ENGINEERING LEADERSHIP MINOR

Description

Overview and Purpose
The engineering leadership minor provides students an opportunity to focus on building leadership, management, and interpersonal skills needed to solve many of our societal challenges. Students complete a series of leadership, project management, and interpersonal skills courses using experiential learning strategies and combine subject area knowledge gained in courses from their majors with strategies and skills to effectively lead in the engineering profession.

Courses included in the minor are leadership courses developed for the minor and focus on leadership, management, and interpersonal skill needs of engineering students, as well as courses lead by the faculty in the Department of Agricultural Leadership, Education and Communication.

This minor is intended to serve students in the College of Engineering. The minor contributes to the National Academy of Engineers call to expose engineering students to formal studies of leadership development (NAE, 2004) and the College of Engineering’s mission to graduate the “Complete Engineer.”

Admission

Open to students in the College of Engineering only.

College Requirements

College Admission

College Entrance Requirements
Students must have high school credit for (one unit is equal to one high school year):

1. Mathematics – 4 units: 2 of algebra, 1 of geometry, and 1 of precalculus and trigonometry
2. English – 4 units
3. Natural sciences – 3 units that must include 1 unit of physics and 1 unit of chemistry (chemistry requirement waived for students in construction management)
4. Foreign language – 2 units of a single foreign language
5. Social studies – 3 units
6. Students having a composite ACT score of 28 or greater (or equivalent SAT score) will be admitted to the College of Engineering even if they lack any one of the following: trigonometry, chemistry, or physics.
7. Students having an ACT score of 19 or less in English (or equivalent SAT score) must take ENGL 150 Writing and Inquiry or ENGL 151 Writing and Argument.

A total of 16 units is required for admission.

Students must have an ACT (enhanced) score of 24 or greater (or equivalent SAT). Students who lack entrance requirements may be admitted based on ACT scores, high school rank and credits, or may be admitted to pre-engineering status in the Exploratory and Pre-

Professional Advising Center. Pre-engineering students are advised within the Exploratory and Pre-Professional Advising Center.

Students for whom English is not their language of nurture must meet the minimum English proficiency requirements of the University.

Students who lack entrance units may complete precollege training by Independent Study through the University of Nebraska–Lincoln Office of On-line and Distance Education, in summer courses, or as a part of their first or second semester course loads while in the Exploratory and Pre-Professional Advising Center or other Colleges at Nebraska.

Students should consult their advisor, their department chair, or Engineering Student Services if they have questions on current policies.

Other Admission Requirements

Students who transfer to the University of Nebraska–Lincoln from other accredited colleges or universities and wish to be admitted to the College of Engineering (COE) must meet COE freshman entrance requirements and have a minimum cumulative GPA of 2.5 and be calculus-ready.

Students not meeting either of these requirements must enroll in the Explore Center or another University college until they meet COE admission requirements. Students transferring from UNO, UNL, or UNK to the College of Engineering must be in good academic standing with their institution.

The COE accepts courses for transfer for which a C or better grade was received. Although the University of Nebraska–Lincoln accepts D grades from the University of Nebraska at Kearney and at Omaha, not all majors in the COE accept such low grades. Students must conform to the requirements of their intended major and, in any case, are strongly encouraged to repeat courses with a grade of C- or less.

All transfer students must adopt the curricular requirements of the undergraduate catalog current at the time of transfer to the COE—not that in use when they entered the University of Nebraska–Lincoln. Upon admission to Nebraska, students wishing to pursue degree programs in the COE will be classified and subject to the policies defined in the subsequent section.

Students who were previously admitted to COE and are returning to the College of Engineering must demonstrate a cumulative GPA of 2.5 in order to be readmitted to COE.

Catalog Rule

Students must fulfill the requirements stated in the catalog for the academic year in which they are first admitted at the University of Nebraska–Lincoln. In consultation with advisors, a student may choose to follow a subsequent catalog for any academic year in which they are admitted to and enrolled as a degree-seeking student at Nebraska in the College of Engineering. Students must complete all degree requirements from a single catalog year. The catalog which a student follows for
degree requirements may not be more than 10 years old at the time of graduation.

Requirements for Minor Offered by Department

The engineering leadership minor is an interdisciplinary program, providing course offerings through the College of Engineering (COE) and the Department of Agricultural Leadership, Education and Communication (ALEC). To successfully complete the minor, students are required to complete 18 credit hours in leadership and professional development—9 of which come from engineering leadership and management courses.

Courses

<table>
<thead>
<tr>
<th>ENGR Leadership &amp; Management Courses</th>
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<td>ENGR 100 Interpersonal Skills for Engineering Leaders (ACE 2)</td>
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<td>ENGR 200 Professionalism and Global Perspective (ACE 6 &amp; 9)</td>
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<td>ENGR 320 Leadership, Management and Ethics (ACE 6 &amp; 8)</td>
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Credit Hours Subtotal: 9

Leadership Courses

Select one or two theory-based courses of the following: 3-6

| ALEC 202 Foundations of Leadership Theory and Practice |  |
| ALEC 302 Dynamics of Effective Leadership in Organizations |  |
| ALEC 455 Dynamics of Effective Leadership in Groups & Teams | 1 |
| ALEC 477 Leadership and Motivation |  |

Select one or two application courses of the following: 3-6

| ALEC 407 Supervisory Leadership |  |
| ALEC 410 Environmental Leadership | 1 |
| ALEC 422 Facilitation and Project Planning | 1 |
| ALEC 466 Leadership and Diversity in Organizations and Communities | 1 |

Credit Hours Subtotal: 6-12

Experiential Learning in Leadership

Select zero to one course of the following: 0-3

| ALEC 337 Instructional Internship in Leadership Development | 2 |

Credit Hours Subtotal: 3

Total Credit Hours 18-24

1 Junior standing is required for these courses.

2 Credit received for being an undergraduate teaching assistant at the selection of the instructor.

Grade Rules

C- and D Grades

All courses must be completed with a Pass, or grade of C or higher.

