must be enrolled in one of the following Fields of Study: Mechanical Engineering.

3111 - Mechanical Design 1
3 Credits
Introduction to mechanical design with the computer used as a tool for solid modeling and design layout. Synthesis and analysis of linkages along with cam design. Minimum grade of D required. Offered fall semester. Prerequisite(s): ( GE 214 Minimum Grade of D and ECCS 164 Minimum Grade of D and ECCS 160 Minimum Grade of D) or ( ENGR 2141 Minimum Grade of D and ME 2511 Minimum Grade of D and ECCS 1611 Minimum Grade of D).

3121 - Mechanical Design 2
3 Credits
Advanced mechanics of materials. Design and selection of various machine elements such as screws, bearings, welds, and gears, etc. Offered spring semester.

3211 - Dynamic Systems 1
3 Credits
Fundamentals of dynamic system behavior. Mathematical modeling of mechanical, thermal, fluid, and electrical systems; analytical and computer solution methods. Transfer function and state variable methods. Free and forced vibration analysis, vibration suppression, multiple DOF. Offered fall semester.

3221 - Dynamic Systems 2
4 Credits
Modeling, analysis and design of linear feedback control systems. LaPlace transforms, transfer functions and frequency response. Digital controls and logic. Laboratory work in digital logic design and performance studies of real systems. Offered spring semester. Prerequisite(s): ( ME 3211 Minimum Grade of D).

3231 - Automotive Engineering
3 Credits
Studies in land vehicle dynamics and driveline systems. Specific topics include acceleration and braking performance, suspension steering, tire-road interface, and current developments in powertrain and safety systems. Offered spring semester. Prerequisite(s): ( ENGR 2141 Minimum Grade of D or GE 214 Minimum Grade of D).

3311 - Fluid Mechanics
3 Credits
Fundamentals of fluids phenomena, including hydrostatics, conservation of mass, momentum, and energy, dimensional analysis, internal and external flow, compressible flow. Offered spring semester. Prerequisite(s): ( MATH 1641 Minimum Grade of D and PHYS 2311 Minimum Grade of D) or ( MATH 275 Minimum Grade of D and ME 365 Minimum Grade of D).

3321 - Heat Transfer
4 Credits
Principles of the three mechanisms of heat transfer (conduction, convection, radiation) in solid, fluid and
vacuum media. Development of the control volume approach, as well as numerical solution techniques. Applications to engineering problems and systems. Prerequisite(s): (PHYS 2311 Minimum Grade of D and MATH 2651 Minimum Grade of D and ME 3311 Minimum Grade of D) or (MATH 275 Minimum Grade of D and PHYS 232 Minimum Grade of D).

3411 - Manufacturing Laboratory
1 Credit
Introduction to the machines and processes involved in the manufacturing process. Students will operate the machines and perform manufacturing of parts and systems. Offered fall semester.

3421 - Manufacturing Processes
3 Credits
Manufacturing engineering and technology including casting, rolling, forging, extrusion, drawing, sheet forming, machining, welding, SPC, etc. The basic theories of casting, forming processing and machining. At least one manufacturing plant tour is included. Prerequisite(s): (ME 1411 Minimum Grade of D or GE 243 Minimum Grade of D).

3511 - Experimental Methods
2 Credits

3521 - Finite Element Analysis
3 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 commercial FEA package, ANSYS. Applications to engineering design of static and dynamic structures, as well as thermal systems. Offered spring semester.

3901 - Special Topics
1 to 3 Credits
Selected topics of current interest in mechanical engineering. Permission of instructor. Must be enrolled in one of the following Fields of Study: Mechanical Engineering.

3951 - Independent Study
1 to 3 Credits
Independent study of a topic of particular interest to the student in mechanical engineering. Permission of instructor. Must be enrolled in one of the following Fields of Study: Mechanical Engineering.

4011 - Process of Design
3 Credits
The process of design is covered with a focus on problem-solving methodology, project management, and engineering economy. Teamwork tools and design are used on a team project. ME senior standing. Offered fall semester. Corequisite(s): ME 4111. Must be enrolled in one of the following Fields of Study: Mechanical Engineering.

