AGRICULTURAL SYSTEMS TECHNOLOGY

Description

Website: https://bse.unl.edu/agst (https://bse.unl.edu/agst/)

Agricultural Systems Technology (AGST) resides at the forefront of new and emerging technologies, enabling students to solve agricultural challenges of the 21st century and beyond. This hands-on major combines coursework in technology, agricultural sciences and business. It prepares graduates with the skills to apply a systems approach to managing technology in agriculture and related industries.

This major is ideal for students interested in working with machinery and technology from a practical hands-on perspective and prepares students for a wide range of careers in a variety of industries related to agriculture, food, energy, water, and manufacturing. With a focus on experiential and hands-on learning, this major allows students to co-create their path to graduation by the intentional selection of courses in technology, agriculture and natural resources, and business and entrepreneurship. The major is designed to allow students to incorporate minors such as precision agriculture, digital agriculture, agronomy, animal science, business, and Engler agribusiness entrepreneurship.

Students in the AGST major benefit from small classes and personalized faculty advising. Students have the opportunity to work part-time with faculty who are doing cutting-edge research in agricultural technology involving robotics, automation, variable rate irrigation, agricultural drones, value-added processing, and precision agriculture in addition to pursuing industry internships for academic credit. Students are encouraged to participate in student organizations in the department such as the student branch of the American Society of Agricultural and Biological Engineers (ASABE), tractor restoration club, and participate in student competition teams such as the Husker Robotics Team, Quarter-Scale Tractor Team, and the Husker Precision Water Team.

College Requirements

College Admission

Requirements for admission into the College of Agricultural Sciences and Natural Resources (CASNR) are consistent with general University admission requirements (one unit equals one high school year): 4 units of English, 4 units of mathematics, 3 units of natural sciences, 3 units of social sciences, and 2 units of world language. Students must also meet performance requirements: a 3.0 cumulative high school grade point average OR an ACT composite of 20 or higher, writing portion not required OR a score of 1040 or higher on the SAT Critical Reading and Math sections OR rank in the top one-half of graduating class; transfer students must have a 2.0 (on a 4.0 scale) cumulative grade point average and 2.0 on the most recent term of attendance.

Admission Deficiencies/Removal of Deficiencies

Students who are admitted to CASNR with core course deficiencies must remove these deficiencies within the first 30 credit hours at the University of Nebraska–Lincoln, or within the first calendar year at Nebraska, whichever takes longer. College-level coursework taken to remove deficiencies may be used to meet degree requirements in CASNR. Deficiencies in the required entrance subjects can be removed by the completion of specified courses in the University or by correspondence.

The Office of Admissions, Alexander Building (south entrance), City Campus, provides information to new students on how deficiencies can be removed.

College Degree Requirements

Curriculum Requirements

The curriculum requirements of the College consist of three areas: ACE (Achievement-Centered Education), College of Agricultural Sciences and Natural Resources Core, and Degree Program requirements and electives. All three areas of the College Curriculum Requirements are incorporated within the description of the Major/Degree Program sections of the catalog. The individual major/degree program listings of classes ensure that a student will meet the minimum curriculum requirements of the College.

World Languages/Language Requirement

Two units of a world language are required. This requirement is usually met with two years of high school language.

Experiential Learning

All undergraduates in the College of Agricultural Sciences and Natural Resources must take an Experiential Learning (EL) designated course. This may include 0-credit courses designed to document co-curricular activities recognized as Experiential Learning.

Minimum Hours Required for Graduation

The College grants the bachelors degree in programs associated with agricultural sciences, natural resources, and related programs. Students working toward a degree must earn at least 120 semester hours of credit. A minimum cumulative grade point average of C (2.0 on a 4.0 scale) must be maintained throughout the course of studies and is required for graduation. Some degree programs have a higher cumulative grade point average required for graduation. Please check the degree program on its graduation cumulative grade point average.

Grade Rules

Removal of C-, D, and F Grades

Only the most recent letter grade received in a given course will be used in computing a student’s cumulative grade point average if the student has completed the course more than once and previously received a grade or grades below C in that course.

The previous grade (or grades) will not be used in the computation of the cumulative grade point average. However, it will remain a part of the academic record and will appear on any transcript.

A student can remove from their cumulative average a course grade of C, D+, D-, or F if the student repeats the same course at the University of Nebraska and receives a grade other than P (pass), I (incomplete), N (no pass), W (withdrew), or NR (no report). If a course is no longer being offered, it is not eligible for the revised grade point average computation process.

For complete procedures and regulations, see the Office of the University Registrar website at http://www.unl.edu/regrec/course-repeats (http://www.unl.edu/regrec/course-repeats/).

Pass/No Pass

Students in CASNR may take any course offered on a Pass/No Pass basis within the 24-hour limitation established by the Faculty Senate. However, a department may specify that the Pass/No Pass status of its
courses be limited to non-majors or may choose to offer some courses for letter grades only.

**GPA Requirements**
A minimum cumulative grade point average of C (2.0 on a 4.0 scale) must be maintained throughout the course of studies and is required for graduation. Some degree programs have a higher cumulative grade point average required for graduation. Please check the degree program in its graduation cumulative grade point average.