Pass/No Pass Limits

Up to 6 credit hours may be taken as Pass/No Pass.

ENGR 100 Interpersonal Skills for Engineering Leaders

Description: Establishes a foundation in communication and leadership skills that is needed for engineering students to be successful in their academic endeavors and future career opportunities. Introduction to the principles and practices of positive interpersonal relationships for leadership development. Self-awareness, awareness of others, effective interpersonal communication, and the building of trust relationships as a basis for understanding and developing leadership.

Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: CSCE 488
ACE: ACE 2 Communication Competence

ENGR 101 Introduction to Engineering

Description: Students will examine relevant and practical industrial and commercial engineering applications to gain necessary engineering skills that will help them succeed as a student as well as a professional engineer. A variety of engineering disciplines will be highlighted and discussed, as well as topics in the underlying physical, chemical, and biological scientific principles and processes related to each topic. The class will use a specified focus area that involves real world applications to aid in the conceptualization and learning of the course material. Students will develop engineering problem solving skills; gain expertise and experience using modern engineering and computational tools; and emulate an engineering team atmosphere - each of which can be applied to a professional engineering environment.

Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

ENGR 191 Freshman Engineering Special Topics

Description: Topics vary.

Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

ENGR 200 Professionalism and Global Perspective

Description: Enhance essential professional skills for personal and team success through investigating issues in a global context. Explore in-demand professional aptitudes (self-awareness, emotional intelligence, teamwork, communication, and workplace interaction expectations). Through industry/community interaction, explore cultural and business norms and the application of broader perspectives to identify issues/solutions responsive and adaptive to their global context.

Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Prerequisite for: ENGR 320
ACE: ACE 9 Global/Diversity ACE 6 Social Science
ENGR 250 Engineering Cooperative Education  
**Prerequisites:** Sophomore standing; permission of College of Engineering Dean's Office and department chair of student's engineering major.  
**Notes:** Special approval is required to take course for credit.  
**Description:** Cooperative education work in a regularly established cooperative education work-study program in any engineering curriculum.  
**Credit Hours:** 0-12  
**Min credits per semester:** 1  
**Max credits per semester:** 12  
**Max credits per degree:** 12  
**Grading Option:** Pass No Pass

ENGR 291 Sophomore Engineering Special Topics  
**Description:** Topics vary.  
**Credit Hours:** 1-3  
**Min credits per semester:** 1  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option

ENGR 300 Principles of Nuclear Engineering  
**Description:** Introduction to nuclear engineering principles.  
**Credit Hours:** 1  
**Max credits per semester:** 1  
**Max credits per degree:** 1  
**Grading Option:** Graded with Option  
**Prerequisite for:** MECH 421, MECH 821, ENGR 421

ENGR 301 Introduction to Nuclear and Radiation Engineering Concepts  
**Description:** History of nuclear development, basic concepts of radiation and radioactivity, radioactive waste management, global warming and the impact of nuclear power plants. Industrial applications, health physics, and nuclear medicine. Job opportunities at power plants, graduate school, and national laboratories. Tour of the University of Texas nuclear research reactor and demonstration experiments.  
**Credit Hours:** 1  
**Max credits per semester:** 1  
**Max credits per degree:** 1  
**Grading Option:** Graded with Option  
**Prerequisite for:** ENGR 402; MECH 421, MECH 821, ENGR 421

ENGR 302 Utilization of Nuclear Technologies in Society  
**Description:** The applications of nuclear science to society and the fundamental radiation principles utilized in these applications.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option  
**Prerequisite for:** ENGR 411; MECH 421, MECH 821, ENGR 421

ENGR 320 Leadership, Management and Ethics  
**Prerequisites:** ENGR 200  
**Description:** Explore professional leadership, ethics, project management tools and skills, and how to successfully implement and respond to change. In a team based environment, enhance essential professional skills for personal and team success by developing and presenting a responsive proposal considering: client needs, basic project controls and scheduling. Learn about personal styles, motivation and effectively implementing change. Examine ethical dilemmas regarding principles, stewardship, and civics from ethical, legal, and expediency perspectives.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option

ENGR 321 Professional Services  
**Description:** Introduction to professional engineering services, including various areas such as engineering management, structural engineering, civil engineering, and environmental engineering.  
**Credit Hours:** 1  
**Max credits per semester:** 1  
**Max credits per degree:** 1  
**Grading Option:** Graded with Option

ENGR 322 Legal and Professional Issues  
**Description:** Legal registration of engineers and architects. Subprofessional and professional services. Changing conditions in engineering practice. Legal and ethical responsibilities, and ethical obligations for engineering practice.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option