4111 - Capstone 1
1 Credit
The process of design is covered with a focus on problem-solving methodology and project management. Teamwork tools are used on a team project. Topics include formal design tools and engineering economics. Initiation of capstone design project as a team effort. ME senior standing. Offered fall semester. Must be enrolled in one of the following Fields of Study: Mechanical Engineering.

4121 - Capstone 2
2 Credits
Completion of capstone design project as a team effort. Offered spring semester. Must be enrolled in one of the following Fields of Study: Mechanical Engineering.

4211 - Industrial Controllers
3 Credits
Applications in control systems concentrating on PLCs and ladder logic. Advanced control theory explored. Laboratory work concentrates on PLC applications. Offered fall semester. Corequisite(s): ME 3221.

4221 - Intelligent Systems
3 Credits
Students will learn to model and control actual systems. Systems from a variety of disciplines will be used. Students will apply a variety of algorithms to control and test these systems in a laboratory setting. Minimum Grade: C. Offered spring semester. Prerequisite(s): (ME 3211 Minimum Grade of C or ECCS 3141 Minimum Grade of C) or (ME 339 Minimum Grade of D or ECCS 344 Minimum Grade of D).

4311 - Computational Fluid Dynamics
3 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 Fluent, Pointwise, Cobalt, and Fieldview. This course meets for two 50-minute lectures and one two-hour lab session each week and is taught in the fall semester. The lab time is primarily spent using commercial CFD codes to perform flow analyses, but some computer programming may be required. Offered fall semester. Prerequisite(s): (ME 3311 Minimum Grade of D) or ME 371 Minimum Grade of D or ME 471 Minimum Grade of D and ME 366 Minimum Grade of D or ME 464 Minimum Grade of D).

4321 - Renewable Energy
3 Credits
An overview of renewable energy sources such as solar, wind, water, and biomass. Current and potential technologies for extracting, storing, and converting renewable energy into electricity. Economic and social issues that impact renewable energy projects. Offered spring semester. Prerequisite(s): (ME 2311 Minimum Grade of D and ME 3311 Minimum Grade of D) or ME 365 Minimum Grade of D and ME 366 Minimum Grade of D).

4331 - Advanced Thermodynamics
3 Credits
Application of thermodynamic laws to the analysis of advanced cycles and processes. Modifications to the basic Rankine, Brayton and piston engine power cycles, including topping cycles and cogeneration.
Basic and advanced refrigeration and heat pump cycles. Prerequisite(s): (ME 2311 Minimum Grade of D) or ME 366 Minimum Grade of D and ME 367 Minimum Grade of D).

4411 - Biomaterials and Medical Devices
3 Credits
Properties and application of materials that are used in contact with biological systems. Structures and properties of human tissues. Biomechanics related to implant design. Host reactions to implants. Offered fall semester.

4511 - Engineering Analysis
3 Credits
Solution of a wide range of mechanical engineering problems using various analytical and numerical techniques.

4901 - Special Topics
1 to 3 Credits
Selected topics of current interest in mechanical engineering. Permission of instructor. Must be enrolled in one of the following Fields of Study: Mechanical Engineering.

4911 - Advanced Thermal Sciences
3 Credits
Application of fundamental concepts from thermodynamics, fluid mechanics, and heat transfer to the analysis of complex thermal systems, including combustion and psychrometrics, compressible flow, and convective and radiative heat transfer. Offered fall semester.

4921 - Mechanical Design of Components
3 Credits
Design and selection of various machine elements. Design teams work on a project. Formerly ME 417. Offered fall semester.

4951 - Independent Study
1 to 3 Credits
Independent study of a topic of particular interest to the student in mechanical engineering. Permission of instructor. Must be enrolled in one of the following Fields of Study: Mechanical Engineering.
The Rudolph H. Raabe College of Pharmacy Courses

Department of Pharmaceutical and Biological Sciences

Subject - Pharmaceutical & Bio Sciences (PHBS)

2901 - Applied Sciences of Pharmacy
3 Credits
Fundamental principles and professional applications of basic and applied sciences, such as physics and biostatistics, are explored in relation to advanced science topics and integrated clinical sciences. Drug discovery and development, medical imaging, and the science of alternative medicine are discussed in the context of applications to pharmacy practice. Model drug compounds are presented to illustrate the critical need for thorough understanding and broad integration of basic science principles when considering the multitude of related professional applications in the practice of pharmacy. Offered spring semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 3 hours.