**Transfer Credit Rules**
To be considered for admission a transfer student, Nebraska resident or nonresident, must have an accumulated average of C (2.0 on a 4.0 scale) and a minimum C average in the last semester of attendance at another college. Transfer students who have completed less than 12 credit hours of college study must submit either ACT or SAT scores.

Ordinarily, credits earned at an accredited college are accepted by the University. The College, however, will evaluate all hours submitted on an application for transfer and reserves the right to accept or reject any of them. Sixty (60) is the maximum number of hours the University will accept on transfer from a two-year college. Ninety (90) is the maximum number of hours the University will accept from a four-year college. Transfer credit in the degree program must be approved by the degree program advisor on a Request for Substitution Form to meet specific course requirements, group requirements, or course level requirements in the major. At least 9 hours in the major field, including the capstone course, must be completed at the University of Nebraska–Lincoln regardless of the number of hours transferred.

The College will accept no more than 10 semester hours of C, D+, D, and D- grades from other schools. The C-, D+, D, and D- grades can only be applied to free electives. This policy does not apply to the transfer of grades from UNO or UNK to the University of Nebraska–Lincoln.

**Joint Academic Transfer Programs**
The College of Agricultural Sciences and Natural Resources has agreements with many institutions to support joint academic programs. The transfer programs include dual degree programs and cooperative degree programs. Dual degree programs offer students the opportunity to receive a degree from a participating institution and also to complete the requirements for a bachelor of science degree in CASNR. Cooperative programs result in a single degree from either the University of Nebraska–Lincoln or the cooperating institution.

**Dual Degree Programs**

**A to B Programs**
The A to B Program, a joint academic program offered by the CASNR and participating community colleges, allows students to complete the first two years of a degree program at the participating community college and continue their education and study in a degree program leading toward a bachelor of science degree.

The A to B Program provides a basic knowledge plus specialized coursework. Students transfer into CASNR with junior standing.

Depending on the community college, students enrolled in the A to B Program may complete the requirements for an associate of science degree at the community college, transfer to the University of Nebraska–Lincoln, and work toward a bachelor of science degree.

Participating community colleges include:
- Central Community College
- Metropolitan Community College
- Mid-Plains Community College
- Nebraska College of Technical Agriculture
- Nebraska Indian Community College
- Northeast Community College
- Southeast Community College
- Western Nebraska Community College

**3+2 Programs**
Two specialized degree programs in animal science and veterinary science are offered jointly with an accredited college or school of veterinary medicine. These two programs permit CASNR animal science or veterinary science students to receive a bachelor of science degree from the University of Nebraska–Lincoln with a degree in animal science or veterinary science after successfully completing two years of the professional curriculum in veterinary medicine at an accredited veterinary school. Students who successfully complete the 3+2 Program, must provide transcripts and complete the Application for Degree form via MyRED. Students without MyRED access may apply for graduation in person at Husker Hub in the Canfield Administration Building, or by mail. Students should discuss these degree programs with their academic advisor.

**Cooperative Degree Programs**
Academic credit from the University and a cooperating institution are applied towards a four-year degree from either the University of Nebraska–Lincoln (University degree-granting program) or the cooperating institution (non-University degree-granting program). All have approved programs of study.

**UNL Degree-Granting Programs**
A University of Nebraska–Lincoln degree-granting program is designed to provide students the opportunity to complete a two-year program of study at one of the four-year institutions listed below, transfer to CASNR, and complete the requirements for a bachelor of science degree.

**Chadron State College.** Chadron State College offers a 2+2 program leading to a grassland ecology and management degree program and a transfer program leading to a bachelor of science in agricultural education in the teaching option.

**Wayne State College.** Wayne State College offers a 3+1 program leading to a bachelor of science in plant biology in the ecology and management option and a 3+1 program leading to a bachelor of science in Applied Science.

**University of Nebraska at Kearney.** Transfer programs are available for students pursuing degree programs leading to a bachelor of science degree.

**University of Nebraska at Omaha.** Transfer programs are available for students pursuing degree programs leading to a bachelor of science degree.

**Non University of Nebraska–Lincoln Degree-Granting Programs**
CASNR cooperates with other institutions to provide coursework that is applied towards a degree at the cooperating institution. Pre-professional programs offered by CASNR allow students to complete the first two or three years of a degree program at the University prior to transferring and completing a degree at the cooperating institution.
Chadron State College–Range Science. The 3+1 Program in range science allows Chadron State College students to pursue a range science degree through Chadron State College. Students complete three years of coursework at Chadron State College and one year of specialized range science coursework (32 credit hours) at CASNR.

Dordt College (Iowa)—Agricultural Education: Teaching Option. This program allows students to pursue an Agricultural Education Teaching Option degree leading toward a bachelor of science in agricultural education. Students at Dordt College will complete 90 credit hours in the Agricultural Education: Teaching Option Transfer Program.