ENGR 350 Engineering Cooperative Education  
**Prerequisites:** Junior standing; permission of College of Engineering Dean's Office and department chair of student's engineering major.  
**Notes:** Special approval is required to take course for credit.  
**Description:** Cooperative education work in a regularly established cooperative education work-study program in any engineering curriculum.  
**Credit Hours:** 0-12  
**Min credits per semester:** 1  
**Max credits per semester:** 12  
**Max credits per degree:** 12  
**Grading Option:** Pass No Pass

ENGR 391 Junior Engineering Special Topics  
**Description:** Topics vary.  
**Credit Hours:** 1-3  
**Min credits per semester:** 1  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option

ENGR 400 Professional Ethics and Social Responsibilities  
**Prerequisites:** Must have senior standing and Professional Admission.  
**Notes:** Best taken during final semester prior to graduation.  
**Description:** Professional relations, personal requirements, civic responsibilities, and ethical obligations for engineering practice. Legal registration of engineers and architects. Subprofessional and professional services. Changing conditions in engineering practice. Requirements for placement in engineering.  
**Credit Hours:** 1  
**Max credits per semester:** 1  
**Max credits per degree:** 1  
**Grading Option:** Pass No Pass

ENGR 402 Energy Systems and Resources  
**Prerequisites:** ENGR 301.  
**Description:** Energy as a critical component of civilization. The critical role of energy from the economic and political point of view worldwide. Energy resources available, the technology to use the resources, the economics of energy production, the environmental consequences of energy use, and energy policy.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option

ENGR 410 Radiation Protection and Shielding  
**Prerequisites:** MATH 221 and ENGR 421.  
**Description:** Basic principles and concepts of radiation protection and shield design. Dosimetric units and response functions, hazards of radiation doses, radiation sources, basic methods for dose evaluation, and shielding design techniques for photons and neutrons.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded

ENGR 411 Radiation Protection and Shielding  
**Prerequisites:** ENGR 420.  
**Description:** Basic principles and concepts of radiation protection and shield design. Dosimetric units and response functions, hazards of radiation doses, radiation sources, basic methods for dose evaluation, and shielding design techniques for photons and neutrons.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded
ENGR 411 Nuclear Reactor Theory  
**Prerequisites:** ENGR 310.  
**Description:** Introduction to neutron diffusion theory, neutron moderation, neutron thermalization, and criticality condition of nuclear reactor.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option  
**Prerequisite for:** ENGR 412

ENGR 412 Nuclear Reactor Analysis  
**Prerequisites:** ENGR 411.  
**Description:** Group diffusion method, multiregional reactors, heterogeneous reactors, reactor kinetics, and change in reactivity.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option  
**Prerequisite for:** ENGR 410, ENGR 420

ENGR 420 Nuclear Reactor Engineering  
**Prerequisites:** MECH 421/821/ENGR 421.  
**Description:** The physics governing nuclear reactors and the design principles for commercial nuclear power plants. Reactor designs currently operating in the power industry.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option

ENGR 421 Elements of Nuclear Engineering  
**Crosslisted with:** MECH 421, MECH 821  
**Prerequisites:** ENGR 300 or ENGR 301 or ENGR 310; MATH 208/MATH 208H; and PHYS 212/PHYS 212H  
**Description:** Survey of nuclear engineering concepts and applications. Nuclear reactions, radioactivity, radiation interaction with matter, reactor physics, risk and dose assessment, applications in medicine, industry, agriculture, and research.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded

ENGR 447 Multi-disciplinary Engineering Capstone  
**Prerequisites:** Senior standing, professional admission to an engineering program, and instructor permission.  
**Description:** Senior standing, professional admission to an engineering program, and instructor permission.  
**Credit Hours:** 2-6  
**Max credits per semester:** 2  
**Max credits per degree:** 6  
**Grading Option:** Graded

ENGR 450 Engineering Cooperative Education  
**Prerequisites:** Senior standing; permission of College of Engineering Dean's Office and department chair of student's engineering major.  
**Notes:** Special approval is required to take course for credit. Pass/No Pass only.  
**Description:** Cooperative education work in a regularly established cooperative work-study program in any engineering curriculum.  
**Credit Hours:** 0-12  
**Min credits per semester:**  
**Max credits per semester:**  
**Max credits per degree:** 3  
**Grading Option:** Pass No Pass

ENGR 469 Technology, Science and Civilization  
**Prerequisites:** Senior standing  
**Description:** Study of the development of technology as a trigger of change upon humankind, from the earliest tools of Homo habilis to the advent of the radio telescope in exploring the creation of the universe. Tracing paths from early science to development of the sciences and technologies that dominate the new millennium.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded  
**ACE:** ACE 8 Civic/Ethics/Stewardship

ENGR 490 Global Experiences  
**Prerequisites:** Permission.  
**Notes:** Choice of subject matter and coordination of on- and off-campus activities are at the discretion of the instructor.  
**Description:** Individual or group educational experience combining classroom lectures, discussions, and/or seminars with field and/or classroom studies in a foreign country.  
**Credit Hours:** 1-3  
**Min credits per semester:** 1  
**Max credits per semester:** 3  
**Max credits per degree:** 12  
**Grading Option:** Graded  
**ACE:** ACE 9 Global/Diversity

ENGR 491 Senior Engineering Special Topics  
**Description:** Topics vary.  
**Credit Hours:** 1-3  
**Min credits per semester:** 1  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option