3101 - Drug Abuse Education
2 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 drug abuse and chemical dependency. Offered fall and spring semesters. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

3111 - Service Learning in Drug Abuse Education
1 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. Offered fall and spring semesters. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 1 hour.

3201 - Pharmacy Applications Laboratory
1 Credit
Clinical skills and problem-solving laboratory experiences examining basic science and clinical applications in pharmacy. In vitro and in vivo laboratory experiences as well as clinically-based exercises emphasizing patient care. Offered spring semester. Must be enrolled in one of the following Colleges:
Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 1 hour.

3311 - Pharmaceutical Sciences 1
2 Credits
Physical pharmacy applications in the pharmaceutical sciences. Application of physico-chemical principles applied to pharmaceutical preparations. Offered spring semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

3411 - Biochemistry 1
3 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. Biochemical genetics and genetic disorders are also covered. Offered fall semester. Prerequisite(s): ( CHEM 251 Minimum Grade of D) and ( CHEM 252 Minimum Grade of D) and ( CHEM 253 Minimum Grade of D). Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 3 hours.

3421 - Biochemistry 2
3 Credits
The major metabolic processes that are essential for human life, including biochemical energetics, the electron transport system, Krebs cycle, the metabolism of carbohydrates, lipids and amino acids, and the biosynthesis of purines, pyrimidines, nucleic acids and proteins. Offered spring semester. Prerequisite(s): ( PHBS 3411 Minimum Grade of D) Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 3 hours.

3501 - Basic Nutrition
2 Credits
Basic principles of nutrition for Pharmacy and non-Pharmacy students. Topics include a description of essential nutrients, methods of evaluating individual dietary adequacy, and dietary methods for weight control. Offered spring semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

3751 - Immunology
3 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 immunobiologics currently available in the USA for prevention and treatment of most common infections and immunologic diseases. The role of biotechnology as a source of immunobiologics will be discussed. Offered spring semester. Prerequisite(s): ( PHBS 3411 Minimum Grade of D). Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 3 hours.
4321 - **Pharmaceutical Sciences 2**  
8 **Credits**  
Basic and clinical pharmacokinetics, and concepts of pharmacokinetics related to physiology and pathophysiology. Pharmaceutic and biopharmaceutic aspects of a variety of drug dosage forms and delivery systems. Offered fall semester. Prerequisite(s): (PHBS 3311 Minimum Grade of D). Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 8 hours.

4431 - **Biomedical Sciences 1**  
5 **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. Offered fall semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 5 hours.

4441 - **Biomedical Sciences 2**  
6 **Credits**  
Continuation of PHBS 4431. Offered spring semester. Prerequisite(s): (PHBS 4431 Minimum Grade of D) and (PHBS 4321 Minimum Grade of D) and (PHPR 4011 Minimum Grade of D). Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 6 hours.

5621 - **Survey of Research Areas in the Pharmaceutical and Biomedical Sciences**  
1 **Credit**  
Presentation of the research areas in the pharmaceutical and biomedical areas. Opportunities in these areas are defined. Offered spring semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 1 hour.

5651 - **Research in the Pharmaceutical and Biomedical Sciences**  
2 **Credits**  
A research experience for students who may pursue graduate studies in the pharmaceutical or biomedical sciences or related areas. Participation in all aspects of the design, implementation, model preparation, instrumentation, and reporting of specific research problems. Offered fall and spring semesters. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

5901 - **Special Topics in Pharmaceutical and Biomedical Sciences**  
1 to 3 **Credits**  
Distinct special topics in the pharmaceutical and/or biomedical sciences. Permission of the instructor is required. Offered fall and spring semesters. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable
5971 - Independent Study - Pharmaceutical and Biomedical Sciences
1 to 3 Credits
Independent study in the pharmaceutical and/or biomedical sciences. Offered fall and spring semesters. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 1 hour.

