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.”

Major Department 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. 4 units of mathematics: 2 of algebra, 1 of geometry, 1 of precalculus and trigonometry.
2. 4 units of English.
3. 3 units of natural science that must include 1 unit of physics and 1 unit of chemistry (chemistry requirement waived for students in construction management).
4. 2 units of a single foreign language.
5. 3 units of social studies.
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 College of Engineering.

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 UNL 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 UNL.

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 for Nebraska residents or 3.0 for non-residents, and be calculus-ready. Students not meeting either of these requirements must enroll in the Explore Center or another UNL college until they meet COE admission requirements.

The COE accepts courses for transfer for which a C or better grade was received. Although UNL 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 UNL. Upon admission to UNL, students wishing to pursue degree programs in the COE will be classified and subject to the policies defined in the subsequent section.

College Degree Requirements

Grade Rules

Grade Appeals

In the event of a dispute involving any college policies or grades, the student should appeal to his/her instructor, and appropriate department chair or school director (in that order). If a satisfactory solution is not achieved, the student may appeal his/her case through the College Academic Appeals Committee on his/her campus.

Catalog Rule

Students must fulfill the requirements stated in the catalog for the academic year in which they are first admitted at UNL. 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 UNL 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

#### ENGR Leadership & Management Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 100</td>
<td>Interpersonal Skills for Engineering Leaders (ACE 2)</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 200</td>
<td>Professionalism and Global Perspective (ACE 6 &amp; 9)</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 320</td>
<td>Leadership, Management and Ethics (ACE 6 &amp; 8)</td>
<td>3</td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: 9

#### Leadership Courses

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALEC 202</td>
<td>Foundations of Leadership Theory and Practice</td>
</tr>
<tr>
<td>ALEC 302</td>
<td>Dynamics of Effective Leadership in Organizations</td>
</tr>
<tr>
<td>ALEC 433</td>
<td>Dynamics of Effective Leadership in Groups &amp; Teams ¹</td>
</tr>
<tr>
<td>ALEC 477</td>
<td>Leadership and Motivation</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>ALEC 407</td>
<td>Supervisory Leadership</td>
</tr>
<tr>
<td>ALEC 410</td>
<td>Environmental Leadership ¹</td>
</tr>
<tr>
<td>ALEC 422</td>
<td>Facilitation and Project Planning ¹</td>
</tr>
<tr>
<td>ALEC 466</td>
<td>Leadership and Diversity in Organizations and Communities ¹</td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: 6-12

#### Experiential Learning in Leadership

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALEC 337</td>
<td>Instructional Internship in Leadership Development ²</td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: 0-3

Total Credit Hours: 15-24

¹ Note that 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.

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**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

**Format:** LEC

**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

**Format:** LEC

**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

**Format:** LEC

**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

**Format:** LEC

**Prerequisite for:** ENGR 320

**ACE:** ACE 6 Social Science ACE 9 Global/Diversity
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. All students in engineering participating in cooperative education must register each term prior to commencing work. P/N only.
Description: Cooperative education work in a regularly established cooperative education work-study program in any engineering curriculum.
Credit Hours: 12.00
Max credits per semester: 12
Max credits per degree: 12
Format: FLD

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
Format: LEC
Prerequisite for: MECH 421, MECH 821, ENGR 421

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
Format: LEC
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
Format: LEC
Prerequisite for: MECH 421, MECH 821, ENGR 421

ENGR 310 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
Format: LEC
Prerequisite for: 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
Format: LEC
ACE: ACE 6 Social Science ACE 8 Civic/Ethics/Stewardship

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. All students in engineering participating in cooperative education must register each term prior to commencing work. P/N only.
Description: Cooperative education work in a regularly established cooperative education work-study program in any engineering curriculum.
Credit Hours: 12.00
Max credits per semester: 12
Max credits per degree: 12
Format: FLD

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
Format: LEC

ENGR 400 Professional Ethics and Social Responsibilities
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
Format: LEC

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 world wide. 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
Format: LEC
ENGR 410 Radiation Protection and Shielding
Prerequisites: MECH401/801/ENGR 421.
Description: Basic principles and concepts of radiation protection and shield design. Dose-metric 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
Format: LEC