Residency
Students must complete at least 30 of the total hours for their degree using University of Nebraska–Lincoln credits. At least 18 of the 30 credit hours must be in courses offered through CASNR including the appropriate ACE 10 degree requirement or an approved ACE 10 substitution offer by another Nebraska college and excluding independent study regardless of the number of hours transferred. Credit earned during education abroad may be used toward the residency requirement if students register through the University of Nebraska–Lincoln and participate in prior-approved education abroad programs. The University of Nebraska–Lincoln open enrollment and summer independent study courses count toward residence.

Online and Distance Education
There are many opportunities to earn college credit online through the University of Nebraska–Lincoln. Some of these credits may be applicable not only as elective credits but also toward the fulfillment of the College's education requirements. Credits earned online may count toward residency. However, certain offerings may not be counted toward scholarship requirements or academic recognition criteria.

For further information, contact:
Office of Online and Distance Education
University of Nebraska–Lincoln
305 Brace Labs
Lincoln, NE 68588-0109
402-472-4681
http://online.unl.edu/

Independent Study Rules
Students wishing to take part in independent studies must obtain permission; complete and sign a contract form; and furnish copies of the contract to the instructor, advisor, departmental office, and the Dean's Office. The contract should be completed before registration. Forms are available in 103 Agricultural Hall or online at the CASNR website.

Independent study projects include research, literature review or extension of coursework under the supervision and evaluation of a departmental faculty member.

Students may only count 12 hours of independent study toward their degrees and no more than 6 hours can be counted during their last 36 hours earned, excluding senior thesis, internships, and courses taught under an independent study number.

Other College Degree Requirements
Capstone Course Requirement
A capstone course is required for each CASNR degree program. A capstone course is defined as a course in which students are required to integrate diverse bodies of knowledge to solve a problem or formulate a policy of societal importance.

ACE Requirements
All students must fulfill the Achievement Centered Education (ACE) requirements. Information about the ACE program may be viewed at ace.unl.edu/.

The minimum requirements of CASNR reflect the common core of courses that apply to students pursuing degrees in the college. Students should work with an advisor to satisfy ACE outcomes 1, 2, 3, 4, 6, and 10 with the college requirements.

Catalog Rule
Students must fulfill the requirements stated in the catalog for the academic year in which they are first admitted to the University of Nebraska–Lincoln or when they were first admitted to a Joint Academic Transfer Program. Students transferring from a community college, but without admission to a Joint Academic Transfer Program, may be eligible to fulfill the requirements as stated in the catalog for an academic year in which they were enrolled at the community college prior to attending the University of Nebraska-Lincoln. This decision should be made in consultation with academic advisors, provided the student a) was enrolled in a community college during the catalog year they are utilizing, b) maintained continuous enrollment at the previous institution for 1 academic year or more, and c) continued enrollment at the University of Nebraska-Lincoln within 1 calendar year from their last term at the previous institution. In consultation with advisors, a student may choose to follow a subsequent catalog for any academic year in which they are admitted to the University of Nebraska–Lincoln within 1 calendar year from their last term at the college. This decision should be made in consultation with academic advisors, and the student a) was enrolled in a community college during the catalog year they are utilizing, b) maintained continuous enrollment at the previous institution for 1 academic year or more, and c) continued enrollment at the University of Nebraska-Lincoln within 1 calendar year from their last term at the previous institution.

Learning Outcomes
Graduates of agricultural systems technology will be able to:

1. Manage power and machinery systems at scales ranging from small farms up to industrial manufacturing environments
2. Use sensors, controls, and automated systems to make data-informed decisions for precision management
3. Analyze the economic implications of the use of equipment and technology in a system
4. Analyze the technical performance of an equipment system, evaluate alternatives, and recommend options for improvement
5. Manage natural resources to balance environmental sustainability with economic viability
6. Work effectively in teams and engage diverse stakeholder perspectives to manage technical projects
7. Select and use appropriate tools and strategies to analyze data and professionally communicate technical information
Major Requirements

Core Requirements

College Integrative Course

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCIL 101</td>
<td>Science and Decision-Making for a Complex World (ACE 8)</td>
<td>3</td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: 3

Mathematics and Statistics

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 102</td>
<td>Trigonometry</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 103</td>
<td>College Algebra and Trigonometry</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 106</td>
<td>Calculus I</td>
<td>3</td>
</tr>
</tbody>
</table>

STAT 218 Introduction to Statistics (ACE 3) 3

Credit Hours Subtotal: 3

Mathematics and Statistics

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 102</td>
<td>Trigonometry</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 103</td>
<td>College Algebra and Trigonometry</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 106</td>
<td>Calculus I</td>
<td>3</td>
</tr>
</tbody>
</table>

STAT 218 Introduction to Statistics (ACE 3) 3

Credit Hours Subtotal: 6

Communications

Select one Written Communication elective (ACE 1) of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 150</td>
<td>Writing and Inquiry</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 151</td>
<td>Writing for Change</td>
<td>3</td>
</tr>
<tr>
<td>JGEN 200</td>
<td>Technical Communication I</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one Professional Communication elective (ACE 2) of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALEC 102</td>
<td>Interpersonal Skills for Leadership</td>
<td>3</td>
</tr>
<tr>
<td>COMM 209</td>
<td>Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>COMM 210</td>
<td>Communicating in Small Groups</td>
<td>3</td>
</tr>
<tr>
<td>COMM 286</td>
<td>Business and Professional Communication</td>
<td>3</td>
</tr>
</tbody>
</table>