Department of Pharmacy Practice

Subject - Pharmacy Practice (PHPR)

1011 - The Profession of Pharmacy 1
1 Credit
The profession of pharmacy, the delivery of patient care, and the operation of the University and College of Pharmacy. Traditional classroom presentations reinforced through structured experiential rotations in a variety of health care and community service sites. Offered fall semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 1 hour.

1021 - The Profession of Pharmacy 2
1 Credit
Continuation of PHPR 1011. Offered spring semester. Prerequisite(s): PHPR 1011 Minimum Grade of D. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 1 hour.

2001 - Spirituality and Health
1 Credit
Implications of spiritual outlook and practice on patient compliance, coping skills and other aspects of health care. Permission of the instructor is required. Offered spring semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 1 hour.

2011 - The Profession of Pharmacy 3
2 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. Offered fall semester. Prerequisite(s): PHPR 1021 Minimum Grade of D. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

2021 - The Profession of Pharmacy 4
2 Credits
Continuation of PHPR 2011. Offered spring semester. Prerequisite(s): PHPR 2011 Minimum Grade of D. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following
Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

2301 - Ethics in Professional Practice
2 Credits
Guided discussions show that there are ethical problems in life and that there are better and worse ways of dealing with those problems. Offered spring semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

2411 - Contemporary Pharmacy Practice 1
2 Credits
Multiple practice settings including retail, institutional, manufacturing, distribution, association, government and how each is implementing a pharmaceutical care mission. Offered fall semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmaceutical Business or Pharmacy. This course is repeatable for a total of 2 hours.

2421 - Contemporary Pharmacy Practice 2
2 Credits
Current topics from multiple practice settings including retail, institutional, manufacturing, distribution, health care/pharmacy associations, and government will be discussed and includes how each is implementing a patient care and pharmaceutical care mission. Offered spring semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmaceutical Business or Pharmacy. This course is repeatable for a total of 2 hours.

2511 - Preventative Medicine: Issues and Education
2 Credits
Important health issues in the United States and the applications that these disease states have on individual health, health care costs, and productivity. Special emphasis on learning teaching methods that can be effective in increasing public awareness and modifying behavior in order to prevent disease. Offered spring semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

3011 - The Profession of Pharmacy 5
2 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 of their quality and impact on professional, legal, and patient care. Offered fall semester. Prerequisite(s): PHPR 2021 Minimum Grade of D. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

3021 - The Profession of Pharmacy 6
2 Credits
Continuation of PHPR 3011. Offered spring semester. Prerequisite(s): PHPR 3011 Minimum Grade of D. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.
3101 - Smoking Cessation
2 Credits
An overview of the complexities of smoking behavior. Discussion of the types of nicotine replacement therapies and skills enhancement that will allow students to counsel patients on smoking cessation and develop a comprehensive plan to help patients quit. Offered spring semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

3201 - Drug Literature Evaluation
2 Credits
A web based approach to strengthen reading, understanding, and applying information from published literature to solve patient-specific pharmacotherapy problems. Emphasis placed on developing skills sufficient to answer questions about the literature and application of research methodology to create a research proposal. Offered fall and spring semesters. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

3311 - OTC Products
3 Credits
Development of appropriate counseling and guidance to patients who desire to conduct self-medication or self-therapy with non-prescription drug products. Offered fall semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 3 hours.

