AGRICULTURAL SYSTEMS TECHNOLOGY

Description
Website: 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 perspective and prepares students for a wide range of careers in a variety of industries related to agriculture, food, energy, water, and manufacturing. The program offers four options for specialization:

• Production Option
• Business Option
• Technical Option
• Processing Operations Option

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, gain hands-on experience in the Nebraska Tractor Test Laboratory, and pursue industry internships for academic credit. Students are encouraged to participate in student organizations in the department.

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, excluding foreign languages. Students have up to 60 credit hours to remove world language deficiencies. 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 ensures 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, but it will remain a part of the academic record and will appear on any transcript.

A student can remove from his/her cumulative average a course grade of C, D+, 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 (withdrawn), 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 on 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 towards a degree at the cooperating institution. Pre-professional programs result in a single degree from the University of Nebraska. Some degree programs require a baccalaureate degree from a University. Some degree programs result in a single 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.

**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 under 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 degree 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 and enrolled as a degree-seeking student at the University of Nebraska–Lincoln in the College of Agricultural Sciences and Natural Resources. 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.

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

Integrative Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCIL 101</td>
<td>Science and Decision-Making for a Complex World</td>
<td>3</td>
</tr>
<tr>
<td>AGST 462</td>
<td>Equipment Systems (ACE 10)</td>
<td>3</td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: 6

Mathematics and Statistics

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 102</td>
<td>Trigonometry</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 106</td>
<td>Calculus I</td>
<td></td>
</tr>
<tr>
<td>STAT 218</td>
<td>Introduction to Statistics (ACE 3)</td>
<td>3</td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: 6

Communications

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSEN 130</td>
<td>Computer-Aided Design</td>
<td>2</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</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 and Argument</td>
<td></td>
</tr>
<tr>
<td>JGEN 200</td>
<td>Technical Communication I</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 209</td>
<td>Public Speaking</td>
<td></td>
</tr>
<tr>
<td>COMM 210</td>
<td>Communicating in Small Groups</td>
<td></td>
</tr>
<tr>
<td>COMM 286</td>
<td>Business and Professional Communication</td>
<td></td>
</tr>
<tr>
<td>JGEN 300</td>
<td>Technical Communication II</td>
<td></td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: 8

Natural Sciences

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 109A</td>
<td>General Chemistry I</td>
<td>4</td>
</tr>
</tbody>
</table>
& CHEM 109L | and General Chemistry I Laboratory (ACE 4) | |
| AGST 109  | Physical Principles in Agriculture and Life Sciences | 5       |
& AGST 109L | and Physical Principles in Agriculture and Life Sciences Laboratory (ACE 4) | |

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLAS 131</td>
<td>Plant Science</td>
<td></td>
</tr>
</tbody>
</table>
& PLAS 132 | and Agronomic Plant Science Laboratory |         |
| PLAS 131  | Plant Science                |         |
& PLAS 134 | and Plant Sciences Laboratory |         |
| BIOS 101  | General Biology              |         |
& BIOS 101L | and General Biology Laboratory |         |
| LIFE 120  | Fundamentals of Biology I    |         |
& LIFE 120L | and Fundamentals of Biology I laboratory |         |

Select 7 hours of Natural Sciences electives from the following:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biochemistry</td>
<td></td>
</tr>
<tr>
<td>Biology</td>
<td></td>
</tr>
<tr>
<td>Chemistry</td>
<td></td>
</tr>
<tr>
<td>Geography (excluding human and economic)</td>
<td></td>
</tr>
<tr>
<td>Geology</td>
<td></td>
</tr>
<tr>
<td>Life Sciences (excluding 115)</td>
<td></td>
</tr>
<tr>
<td>Meteorology (excluding 140)</td>
<td></td>
</tr>
<tr>
<td>Physics and Astronomy (excluding PHYS 115 and ASTR 103)</td>
<td></td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: 4