JGEN 300 Technical Communication II 3

Credit Hours Subtotal: 6

Natural Sciences

AGST 109 Physical Principles in Agriculture and Life Sciences 5

AGST 109L Physical Principles in Agriculture and Life Sciences Laboratory (ACE 4) 5

CHEM 109A General Chemistry I 4

CHEM 109L General Chemistry I Laboratory (ACE 4) 4

CHEM 113A Fundamental Chemistry I 4

CHEM 113L Fundamental Chemistry I Laboratory 4

Select one CASNR approved Life Sciences elective (ACE 4) of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLAS 131</td>
<td>Plant Science</td>
<td>3</td>
</tr>
<tr>
<td>&amp; PLAS 132</td>
<td>and Agronomic Plant Science Laboratory</td>
<td>3</td>
</tr>
</tbody>
</table>

PLAS 131 Plant Science 3

PLAS 132 Plant Science Laboratory 3

PLAS 134 Plant Science 3

PLAS 134 Plant Sciences Laboratory 3

BIOS 101 General Biology 3

BIOS 101L General Biology Laboratory 3

Credit Hours Subtotal: 13

Economics, Humanities and Social Sciences

AECN 141 Introduction to the Economics of Agriculture (ACE 6) 3

or ECON 200 Economic Essentials and Issues 3

Select one course each from ACE outcomes 5, 7, and 9 9

Credit Hours Subtotal: 12

Major Requirements

Complete requirements 35

Credit Hours Subtotal: 35

Technology Courses

Select 12 hours 12

Credit Hours Subtotal: 12

Agriculture and Natural Resources Courses

Select 12 hours 12

Credit Hours Subtotal: 12

Business and Entrepreneurship Courses

Select 12 hours 12

Credit Hours Subtotal: 12

Electives

Students can select 9 hours of personal development courses. These courses can be used to foster a greater understanding of a topic of interest, to develop a skill, or to pursue a minor. Please consult with your academic advisor. 9

Credit Hours Subtotal: 9

Total Credit Hours 120

Major Requirements

Complete the following courses:

AGST 162 Introduction to Agricultural Systems Technology 1

AGST 216 Fundamentals of Electrical Systems 3

AGST 232 Power and Machinery Principles 3

AGST 262 Techno-Economic Project Management 3

AGST 316 Technologies and Techniques in Digital Agriculture 3

AGST 354 / SOIL 354 Soil Conservation and Watershed Management 3

AGST 362 Agricultural Products Processing and Handling 3

AGST 395 Internship in Agricultural Systems Technology 1

AGST 412 Hydraulic Power Systems 3

AGST 416 Sensors and Control Systems for Agriculture Industries 3

AGST 462 Managing Technology in Agricultural Systems (ACE 10) 3

BSEN 130 Computer-Aided Design 2

SOIL 153 / PLAS 153 Soil Resources 4

Credit Hours Subtotal: 35

Total Credit Hours 35

Technology Courses

Select 12 hours from the following 12

AGST 342 Animal Housing Systems

AGST 431 Site-specific Crop Management

AGST 436 Embedded Controls for Agricultural Applications

AGST 452 Irrigation Systems Management

AGST 492 Special Topics in Agricultural Systems Technology

AGST 496 Principles and Problems in Mechanized Agriculture
### Agriculture Systems Technology

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGST 363</td>
<td>Heat and Mass Transfer</td>
</tr>
<tr>
<td>AGST 367</td>
<td>Pet Food Manufacturing</td>
</tr>
<tr>
<td>AGST 400A</td>
<td>Occupational Safety</td>
</tr>
<tr>
<td>AGST 400E</td>
<td>Biorenewable Systems Technology</td>
</tr>
<tr>
<td>AGST 400K</td>
<td>Chemical Application Systems</td>
</tr>
<tr>
<td>AGST 465</td>
<td>Food Engineering Unit Operations</td>
</tr>
<tr>
<td>ENSC 220</td>
<td>Introduction to Energy Systems</td>
</tr>
</tbody>
</table>