ALEC 101 Mechanical Drafting  
**Description:** Develop expertise in the use of drafting equipment, geometric construction, orthogonal projections, dimensioning, and the application of American National Standards Institute (ANSI) standards.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option  
**Prerequisite for:** ALEC 122; ALEC 303; ALEC 346
ALEC 102 Interpersonal Skills for Leadership
**Prerequisites:** Open to Freshman or Sophomores, or Agricultural Education degree students, or Leadership & Communication Minor students, or Leadership & Entrepreneurship Minor students.
**Notes:** Credit for both ALEC 102 and ENGR 100 is not allowed.
**Description:** Introduction to the principles and practices of positive interpersonal relationships for leadership development. Self-awareness, awareness of others, effective interpersonal communication, and the building of trust relationships as a basis for understanding and developing leadership. An experiential approach, field projects and a supervised service project. Open to freshman or sophomores or Agricultural Leadership, Education & Communication degree students or Leadership & Communication minor students or Leadership & Entrepreneurship minor students.

**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option  
**ACE:** ACE 2 Communication Competence

ALEC 103 Computer-Aided Drafting
**Prerequisites:** ALEC 122.
**Description:** Applying computer commands to create two-dimensional engineering and architectural drawings.

**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option

ALEC 104 Wood Technology
**Description:** Fundamental woodworking tools and processes. Hand tool, lathe and machine related projects.

**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option

ALEC 105 Introduction to Engineering Design (IED)
**Notes:** This course is the first course in the Project Lead the Way pre-engineering program and requires no prerequisite.
**Description:** Students dig deep into the engineering design process, applying math, science, and engineering standards to hands-on projects. They work both individually and in teams to design solutions to a variety of problems using 3D modeling software, and use an engineering notebook to document their work.

**Credit Hours:** 4  
**Max credits per semester:** 4  
**Max credits per degree:** 4  
**Grading Option:** Graded with Option  
**Offered:** SUMMER  
**Prerequisite for:** ALEC 115

ALEC 108 Food in Society
**Description:** An introduction to the systems required to produce, distribute and sell the food that sustains life. The course provides the opportunity to learn from international experts who specialize in the sources, production, safety, distribution, culture, sale, politics and consumption of food worldwide.

**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option  
**Prerequisite for:** SCIL 300

ALEC 109 Industrial Metals and Plastics Materials Processing
**Description:** Forming, molding, separating, and fabricating of industrial materials.

**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option

ALEC 115 Principles of Engineering (POE)
**Prerequisites:** ALEC 105, Introduction To Engineering Design is a prerequisite
**Notes:** This course is the second foundational course taught in the Project Lead the Way pre-engineering curriculum. Students that complete this course will be certified to teach both foundational courses in any secondary PLTW pre-engineering program across the country. This certification gives UNL STS students in the ALEC department a rigorous STEM skill set. Once the course is completed the credit will be reverse transferred back to the community college to fulfill the STEM skill requirement of the 2+2 articulation agreements established with UNL and the ALEC department.

**Description:** Through problems that engage and challenge, students explore a broad range of engineering topics, including mechanisms, the strength of structures and materials, and automation. Students develop skills in problem solving, research, and design while learning strategies for design process documentation, collaboration, and presentation.

**Credit Hours:** 5  
**Max credits per semester:** 5  
**Max credits per degree:** 5  
**Grading Option:** Graded with Option

ALEC 122 Architectural Drafting
**Prerequisites:** ALEC 101.
**Description:** Basic skills in the construction of architectural drawings, plot plans, elevation view, wall and floor sections, and roof construction. Architectural modeling.

**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option

**Prerequisite for:** ALEC 103
ALEC 134 Agricultural Leadership, Education and Communication Careers

Description: Explore the career opportunities available in agricultural leadership, education and communication focusing on agribusiness, industry training positions, secondary agri-science instruction, extension education, agricultural and environmental sciences communication, and international agricultural education. Course has guest speakers and field trips.

Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: ALEC 234

ALEC 135 Early Field Experience in Agricultural Leadership, Education and Communication

Prerequisites: Agricultural leadership, education and communication major

Description: An exploration of the history, philosophy, goals, and objectives of career and Technical Education, more specifically, School-Based Agricultural Education. An introduction to lesson plan development, objective/essential question writing, and peer teaching will provide knowledge and skills that will be used in an early field experience. The early field experience will provide a platform for critical reflection that will help mold future agricultural teachers.

Credit Hours: 6
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: ALEC 234

ALEC 135A Introduction to Skilled and Technical Sciences Education

Description: This is an introduction to basic lesson plan development, objective writing, and teaching in Skilled and Technical Sciences. A 40-hour early field experience in a Skills USA affiliated STS education program is required. The early field experience explores teaching as a potential career.

Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

ALEC 136 Fundamentals of Agricultural and Environmental Sciences Communication

Description: Introduction to the study of agricultural and environmental sciences communications. Strategies and techniques for success in the major and college courses generally using a systems thinking approach, fundamental concepts of communicating information related to science, environment, agriculture and natural resources to internal and external audiences, and job shadowing experience to help prepare for careers in the field.

Credit Hours: 6
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

ALEC 153 Chancellor's Leadership Class

Prerequisites: Admission to the Chancellor’s Leadership Class program

Description: Leadership development. Understanding of self, develop leadership knowledge, and how to make a difference in the community.

Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

Prerequisite for: ALEC 422

ALEC 165 Pepsi Service Scholars

Prerequisites: Pepsi Scholarship for Outstanding Leadership and Service recipient

Notes: Requires 2 to 3 hours per week of outside of class time in community service.

Description: Civic and social responsibility through service-learning programming. Introduction to civic life, civic agent, and life-long service.

Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

ACE: ACE 8 Civic/Ethics/Stewardship

ALEC 189H University Honors Seminar

Prerequisites: Good standing in the University Honors Program or by invitation.

Description: Topic varies.

Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

ALEC 200 Writing for Agriculture and Natural Resources

Prerequisites: Major or minor in Agricultural and Environmental Sciences Communication (AESC)

Description: Application of generally accepted practices for students desiring a communications career in agricultural and/or environmental sciences. Associated Press writing style, audience analysis, interviewing skills, writing mechanics, nuances of both verbal and nonverbal communication and professional collaboration.

Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

ALEC 201 Electricity/Electronics

Description: Introduction to electricity and/or electronics and their applications to industry. AC and DC circuit design, construction, and analysis.

Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

ALEC 202 Foundations of Leadership Theory and Practice

Notes: Will be offered both in face-to-face and online formats during fall and spring semesters and will be offered only online during the summer 8-week session.

Description: Foundational knowledge of leadership theory and its relationship to the practice of leadership. Resolve complex leadership challenges by evaluating the intersection between leader, follower, and context. Critically assess real-world situations and make decisions about what theoretically-based leadership skills and behaviors are most likely to be effective.

Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

Prerequisite for: ALEC 422
ALEC 203 Automotive Technology
Description: Automotive technology and the equipment related to automotive repairs. The design, theory, and operations of automotive systems through laboratory activities.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: ALEC 303

ALEC 204 Machine Tool Technology
Description: Basic machine shop practices involving hand and precision measuring tools, bench work, layout, engine lathe, milling machine, surface and pedestal grinders.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: ALEC 303

ALEC 205 Welding Technology
Description: Basic knowledge and skill in both oxygen-acetylene welding and cutting, and electrical arc welding.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: ALEC 246; ALEC 303

ALEC 207 Communicating to Public Audiences
Crosslisted with: ADPR 207
Prerequisites: College of Agricultural Sciences and Natural Resources (CASNR): completion of all CASNR core communications course requirements.
Description: Concepts and techniques of public relations. Skills and theory for relating to government, corporate, and other agricultural public audiences.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

ALEC 234 Planning Leadership and Experience Programs
Prerequisites: Sophomore standing and ALEC 134 and/or ALEC 135.
Description: Theory of experiential education to middle school and secondary agricultural education programs, especially leadership and career education. Development of Supervised Agricultural Experiences (SAE), Young Adult/Farmer, FFA, and alumni activities, appropriate to the community, school, and student needs using electronic technology in learning how to teach Nebraska's agricultural education financial management system.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

ALEC 235 STS Technical Skills and Skills USA
Description: Theory of experiential education to middle school and secondary Skilled and Technical Sciences education programs, especially leadership and career education. Exposure to Supervised Career and Technical Student Organization Experience (CTSO), Skills USA, appropriate to the community, school, and student needs recording using electronic technology in learning how to teach Skilled and Technical Science courses supported by Skills USA. This course will provide the work based learning credit (006.34D3) for the Industrial Technology Education Field Endorsement, and STS Supplemental endorsements. This course includes 20 hours of SkillsUSA field experience.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Groups: Introductory

ALEC 240 Digital Photography and Visual Communication for Agriculture and the Environment
Prerequisites: Students must be an AESC major or minor.
Description: Digital photography theory and tools to deliver science-based agricultural and environmental information for diverse audiences. Develop an understanding of and apply digital photography concepts such as composition, lighting, landscape, portrait, and editing in the development of a final photo essay project for a real-world audience.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

ALEC 241 Mobile Video Production of Agricultural and Environmental Issues
Prerequisites: ALEC 240
Description: Use mobile devices to research agricultural and environmental science topics, conduct and record video interviews with scientists about controversial scientific topics, record footage in science labs and field sites, and produce final videos for real-world audiences. Gain experience with digital storytelling theory and techniques.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

ALEC 242 Construction Technology
Prerequisites: ALEC 104
Description: Classifications, properties, and uses of common construction materials and building practices. Construction of a residential dwelling from plot plan through trim and finish work.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ALEC 243 Fine Woodworking  
Prerequisites: ALEC 104  
Description: Woodworking special processes. Furniture design, frame and panel construction, veneering and steam bending. Project design and construction on an individual project serve as the final assessment.  
Credit Hours: 3  
Max credits per semester: 3  
Max credits per degree: 3  
Grading Option: Graded with Option  
Prerequisite for: ALEC 340  

ALEC 246 Modern Industries  
Prerequisites: ALEC 204  
Description: CNC (Computer Numerical Control) programming for tool making to include milling, computer aided manufacturing and/or drafting and/or design and electrical discharge machines.  
Credit Hours: 3  
Max credits per semester: 3  
Max credits per degree: 3  
Grading Option: Graded with Option  