3401 - Women's Health Issues
2 Credits
This 2-credit hour course will introduce students to timely and important topics in women's health through a discussion-based approach guided by the course instructor. This course will broadly cover a number of issues that impact women's health and affect the provision of healthcare to women in the U.S. and internationally, both from a clinical health and public health perspective. Students will be presented with a holistic view of women's health across the lifespan and will be introduced to topics such as the biological basis for sex-related differences and subsequent health outcomes, the involvement of women in clinical trials, and maternal and child health. Students will also be exposed to social and economic issues that impact women's health in the U.S. and internationally. Offered spring semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

3411 - Introduction to Natural Product Therapeutics
2 Credits
The course will help the pharmacy students understand the use of therapeutics and natural products in modern medical practice and the role of the pharmacist within the practice. Offered spring semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

3431 - Chemical Dependency
2 Credits
This course educates the pharmacy student about the disease of chemical dependency, the risks to pharmacists, consequences of use (personal and professional) and treatment methods and recovery.
Offered fall and spring semesters. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

3451 - Pharmacy Ownership
2 Credits
A stepwise approach to establishing a pharmacist-owned business. Starting with a review of the various business opportunities available for someone with a pharmacy degree, the course begins with the philosophy of business ownership and then leads the student through the steps needed to open a business. Market and site analysis, business forms, lease review, developing a business plan, understanding financial considerations, capital needs, acquiring startup monies, layout, human resources and promotional strategy are all reviewed. Offered spring semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

3551 - Life Skills for Pharmacists
2 Credits
This course is designed to help student pharmacists learn about life skills that will be important for them as students as well as after graduating from pharmacy school. The course will provide education about skills that are necessary for both the professional and personal lives of the students. Topics that will be covered during this course will be skills such as the importance of professional networking, developing good leadership skills, learning about effective interviewing skills, a refresher on how to write CVs and rsums, and business and professional writing. Business related areas that will be covered include financial aspects such as budgeting, investing, financial and retirement planning, and entrepreneurship. The final area of the course will deal with issues relating to the importance of having malpractice insurance as a pharmacist. Offered spring semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

4011 - Patient Care Assessment Module 1
2 Credits
Preparation for subsequent therapeutic modules. Development and enhancement of analytical and communicative skills required to prepare a drug therapy problem list. Offered fall semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

4411 - Biomedical Science and Patient Care Module 1
6 Credits
An integrated approach to organ system disorders including the rational use of pharmacological agents used to treat them. Comprehensive discussion of drug design and structure-activity relationships is integrated with the therapeutic and toxicologic actions of the drugs. Basic principles of the pharmacokinetic and pharmaco-dynamic properties of the drugs used in these disorders are presented and discussed. Offered spring semester. Prerequisite(s): PHBS 4321 Minimum Grade of D  PHBS 4441 Minimum Grade of D. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 6 hours.
4421 - Biomedical Science and Patient Care Module 2
6 Credits
Continuation of PHPR 4411. An integrated approach to organ system disorders including the rational use of pharmacological agents used to treat them. Comprehensive discussion of drug design and structure activity relationships is integrated with the therapeutic and toxicologic actions of the drugs. Basic principles of the pharmacokinetic and pharmaco-dynamic properties of the drugs used in these disorders are presented and discussed. Offered spring semester. Prerequisite(s): PHBS 4321 Minimum Grade of D  PHBS 4441 Minimum Grade of D. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 6 hours.

5251 - Drugs of Abuse
2 Credits
Major issues regarding drug abuse, with special emphasis on the specific agents, their sources, common distribution modes, patterns of substance abuse, pharmacological effects, mechanisms, toxicological concerns, treatment modalities, and approaches to drug abuse education. Offered fall and spring semesters. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

5301 - Geriatric Pharmacotherapy
2 Credits
An introduction to the principles regarding population specific alterations in pharmacokinetics drug interactions, mental status, disease state presentation, and pharmacotherapy in the elderly. Social and psychological issues will also be addressed. Offered spring semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

5401 - Patient Counseling and Communications
2 Credits
To be a pharmacist is to be an educator and communicator of health and medication information. Counseling patients regarding prescription and over-the-counter medications is a skill that usually develops with practice and professional guidance. The purpose of this course is to give the interested student some constructive critical evaluation in the art of patient counseling. Offered spring semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