**Total Credit Hours:** 12

### Agriculture and Natural Resource Courses

**Select 12 hours from the following:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLAS 204</td>
<td>Resource-Efficient Crop Management</td>
</tr>
<tr>
<td>PLAS 240</td>
<td>Forage Crop and Pasture Management</td>
</tr>
<tr>
<td>PLAS 306</td>
<td>Greenhouse Practices and Management</td>
</tr>
<tr>
<td>PLAS 307</td>
<td>Hydroponics for Growing Populations</td>
</tr>
<tr>
<td>PLAS 366</td>
<td>Soil Nutrient Relationships</td>
</tr>
<tr>
<td>PLAS 405</td>
<td>Crop Management Strategies</td>
</tr>
<tr>
<td>PLAS 425</td>
<td>Cover Crops in Agroecosystems</td>
</tr>
<tr>
<td>PLAS 426</td>
<td>Invasive Plants</td>
</tr>
<tr>
<td>PLAS 435</td>
<td>Agroecology</td>
</tr>
<tr>
<td>PLAS 439</td>
<td>Organic Farming and Food Systems</td>
</tr>
<tr>
<td>ASCI 210</td>
<td>Principles of Animal Products for Today’s Society</td>
</tr>
<tr>
<td>ASCI 250A</td>
<td>Basic Beef Cow-Calf Management</td>
</tr>
<tr>
<td>ASCI 250B</td>
<td>Basic Beef Stocker and Feedlot Management</td>
</tr>
<tr>
<td>ASCI 250K</td>
<td>Basic Swine Management</td>
</tr>
<tr>
<td>ASCI 250M</td>
<td>Basic Dairy Management</td>
</tr>
<tr>
<td>ASCI 250P</td>
<td>Basic Poultry Management</td>
</tr>
<tr>
<td>ASCI 250R</td>
<td>Basic Small Ruminant Management</td>
</tr>
<tr>
<td>ASCI 254</td>
<td>Basic Swine Science</td>
</tr>
<tr>
<td>ASCI 320</td>
<td>Animal Nutrition and Feeding</td>
</tr>
<tr>
<td>ASCI 330</td>
<td>Animal Breeding and Genetics</td>
</tr>
<tr>
<td>ASCI 370</td>
<td>Animal Welfare</td>
</tr>
<tr>
<td>ASCI 455</td>
<td>Beef Cow-Calf Management</td>
</tr>
<tr>
<td>ASCI 457</td>
<td>Beef Feedlot Management</td>
</tr>
<tr>
<td>NRES 220</td>
<td>Principles of Ecology</td>
</tr>
<tr>
<td>NRES 281</td>
<td>Introduction to Water Science</td>
</tr>
<tr>
<td>NRES 415</td>
<td>GIS for Agriculture and Natural Resources</td>
</tr>
<tr>
<td>NRES 418</td>
<td>Introduction to Remote Sensing</td>
</tr>
</tbody>
</table>

**Total Credit Hours:** 12

### Business and Entrepreneurship Courses

**Select 12 hours from the following:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 200</td>
<td>Accounting for Business Decisions</td>
</tr>
<tr>
<td>AECN 201</td>
<td>Farm and Ranch Management</td>
</tr>
<tr>
<td>AECN 225</td>
<td>Agribusiness Entrepreneurship in Food Products Marketing</td>
</tr>
<tr>
<td>AECN 235</td>
<td>Introduction to Commodity Marketing</td>
</tr>
<tr>
<td>AECN 256</td>
<td>Legal Aspects in Agriculture</td>
</tr>
<tr>
<td>AECN 301</td>
<td>Farm Accounting, Analysis, and Tax Management</td>
</tr>
<tr>
<td>AECN 316</td>
<td>Agribusiness Management</td>
</tr>
<tr>
<td>AECN 325</td>
<td>Marketing of Agricultural Commodities</td>
</tr>
<tr>
<td>AECN 336</td>
<td>Grain Merchandising</td>
</tr>
<tr>
<td>AECN 425</td>
<td>Agricultural Marketing in a Multinational Environment</td>
</tr>
<tr>
<td>AECN 435</td>
<td>Advanced Agricultural Marketing Management</td>
</tr>
<tr>
<td>BLAW 300</td>
<td>Business, Government &amp; Society</td>
</tr>
<tr>
<td>EAE 201</td>
<td>New Venture Experience</td>
</tr>
<tr>
<td>EAE 225</td>
<td>Agribusiness Entrepreneurship in Food Products Marketing</td>
</tr>
<tr>
<td>EAE 275</td>
<td>Agribusiness Entrepreneurial Finance</td>
</tr>
<tr>
<td>EAE 388</td>
<td>Business Systems in Entrepreneurship</td>
</tr>
<tr>
<td>EAE 488</td>
<td>Entrepreneurship and Enterprise Development</td>
</tr>
<tr>
<td>ENTR 322</td>
<td>Family Business</td>
</tr>
<tr>
<td>FINA 300</td>
<td>Financial Decision Making</td>
</tr>
<tr>
<td>MNGT 300</td>
<td>Management Essentials For Contemporary Organizations</td>
</tr>
</tbody>
</table>

**Total Credit Hours:** 12

### Requirements for Minor Offered by Department

**Agricultural Systems Technology Minor – 18 Hours**

The overall goal of the minor is to provide a foundation of technical skills to manage systems relevant to food, agriculture, and natural resources.