ALEC 302 Dynamics of Effective Leadership in Organizations  
Prerequisites: Open to sophomores or above.  
Description: Principle and process of effective leadership in complex organizations of society and commerce. Dynamic interactions of personal characteristics, technical skills, interpersonal influence, commitment, goals and power.  
Credit Hours: 3  
Max credits per semester: 3  
Max credits per degree: 3  
Grading Option: Graded with Option  
Prerequisite for: ALEC 495A  

ALEC 303 Energy, Power and Transportation Technology  
Prerequisites: ALEC 101, 109, 203, 204 and 205.  
Notes: A synthesis of skill-based courses for Industrial Technology Education (ITE) majors.  
Description: Design, construct, and test a one-person electric vehicle. Enter the vehicle in a statewide competition.  
Credit Hours: 3  
Max credits per semester: 3  
Max credits per degree: 3  
Grading Option: Graded with Option  

ALEC 305 Presentation Strategies for Agricultural Audiences  
Description: Presentation strategies used in agribusiness, education, government and public service. Attention to audience need, organization, methodology and management of presentation resource, especially electronic technology.  
Credit Hours: 3  
Max credits per semester: 3  
Max credits per degree: 3  
Grading Option: Graded with Option  
Offered: FALL/SPR  

ALEC 308 Laboratory Instruction and Management  
Prerequisites: 6 hrs mechanized systems management; advanced standing.  
Notes: Student demonstrations and presentations required.  
Description: Planning, conducting, and administering the instructional programs related to experientially based education in school laboratory settings. Variety of laboratory settings, including agricultural mechanics, greenhouse, soils, etc.  
Credit Hours: 3  
Max credits per semester: 3  
Max credits per degree: 3  
Grading Option: Graded with Option  

ALEC 330 Foundations of Cooperative Extension  
Prerequisites: Junior standing.  
Description: Cooperative Extension in a variety of settings and its role in the land-grant mission. Processes for developing and conducting need-driven, research-based, extension programs. Relationships with public and private agencies. Strategies for volunteerism.  
Credit Hours: 3  
Max credits per semester: 3  
Max credits per degree: 3  
Grading Option: Graded with Option  

ALEC 331 Supervised Field Experiences  
Prerequisites: Junior or senior by application.  
Description: Field course of supervised observation and participation with various phases of agricultural education and/or agribusiness.  
Credit Hours: 2-5  
Min credits per semester: 2  
Max credits per semester: 5  
Max credits per degree: 10  
Grading Option: Graded with Option  

ALEC 337 Instructional Internship in Leadership Development  
Prerequisites: Permission.  
Description: A structured professional and personal leadership developmental experience by providing planning, facilitation, instruction, and evaluation assistance in leadership & communication courses.  
Credit Hours: 0-3  
Min credits per semester:  
Max credits per semester: 3  
Max credits per degree: 3  
Grading Option: Pass No Pass  

ALEC 340 Advanced Machine Woodworking  
Prerequisites: ALEC 243  
Notes: A continuation of ALEC 243.  
Description: Machine woodworking on a major individual project. Wood finishing and maintenance of hand and power tools.  
Credit Hours: 3  
Max credits per semester: 3  
Max credits per degree: 3  
Grading Option: Graded with Option
ALEC 341 Podcasting to Increase Science Literacy  
**Prerequisites:** AESC majors and minors  
**Notes:** This is a blended learning course. We will meet face-to-face once a week to develop our projects. We will also participate in weekly online activities such as readings, discussion boards, wikis, etc. Offered in the spring semester of odd years.  
**Description:** Analysis and research of science literacy concepts, how to engage in public conversations about controversial issues, how to interview scientists, how to edit scientific audio interviews, and how to ultimately produce a podcast series with the goal of increasing the public’s science literacy.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded

ALEC 346 Advanced Computer Aided Drafting and Design  
**Prerequisites:** ALEC 101 or 103.  
**Description:** Introduction to 3D modeling using sketching and Inventor software.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option

ALEC 350 Agriculture, the Environment & Science in the Media  
**Prerequisites:** Completion of ACE 1 and ACE 2 coursework.  
**Notes:** Recommended for junior level students and above.  
**Description:** How agriculture, the environment, and science are covered in media by news media outlets. Use of framing theory as a foundation to understand why messages are crafted in certain ways, how and why news media portray topics and issues using certain metaphors and story lines. Creation of effective media messages related to topics using framing, how to handle and respond to media requests, and interact with members of the media.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded  
**Prerequisite for:** ASCI 381

ALEC 388 Ethics in Agriculture and Natural Resources  
**Crosslisted with:** AECN 388  
**Description:** Ethics focusing on agricultural and natural resource issues. Using case studies from the professional workplace and contemporary society, develops intellectual skills necessary to reflect critically on ethical issues and apply appropriate conceptual tools for resolution of issues arising from conflicting ethical and value systems.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option  
**Prerequisite for:** ACE: AECN 388

ALEC 390 Industrial Experience  
**Prerequisites:** Permission.  
**Description:** Occupational experience or supervised occupational experience in conjunction with directed observation.  
**Credit Hours:** 1-6  
**Min credits per semester:** 1  
**Max credits per semester:** 6  
**Max credits per degree:** 6  
**Grading Option:** Graded with Option