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
Format: LEC

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
Format: LEC

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
Format: LEC

ENGR 421 Elements of Nuclear Engineering
Crosslisted with: MECH 421, MECH 821
Prerequisites: ENGR 300 or 301 or 310; MATH 208/208H; and PHYS 212/212H
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
Format: LEC

ENGR 447 Multi-disciplinary Engineering Capstone
Prerequisites: Senior standing, professional admission to an engineering program, and instructor permission.
Description: Definition, scope, analysis, synthesis, and the design for the solution of a comprehensive engineering problem in any major area of engineering, with emphasis on multi-disciplinary engineering problems.
Credit Hours: 2-6
Min credits per semester: 2
Max credits per semester: 6
Max credits per degree: 6
Format: LEC

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. All students in engineering participating in cooperative education must register each term prior to commencing work. Pass/No Pass only.
Description: Cooperative education work in a regularly established cooperative work-study program in any engineering curriculum.
Credit Hours: 12.00
Max credits per semester: 12
Max credits per degree: 12
Format: FLD

ENGR 490 Global Experiences
Prerequisites: Permission.
Notes: Choice of subject matter and coordination of on- and off-campus activities at the discretion of the instructor. ENGR 490 is 'Pass/No Pass' only.
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
Format: FLD
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
Format: LEC

ALEC 101 Mechanical Drafting
Description: Develop expertise in the use of drafting equipment, geometric construction, orthographic 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
Format: LEC

ALEC 102 Interpersonal Skills for Leadership
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 minor students or Leadership & Communication minor students or Leadership & Entrepreneurship minor students.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
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
Format: LEC

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
Format: LEC

ALEC 105 Introduction to Engineering Design (IED)
Prerequisites: This course is the first course in the Project Lead the Way pre-engineering program and requires no prerequisite.
Notes: This is a secondary course training option for pre service teachers in Skilled and Technical Sciences. It is a STEM skill requirement for the 2+2 articulation agreement with various community colleges across the state of Nebraska. By allowing pre-service teachers to complete this course, students can reverse transfer the credit back to the community colleges to fulfill rigorous training needs in the STEM field for future STS teachers coming out of the ALEC department.
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
Format: LAB
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
Format: LEC
ACE: ACE 6 Social Science

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
Format: LEC

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
Format: LAB

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
Format: LEC

ALEC 125 Land, Food and People
Description: Analyze and synthesize information about the dynamic relationships of land, food, and people and the impacts of human decisions on renewable and non-renewable resources from a local and global perspective.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
ACE: ACE 8 Civic/Ethics/Stewardship

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 agriscience instruction, extension education, agricultural and environmental sciences communication, and international agricultural education. Course has guest speakers and field trips.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Format: LEC
ALEC 135 Early Field Experience in Agricultural Leadership, Education and Communication  
**Prerequisites:** Agricultural leadership, education and communication major or permission  
**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:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Format:** LEC

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:** 1  
**Max credits per semester:** 1  
**Max credits per degree:** 1  
**Format:** FLD

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:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Format:** LEC

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  
**Format:** LEC

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  
**Format:** LEC

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  
**Format:** LEC

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  
**Format:** LEC

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  
**Format:** LEC

ALEC 202 Foundations of Leadership Theory and Practice  
**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. ALEC 202 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.  
**Credit Hours:** 3  
**Max credits per semester:** 3  
**Max credits per degree:** 3  
**Format:** LEC

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  
**Format:** LEC

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  
**Format:** LEC
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
Format: LEC

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
Format: LEC
Prerequisite for: ADPR 429; ADPR 439

ALEC 234 Planning Leadership and Experience Programs
Prerequisites: Sophomore standing and ALEC 134 and/or 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
Format: LEC
Prerequisites: ALEC 134 and/or 135.