**Required Courses for the Minor**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGST 216</td>
<td>Fundamentals of Electrical Systems</td>
</tr>
<tr>
<td>AGST 232</td>
<td>Power and Machinery Principles</td>
</tr>
</tbody>
</table>

**Credit Hours Subtotal:** 6

### Technical Courses

**Select 6 hours from the following:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGST 316</td>
<td>Technologies and Techniques in Digital Agriculture</td>
</tr>
<tr>
<td>AGST 412</td>
<td>Hydraulic Power Systems</td>
</tr>
<tr>
<td>AGST 416</td>
<td>Sensors and Control Systems for Agri-Industries</td>
</tr>
<tr>
<td>AGST 436</td>
<td>Embedded Controls for Agricultural Applications</td>
</tr>
</tbody>
</table>

**Credit Hours Subtotal:** 6

### Agricultural Systems Courses

**Select 6 hours from the following:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGST 342</td>
<td>Animal Housing Systems</td>
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<tr>
<td>AGST 354</td>
<td>Soil Conservation and Watershed Management</td>
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<td>AGST 452</td>
<td>Irrigation Systems Management</td>
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**Total Credit Hours:** 12
AGST 109 Physical Principles in Agriculture and Life Sciences
Prerequisites: MATH 101 or 102 or 103 or 104 or 106; or placement in MATH 102 or 104 or 106.
Notes: Students cannot receive credit for both AGST 109 and PHYS 141 or 151.
Description: Fundamental principles of mechanics, heat, electricity, magnetism and electromagnetism and their relationship to energy utilization and conservation. Principles then applied to problem situations in agriculture and life sciences.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Prerequisite for: AGST 109L; AGST 216; AGST 232; AGST 262; AGST 342; AGST 354, SOIL 354; AGST 362; AGST 452, AGST 852, PLAS 452; FDST 363, AGST 363
ACE: ACE 4 Science

AGST 109L Physical Principles in Agriculture and Life Sciences Laboratory
Prerequisites: AGST 109 or parallel, or PHYS 151
Description: Laboratory experiments on mechanics, heat, electricity, magnetism and electromagnetism and their relationship to energy utilization and conservation in agriculture and life sciences.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded with Option

AGST 162 Introduction to Agricultural Systems Technology
Description: Basic principles of describing and evaluating mechanized systems relevant to agriculture, food, energy, and water. Problem solving using systems-thinking. Exploration of major and career opportunities. Academic success and planning.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded with Option

AGST 216 Fundamentals of Electrical Systems
Prerequisites: AGST 109 or PHYS 141, or PHYS 151, or PHYS 211
Description: Basic theory of electrical circuits, utilization of electric energy in production, processing, and residential applications. Theory and application of direct current (DC) and alternating current (AC) principles, switch and outlet wiring, wiring installations, selection of safe and adequate circuit devices, service equipment sizing, conductor sizing, electric motor operation and their control are covered. Develop switch and relay circuit schematics and build both DC and AC functional circuits. Ladder logic diagrams will be studied to understand the basic controls implemented in industrial automation.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING
Prerequisite for: AGST 412; AGST 416

AGST 232 Power and Machinery Principles
Prerequisites: AGST 109, or PHYS 141, or PHYS 151, or PHYS 211, or parallel PHYS 211
Description: Operational characteristics of IC engines, field, materials-handling, and processing machines and their components. Includes analyses, estimations, and objective comparisons of performance; principles for adjustment and calibration of metering systems; and cost-effective sizing of machines. Exercises include using ASABE Standards and available reports of machine performance (tractor test reports, etc.).
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL

AGST 262 Techno-Economic Project Management
Prerequisites: AGST 109 or PHYS 141 or PHYS 151 or PHYS 211.
Notes: Open to AGST majors only.
Description: Professional communication of technical information. Strategies for effective teamwork to plan and execute technical projects. Fundamentals of project planning in a team-based context. Introduction to quantitative techno-economic analysis to support decision-making related to agricultural systems technology. Professional ethics in context of project management.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING

AGST 299 Career Experiences
Prerequisites: Permission and advanced approval of plan or work.
Description: Student participation in physical systems applications. May include participation in mechanization-related areas of agribusiness, production practices, and processing operations; research in laboratory, greenhouse and field; or preparation of teaching materials.
Credit Hours: 1-5
Min credits per semester: 1
Max credits per semester: 5
Max credits per degree: 12
Grading Option: Pass No Pass

AGST 316 Technologies and Techniques in Digital Agriculture
Prerequisites: Junior Standing
Notes: Class meets once a week with the lecture and lab being taught concurrently to foster hands-on learning.
Description: Overview of the digital agriculture technologies and techniques to support crop and livestock production systems. Emphasis on data life cycle including generation, collection, storage, processing, visualization, and analysis. Hands-on experiences with agricultural IoT, sensing, data processing, and decision making with open-source programming tools.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING
AGST 342 Animal Housing Systems
Prerequisites: AGST 109 or PHYS 141 or PHYS 151 or PHYS 211
Description: Production facilities for livestock and poultry will be
developed with emphasis on building and feedlot layout, ventilation,
heating and cooling systems; energy utilization; and construction
materials and methods.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL

AGST 354 Soil Conservation and Watershed Management
Crosslisted with: SOIL 354
Prerequisites: PLAS/SOIL 153; and AGST 109 or PHYS 141 or PHYS 151
or PHYS 211
Description: Watershed hydrology, soil erosion, erosion control, water
management, and land surveying and mapping. Includes rainfall-runoff
relationships; determination of watershed characteristics; terraces,
waterways, vegetative filters, and residue management; ponds, wetlands,
non-point source pollution control, and water conservation; profile and
topographic surveying.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL

AGST 362 Agricultural Products Processing and Handling
Prerequisites: AGST 109 or PHYS 141 or PHYS 151 or PHYS 211
Description: Analysis of processing and handling operations. Chemical
and physical characteristics of agricultural products. Application of
psychrometrics. Power requirements, capacities, and efficiencies of
drying and conveying systems. Discussion of safety issues, logistics, and
survey of industry technologies.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING

AGST 363 Heat and Mass Transfer
Crosslisted with: FDST 363
Prerequisites: MATH 104 or 106; AGST 109 or PHYS 141 or 151.
Description: Fundamentals of food engineering including material and
energy balances, fluid mechanics, heat transfer and mass transfer.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING

AGST 367 Pet Food Manufacturing
Crosslisted with: FDST 367
Prerequisites: FDST 205
Notes: Field trips are required and may occur outside of scheduled class
time.
Description: The companion animal industry, products, processes and
career opportunities.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: FALL

AGST 395 Internship in Agricultural Systems Technology
Prerequisites: By permission
Notes: Completion of internship approval form is required. The internship
proposal is subject to approval by the Department of Biological Systems
Engineering. Pass/No Pass only.
Description: Practical experience, directed learning, and career
exploration and development in a selected business, industry, agency, or
educational institution.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 5
Grading Option: Pass No Pass
Experiential Learning: Internship/Co-op

AGST 400A Occupational Safety
Prerequisites: Junior standing
Notes: Online course offered by Iowa State University through the
AG*IDEA consortium. Contact CASNR Distance Education Consortium
Coordinator for course details, prerequisites and registration information.
Description: Identifies safety and health risks in industrial work
environments. Focus on how managers and supervisors meet their
responsibilities for providing a safe workplace for their employees.
Includes the identification and remediation of workplace hazards.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

AGST 400E Biorenewable Systems Technology
Notes: Online course offered by Iowa State University through the
AG*IDEA consortium. Contact CASNR Distance Education Consortium
Coordinator for course details, prerequisites and registration information.
Description: The science, engineering, economics and business of
converting biorenewable resources into bioenergy and biobased
products. Biorenewable concepts as they relate to drivers of change,
feedstock production, economics, transportation and logistics, and
marketing.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

AGST 400K Chemical Application Systems
Notes: Online course offered by Kansas State University through the
AG*IDEA consortium. Contact CASNR Distance Education Consortium
Coordinator for course details, prerequisites and registration information.
Description: Systems, components, operation practices, and safety
procedures used in the chemical application industry. Liquid and granular
application systems and respective components will be studied along
with procedures for equipment sizing and maintenance, minimizing drift,
system calibration, and safe handling-transportation-storage-disposal
and spill clean-up of agrichemicals.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Graded
AGST 412 Hydraulic Power Systems
Prerequisites: AGST 245
Description: Theory and application of fluids under controlled pressure to perform work in mobile and industrial applications. Positive displacement (PD) pumps, linear and rotary hydraulic actuators (hydraulic cylinders and motors), valves, and electric over hydraulic systems will be studied in detail. Fluid power circuit development on both hydraulic benches and computer simulated environments will be performed with emphasis on circuit analysis, and system troubleshooting.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING

AGST 416 Sensors and Control Systems for Agri-Industries
Prerequisites: AGST 245 or permission.
Description: Application of sensors for measurement of process control variables and implementation of microcomputer-based measurement and control systems. Basic electrical and electronic instrumentation plus control of electrically, pneumatically and/or hydraulically powered systems.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

AGST 431 Site-specific Crop Management
Crosslisted with: AGST 431, PLAS 431
Prerequisites: Senior standing; PLAS/SOIL 153; PLAS 204.
Description: Principles and concepts of site-specific management. Evaluation of geographic information systems for crop production practices. Practical experience with hardware and software necessary for successful application of information affecting crop management.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

AGST 433 Equipment and Tractor Testing
Crosslisted with: AGST 833
Prerequisites: AGST 232; and STAT 218 or STAT 380 or MECH 321
Notes: Offered spring semester in even-numbered calendar years.
Description: Principles and procedures involved in testing agricultural equipment and tractors. Actual test planned, scheduled, conducted and reported. Test may be based upon procedures used at the Nebraska Tractor Testing Laboratory or involve other equipment being used for research in the department.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING

AGST 436 Embedded Controls for Agricultural Applications
Crosslisted with: AGEN 436, AGEN 836, AGST 836
Prerequisites: AGEN/BSEN 260 or AGST 416
Description: Introduction to the basics of embedded controller programming, and the development of Controller Area Network (CAN) bus systems in agricultural applications. Interfacing sensors with analog and digital signals, closed loop control of actuators, transmission and reception of CAN messages, programming of CAN messages in a distributed controller set up for sensor data acquisition, and actuator control will be studied.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: FALL