ALEC 393 Digital Imaging and Storytelling in Agriculture and Natural Resources  
**Crosslisted with:** NRES 393  
**Prerequisites:** Consent of instructor(s). One college level course in photography or equivalent, and knowledge of the basics of shooting still photographs or video using digital cameras. Open only to College of Agricultural Sciences and Natural Resources students.  
**Notes:** Can be repeated for a maximum of 9 credit hours by consent of instructor.  
**Description:** Concepts and techniques related to use of remote and automated digital camera technology to capture images in agriculture and natural resources contexts to communicate a narrative/story. Completion of individual project using a variety of technologies including camera traps, time-lapse camera systems, remote triggered cameras, as well as traditional audio and video and conventional photography.  
**Credit Hours:** 1-9  
**Min credits per semester:** 1  
**Max credits per semester:** 9  
**Max credits per degree:** 9  
**Grading Option:** Graded

ALEC 397 Special Topics  
**Prerequisites:** Permission.  
**Description:** Readings; in depth discussions; analysis of current theory, issues, problems, research and practice in leadership, education and/or communication. Topics vary.  
**Credit Hours:** 1-3  
**Min credits per semester:** 1  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option

ALEC 399 Independent Study in Communications  
**Prerequisites:** Completion of individual project using a variety of technologies including camera traps, time-lapse camera systems, remote triggered cameras, as well as traditional audio and video and conventional photography.  
**Credit Hours:** 1-3  
**Min credits per semester:** 1  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option

ALEC 400 Overview to Program Planning  
**Crosslisted with:** ALEC 800  
**Prerequisites:** ALEC 305 or ALEC/TEAC 805/NUTR 806.  
**Notes:** Designed for individuals interested in developing and/or improving program planning skills.  
**Description:** Theoretical and applied considerations for identifying content, design, implementation, and evaluation of educational programs that vary in length from several hours to several months.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Grading Option:** Graded with Option
ALEC 405 Methods of Instruction for Secondary Agriscience Education
Prerequisites: Senior standing and 3 hrs educational psychology
Description: Instructional delivery of a secondary agricultural education program in the public school system. Organizing instructional content, individual lesson planning, methods of formal instructional delivery, student behavior management, instructing the handicapped and disadvantaged, and student testing. Considerable time is spent on undergraduates demonstrating instructional delivery.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: ALEC 405L

ALEC 405L Methods of Instruction Laboratory Education
Prerequisites: Admission to the teaching program in agricultural education and parallel registration in ALEC 405.
Description: Laboratory exercises that complement material covered in ALEC 405. Involve practice teaching at either the middle or secondary school level.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded with Option

ALEC 407 Supervisory Leadership
Crosslisted with: ALEC 807, CYAF 807
Prerequisites: ALEC 202 or ALEC 302; Junior standing
Description: Knowledge and theoretical basis for practicing supervisors in a changing workplace where supervisors have increasing responsibilities due to the flattening or organizational structures, solving supervisory challenges in organizing and planning, problem solving and decision making, performance appraisal and leading a diverse workforce.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

ALEC 410 Environmental Leadership
Crosslisted with: ALEC 810, NRES 413, NRES 813
Prerequisites: Junior Standing
Notes: Offered on the World Wide Web (WWW) fall semester of odd-numbered years and in the classroom fall semester of even numbered years.
Description: Major leaders in conservation and ecology that emphasizes agricultural and cultural issues and relationships with the environment.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

ALEC 413 Program Development
Prerequisites: Junior standing and acceptance into the student teaching program in agricultural education
Description: Planning, marketing and managing formal and non-formal educational programs for youth and adults. The learning process applied to learner needs and styles. Building collaborative relationships.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

ALEC 414 Classic Figures in Leadership
Crosslisted with: ALEC 814
Prerequisites: Junior standing.
Description: Leadership theory in an applied context. Leadership analyzed through a variety of genres: autobiography, drama, fiction, tracts and treaties, speeches.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

ALEC 417 Issues Management and Crisis Communications in Agriculture
Crosslisted with: ADPR 417
Prerequisites: Junior standing. College of Journalism and Mass Communications: Junior standing; JOMC 101, JOMC 130-134, ADPR 151, ADPR 221, and ADPR 283
Description: Fundamental components of issues management and crisis communications. Learning experiences in agriculture and natural resources that provide an understanding of issues facing the respective field of study.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

ALEC 420 Improvement of Instructional Programs for Post-High-School Occupational Education
Crosslisted with: ALEC 820
Description: Designing new instructional programs, expanding the impact of student behavioral objectives, and evaluating the total instructional program.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

ALEC 421 Agricultural & Environmental Sciences Communication Practicum
Prerequisites: Junior status. Major or minor in Agricultural and Environmental Sciences Communication.
Description: This is a project course for students enrolled in the Agricultural and Environmental Communications program. It provides students the opportunity to develop, plan, and execute a project of their own design to showcase skills and knowledge gained through coursework. Students are guided by course instructor(s) and collaborate with additional identified faculty with appropriate expertise in agricultural sciences and natural resources.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
ALEC 422 Facilitation and Project Planning
Prerequisites: ALEC 202 or equivalent and at least junior standing
Notes: The course will require travel to project sites, which are within 75 miles of Lincoln. At least 5 project visits are required, and more project visits may be required depending on the project. Generally, students work in pairs, so not all students need to be able to drive, and the instructor will try to create partnerships that facilitate traveling needs. However, if students cannot find transportation to a project site, they will not be able to complete the course.
Description: Foundational knowledge of project planning and facilitation. An experiential opportunity to facilitate a project within a community.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