5431 - Biomedical Science and Patient Care Module 3
6 Credits
Continuation of PHPR 4421. An integrated approach to organ system disorders including the rational use of pharmacological agents used to treat them. Comprehensive discussion of drug design and structure activity relationships is integrated with the therapeutic and toxicologic actions of the drugs. Basic principles of the pharmacokinetic and pharmaco-dynamic properties of the drugs used in these disorders are presented and discussed. Offered fall semester. Prerequisite(s): PHPR 4411 Minimum Grade of D  PHPR 4421 Minimum Grade of D. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 6 hours.
5441 - Biomedical Science and Patient Care Module 4
6 Credits
Continuation of PHPR 5431. An integrated approach to organ system disorders including the rational use of pharmacological agents used to treat them. Comprehensive discussion of drug design and structure activity relationships is integrated with the therapeutic and toxicologic actions of the drugs. Basic principles of the pharmacokinetic and pharmaco-dynamic properties of the drugs used in these disorders are presented and discussed. Offered fall semester. Prerequisite(s): PHPR 4411 Minimum Grade of D PHPR 4421 Minimum Grade of D. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 6 hours.

5451 - Biomedical Science and Patient Care Module 5
6 Credits
Continuation of PHPR 5441. An integrated approach to organ system disorders including the rational use of pharmacological agents used to treat them. Comprehensive discussion of drug design and structure activity relationships is integrated with the therapeutic and toxicologic actions of the drugs. Basic principles of the pharmacokinetic and pharmaco-dynamic properties of the drugs used in these disorders are presented and discussed. Offered fall semester. Prerequisite(s): PHPR 4411 Minimum Grade of D PHPR 4421 Minimum Grade of D. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 6 hours.

5461 - Capstone in Pharmacy Practice
6 Credits
The module requires the student to utilize accumulated pharmaceutical education and apply learned principles to organize and synthesize relevant information to describe, optimize and critique drug therapy in unique and classic diseases. Information will be presented in written and oral, formal and informal formats. Activities include case presentations, reviews of 'the literature,' literature critiques and other formats that allow demonstration of proficiency in effective, safe, and 'patient specific' application of drug therapy. Students work in small groups when possible to demonstrate interpersonal skills. Culminates with an encompassing final exam which is a prerequisite for clinical rotations. Offered spring semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 6 hours.

5501 - Pharmacy Administration Module
6 Credits
An interdisciplinary approach to the practice of pharmacy as it fits into the contemporary health-care 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. Offered spring semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 6 hours.

5531 - Special Populations
3 Credits
The course will educate students in the clinical guidelines and therapeutics of special patient populations including pediatrics, geriatrics, pregnancy and lactation, and others. Offered spring
semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 3 hours.

5541 - Advanced Topics in Psychiatric Medicine
2 Credits
This course will emphasize the process of learning and evaluating information pertaining to the treatment of psychiatric illnesses. A single illness will provide the context for learning with the hope that the skills introduced and used during this process will help to facilitate self-learning on the part of the student and prove applicable to a wide variety of student inquiries. Offered spring semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

5551 - Emergency Medicine
2 Credits
An overview of unscheduled medical appointments and emergencies. Offered spring semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

5561 - Palliative Care
2 Credits
Discuss and understand related pathophysiology changes and apply related therapeutics to various chronic disease states that warrant palliation of related symptoms. The role of the interdisciplinary team including pharmacists, nurses, physicians, chaplains and related social support will be explored as a pivotal point for successful palliative care. Pharmacokinetic and pharmacodynamic implications of geriatric patients will be discussed in relation to therapeutic selection and various disease progression models. Offered spring semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

5571 - Pediatrics
2 Credits
The purpose of this course is to orient and expose the student to the challenges confronting the pharmacist in dealing with issues of the pediatric patient and to educate the student in pediatric disease and pharmacotherapy. Offered spring semester. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 2 hours.

5941 - Seminar in Pharmacy Practice
1 to 3 Credits
Can be repeated as the topic varies. Offered fall and spring semesters. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 1 hour.

5971 - Independent Study-Pharmacy Practice
1 to 16 Credits
Can be repeated as the topic varies. Offered fall and spring semesters. Must be enrolled in one of the following Colleges: Pharmacy. Must be enrolled in one of the following Fields of Study: Pharmacy. This course is repeatable for a total of 1 hour.