AGST 452 Irrigation Systems Management
Crosslisted with: AGST 852, PLAS 452
Prerequisites: AGST 109 or PHYS 141 or PHYS 151 or PHYS 211
Notes: PLAS/SOIL 153 recommended.
Description: Irrigation management and the selection, evaluation, and improvement of irrigation systems. Includes soil-water measurement, crop water use, irrigation scheduling, irrigation efficiency, measurement of water flow, irrigation systems, groundwater and wells, pumping systems, applying chemicals with irrigation systems, and environmental and water resource considerations.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL
Prerequisite for: AGEN 854, AGST 854; AGST 855

AGST 462 Managing Technology in Agricultural Systems
Crosslisted with: AGST 862
Prerequisites: Senior standing in AGST
Notes: Capstone course.
Description: Team-based activities to evaluate integration of technology into, and utilization of resources for, agricultural systems; perform technical and economic evaluations; make technical and economic recommendations; and develop professional written and oral reports. Topics include technology system performance and management, project scheduling and planning, cost estimation, reliability analysis, and risk assessment.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING
ACE: ACE 10 Integrated Product
Experiential Learning: Case/Project-Based Learning

AGST 465 Food Engineering Unit Operations
Crosslisted with: FDST 465, FDST 865, AGST 865
Prerequisites: FDST/AGST 363.
Description: Unit operations and their applications to food processing.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
AGST 469 Bio-Atmospheric Instrumentation
Crosslisted with: GEOG 469, PLAS 407, METR 469, NRES 469, AGRO 869, GEOG 869, HORT 807, METR 869, AGST 869, NRES 869
Prerequisites: Junior standing; MATH 106; 4 hrs physics; physical or biological science major.
Description: Discussion and practical application of principles and practices of measuring meteorological and related variables near the earth's surface including temperature, humidity, precipitation, pressure, radiation and wind. Performance characteristics of sensors and modern data collection methods are discussed and evaluated.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

AGST 475 Water Quality Strategy
Crosslisted with: NRES 475, NRES 875, SOIL 475, PLAS 475, AGRO 875, CIVE 475, CIVE 875, CRPL 475, CRPL 875, GEOL 475, GEOL 875, AGST 875, POLS 475, POLS 875
Prerequisites: Senior standing.
Notes: Capstone course.
Description: Holistic approach to the selection and analysis of planning strategies for protecting water quality from nonpoint sources of contamination. Introduction to the use of methods of analyzing the impact of strategies on whole systems and subsystems; for selecting strategies; and for evaluating present strategies.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ACE: ACE 10 Integrated Product

AGST 492 Special Topics in Agricultural Systems Technology
Crosslisted with: AGST 892
Prerequisites: Permission
Description: Subject matter in emerging areas of Mechanized Systems Management not covered in other courses within the curriculum. Topics, activities, and delivery methods vary.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Graded with Option

AGST 496 Principles and Problems in Mechanized Agriculture
Crosslisted with: AGST 896
Prerequisites: 15 hours in AGST or closely related area.
Description: Individual or group projects in research, literature review, or extension of course work under the supervision and evaluation of a departmental faculty member.
Credit Hours: 1-5
Min credits per semester: 1
Max credits per semester: 5
Max credits per degree: 12
Grading Option: Graded with Option

AGST 499H Honors Thesis
Prerequisites: Admission to the University Honors Program and permission
Notes: 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

Career Information
The following represents a sample of the internships, jobs and graduate school programs that current students and recent graduates have reported.

Jobs of Recent Graduates
- Operations Management LDP, Ardent Mills - Kenosha, WI
- Operations Supervisor, Cargill - Nebraska City, NE
- Production Supervisor, Land O'Lakes - Harrisburg, PA
- Operations Management, Union Pacific - Lincoln, NE
- Ag Services Operations Management, Archer Daniels Midland - Fremont, NE
- Technical Product Support Specialist, Orthman Manufacturing - Lexington, NE
- Marketing Representative - Product Support, John Deere - Waterloo, IA
- Field Test Engineer, AGCO Corporation - Hesston, KS
- Ag Specialist, JR Simplot Company - Scottsbluff, NE
- Product Support Technician, Lindsay Manufacturing - Lindsay, NE

Internships
- Ag Services Operations Intern, ADM Grain - Corpus Christi, TX
- Marketing Intern, John Deere - Urbandale, IA
- Operations Intern, Dow AgroSciences - York, NE
- Product Support Intern, John Deere - Ottumwa, IA
- Operations Intern, ConAgra Foods - Hastings, MN
- Agronomy/Crop Scout Intern, DuPont Pioneer - York, NE
- Test Engineer Assistant, Global Industries - Grand Island, NE
- Equipment Testing Technician, CLAAS - Omaha, NE
- Plant Operations, Scoular - Omaha, NE
- Engineering Test Lab Intern, Exmark Manufacturing - Beatrice, NE

Graduate & Professional Schools
- Master’s in Agricultural & Biological Engineering, Purdue University - West Lafayette, IN
- Master’s in Mechanized Systems Management, University of Nebraska-Lincoln - Lincoln, NE
- Master’s in Agricultural & Biological Systems Engineering, University of Nebraska-Lincoln - Lincoln, NE
- Ph.D., Engineering, Purdue University - Richmond, IN
- Ph.D., Engineering, University of Nebraska-Lincoln - Lincoln, NE