ALEC 424 Foundation of Career and Technical Education
Crosslisted with: ALEC 824
Description: Scope and structure of career and technical education within the educational system. Teacher's role and responsibilities in dealing with legislative mandates in planning, management, and evaluation of a local program.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

ALEC 428 Leadership in Public Organizations
Crosslisted with: ALEC 828, NRES 428, NRES 828
Prerequisites: Junior standing
Description: Leadership in theories, research, and practices in public organizations and natural resource agencies.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

ALEC 431 Student Teaching
Prerequisites: 3 hrs EDPS; passing score on the Preprofessional Skills Tests (PPST); and permission
Notes: Capstone course. Placement arranged by the department. Student teaching placement arranged by the department. Seven to sixteen weeks of off-campus student teaching. Pass/no pass only.
Description: Guided participation in various phases of a public school agricultural education program.
Credit Hours: 1-12
Min credits per semester: 1
Max credits per semester: 12
Max credits per degree: 12
Grading Option: Pass No Pass
ACE: ACE 10 Integrated Product

ALEC 444 Science Writing
Crosslisted with: JOMC 444, JOMC 844
Prerequisites: Permission.
Notes: Open to all majors. Articles may be submitted for publication.
Description: Advanced writing about science for the non-expert and/or for the general public. Issues in science communication through reading the best writers in science and journalism. Research and write short articles and longer profiles about science and scientists at the University of Nebraska-Lincoln (UNL) and elsewhere. Polish writing skills for doing work in science classes.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

ALEC 455 Dynamics of Effective Leadership in Groups & Teams
Crosslisted with: ALEC 855, CDEV 855
Prerequisites: At least Junior standing is required for ALEC 455.
Description: Explore foundational knowledge of team and group dynamics theory and its relationship to the practice of leadership in organizations and communities. Development of leadership, followership, and teamwork skills in small groups and teams. Focus on team and group decision making, problem solving, and creativity, peer assessment, and evaluation using real-world situations and contexts. Critically apply team and group dynamic theories and research to leadership in organizations and communities.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING

ALEC 466 Leadership and Diversity in Organizations and Communities
Crosslisted with: ALEC 866
Prerequisites: Junior standing.
Description: Leadership theories and their applications to human diversity in organizations and communities.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

ALEC 477 Leadership and Motivation
Crosslisted with: ALEC 877
Description: Classic and contemporary motivation theories applied to leadership in organizations and communities.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ALEC 480 Capstone Experience in Agricultural and Environmental Sciences Communication
Prerequisites: Consent of Instructor. Senior standing.
Notes: Requires interviews outside of class time.
Description: Investigate topics identified by IANR as critical to Nebraska agriculture and research, conduct interviews, write, edit, design and assist in the production of print and multimedia versions of the Strategic Discussions for Nebraska publication. Emphasis on factual, complete, accurate and clear communication of complex scientific and sociologically important issues in Nebraska agriculture. Learning to communicate research and science-based agricultural concepts to public audiences.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ACE: ACE 10 Integrated Product

ALEC 488 Leadership, Power and Influence
Crosslisted with: ALEC 888
Description: Organizational influence processes, power, and politics in organizations and communities.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

ALEC 494 Undergraduate Seminar in Agricultural Education
Description: Philosophy and relationship of agricultural education in the public schools. Development and coordination of adult and continuing agricultural education programs.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: ALEC 405

ALEC 495A Internship in Leadership Development
Prerequisites: Junior standing; ALEC 302; Agricultural Education major; and permission.
Notes: Must be taken as 'Pass/No Pass' by Agricultural Education majors.
Description: Internship in a selected agribusiness, industry, or agency. Collaboration development of a training program and leadership activities.
Credit Hours: 3-6
Min credits per semester: 3
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Pass No Pass
ACE: ACE 10 Integrated Product

ALEC 495B Internship in Agricultural and Environmental Sciences Communication
Prerequisites: Junior standing. Agricultural and Environmental Sciences Communication major, and permission
Notes: Taken the second semester of the junior year or in the summer following the junior year. Department approval is required. Cannot be taken Pass/No Pass.
Description: Internship experience with an organization selected by student and approved by instructor in an agricultural or environmental sciences organization where the focus of the internship is related broadly to communications.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

ALEC 496 Independent Study in Leadership Education
Crosslisted with: ALEC 896
Prerequisites: Permission.
Description: Projects to research, literature review, or extension of course work.
Credit Hours: 1-9
Min credits per semester: 1
Max credits per semester: 9
Max credits per degree: 9
Grading Option: Graded with Option

ALEC 496A Independent Study in Leadership Education: Experiential Learning in Leadership
Notes: For students majoring in the Leadership Option or minoring in Leadership and Communication or Leadership and Entrepreneurship only
Description: Projects to research, literature review, or extension of coursework related specifically to experiential learning in leadership
Credit Hours: 0-3
Min credits per semester: 0
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

ALEC 499H Honors Thesis
Prerequisites: Admission to the University Honors Program and permission, AGRI 299H recommended.
Description: Conduct a scholarly research project and write a University Honors Program or undergraduate thesis.
Credit Hours: 3-6
Min credits per semester: 3
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Graded