ALEC 240 Digital Photography and Visual Communication for Agriculture and the Environment
Prerequisites: Students must be an AESC major or minor. Otherwise, instructor permission is required.
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
Format: LEC

ALEC 241 Mobile Video Production of Agricultural and Environmental Issues
Prerequisites: AESC major or minor. Otherwise, instructor permission required.
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.
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
Format: LEC

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
Format: LEC

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
Format: LEC

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
Format: LEC

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 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 Sciences education programs. This course includes 20 hours of SkillsUSA field experience.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC
Groups: Introductory
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
Format: LEC

ALEC 303 Energy, Power and Transportation Technology
Prerequisites: ALEC 101, 109, 203, 204, and 205.
Notes: ALEC 303 is 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
Format: LEC

ALEC 305 Presentation Strategies for Agricultural Audiences
Prerequisites: JGEN 200 or 300.
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
Format: LEC

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
Format: LEC

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
Format: LEC

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
Format: FLD

ALEC 337 Instructional Internship in Leadership Development
Prerequisites: Permission.
Description: A structured professional and personal development experience. Small group facilitation and instructional assistance in leadership development courses.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 3
Format: FLD

ALEC 340 Advanced Machine Woodworking
Prerequisites: ALEC 243
Notes: ALEC 340 is 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
Format: LEC

ALEC 341 Podcasting to Increase Science Literacy
Prerequisites: AESC majors and minors. Otherwise, instructor permission is required.
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.
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. Offered in the spring semester of odd years.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

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
Format: LEC
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
Format: LEC

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
Format: LEC
ACE: ACE 8 Civic/Ethics/Stewardship

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
Format: LEC

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
Format: LAB

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
Format: LEC

ALEC 399 Independent Study in Communications
Prerequisites: Permission and advance approval of plan of work.
Description: Individual or group projects in research, literature review, or extension of course work under supervision and evaluation of a departmental faculty member.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 12
Format: IND

ALEC 400 Overview to Program Planning
Crosslisted with: ALEC 800
Prerequisites: ALEC 305 or ALEC/TEAC 805/NUTR 806.
Notes: ALEC 400/800 is 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
Format: LEC

ALEC 405 Methods of Instruction for Secondary Agriscience Education
Prerequisites: Senior standing and 3 hrs educational psychology, or permission
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 disadvantage, 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
Format: LEC

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
Format: LAB

ALEC 408 Engineering Leadership Minor
ALEC 407 Supervisory Leadership
Crosslisted with: ALEC 807, CYAF 807
Prerequisites: ALEC 302.
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
Format: LEC

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
Format: LEC

ALEC 412 Multimedia Applications for Education and Training
Crosslisted with: ALEC 812, NUTR 812
Description: Practical applications in developing and evaluating multimedia resources for students. Surveys new applications, creates and develops various instructional materials, and reviews current practice against relevant theory. Use current software packages to develop materials for various audiences.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Format: LEC

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
Format: LEC

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
Format: LEC

ALEC 417 Issues Management and Crisis Communications in Agriculture
Crosslisted with: ADPR 417
Prerequisites: Junior standing. College of Journalism and Mass Communications: Junior standing; 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
Format: LEC
Prerequisite for: ASCI 381

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
Format: LEC

ALEC 421 Agricultural & Environmental Sciences Communication Practicum
Prerequisites: Junior status. Major or minor in Agricultural and Environmental Sciences Communication. Students in the minor must have completed a minimum of 12 credits of minor coursework to enroll.
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
Format: LEC

ALEC 422 Facilitation and Project Planning
Prerequisites: ALEC 202 or equivalent and at least junior standing or permission.
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
Format: LEC
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
Format: LEC

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
Format: LEC

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
Format: FLD
ACE: ACE 10 Integrated Product

ALEC 433 Dynamics of Effective Leadership in Groups & Teams
Crosslisted with: ALEC 833
Prerequisites: At least Junior standing or permission
Description: This course will cover the 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
Format: LEC

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
Format: LEC

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
Format: LEC

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
Format: LEC

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
Format: LEC
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
Format: LEC
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

**Format:** LEC

ALEC 495A Internship in Leadership Development

**Prerequisites:** Junior standing; ALEC 302; Agricultural Education major; and permission.

**Notes:** Agricultural Education majors must take ALEC 495A for ‘Pass/No Pass’. Capstone course.

**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

**Format:** FLD

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:** ALEC 495B is taken the second semester of the junior year or in the summer following the junior year. Department approval is required. ALEC 495B 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

**Format:** FLD

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

**Format:** IND

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

**Format:** IND