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

Credit Hours Subtotal: 9

Economics, Humanities and Social Sciences

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSEN 206</td>
<td>Engineering Economics (ACE 8)</td>
<td>3</td>
</tr>
<tr>
<td>CONE 206</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECON 211</td>
<td>Principles of Macroeconomics (ACE 6)</td>
<td>3</td>
</tr>
<tr>
<td>ECON 212</td>
<td>Principles of Microeconomics</td>
<td>3</td>
</tr>
<tr>
<td>or AECN 141</td>
<td>Introduction to the Economics of Agriculture</td>
<td></td>
</tr>
</tbody>
</table>

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

Credit Hours Subtotal: 18

Major Requirements

Complete requirements: 21

Credit Hours Subtotal: 21

Option Requirements

Complete requirements: 33

Credit Hours Subtotal: 33

Personal Development Electives

Select 8 hours

Credit Hours Subtotal: 8

Total Credit Hours: 120

Specific Major Requirements

Major Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGST 162</td>
<td>Introduction to Agricultural Systems Technology</td>
<td>1</td>
</tr>
<tr>
<td>AGST 232</td>
<td>Power and Machinery Principles</td>
<td>3</td>
</tr>
<tr>
<td>AGST 245</td>
<td>Fundamentals of Electrical Systems</td>
<td>3</td>
</tr>
<tr>
<td>AGST 262</td>
<td>Problem Solving in Agricultural Systems Technology</td>
<td>1</td>
</tr>
</tbody>
</table>

AGST 354 / SOIL 354 / WATS 354 | Soil Conservation and Watershed Management | 3 |

AGST 364 | Agricultural Products Processing and Handling | 3 |

AGST 416 | Sensors and Control Systems for Agri-Industries | 3 |

SOIL 153 / PLAS 153 | Soil Resources | 4 |

Credit Hours Subtotal: 21

Total Credit Hours: 21

1 In addition to capstone AGST 462.

Production Option

The production option is for students interested in careers in production agriculture such as farming, ranching, and crop consulting. The option integrates coursework in agricultural systems technology with agricultural sciences, management, and marketing. Students have flexibility in course selection to pursue minors in areas such as agronomy and animal science.
### Option Requirements

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLAS 204</td>
<td>Resource-Efficient Crop Management</td>
<td>3</td>
</tr>
<tr>
<td>AECN 201</td>
<td>Farm and Ranch Management</td>
<td>4</td>
</tr>
<tr>
<td>AECN 235 /  MRKT 235</td>
<td>Introduction to Commodity Marketing</td>
<td>3</td>
</tr>
<tr>
<td>ASCI 250</td>
<td>Animal Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**Agricultural Systems Technology Electives**

Select three of the following:

- AGST 342 Animal Housing Systems
- AGST 412 Hydraulic Power Systems
- AGST 431 / AGEN 431 / PLAS 431 Site-specific Crop Management
- AGST 433 Equipment and Tractor Testing
- AGST 452 / PLAS 452 / WATS 452 Irrigation Systems Management

**Production Agriculture Electives**

Select 8-11 hours from specified CASNR courses at 200 level or above

- Any 200, 300, or 400 level AGST course
- ASCI 210 Animal Products
- ASCI 254 Basic Swine Science
- ASCI 310 Fresh Meats
- ASCI 320 Animal Nutrition and Feeding
- ASCI 330 Animal Breeding and Genetics
- ASCI 370 Animal Welfare
- ASCI 451 Livestock Management on Range and Pasture
- ASCI 455 Beef Cow-Calf Management
- ASCI 456 Beef Cattle Merchandising
- ASCI 457 Beef Feedlot Management
- ASCI 485 Animal Systems Analysis
- ENTO 308 Management of Field Crop Insects
- ENTO 412 Entomology and Pest Management
- PLAS 240 Forage Crop and Pasture Management
- PLAS 245 Introduction to Grassland Ecology and Management
- PLAS 269 Principles of Soil Management
- PLAS 270 Biological Invaders
- PLAS 306 Greenhouse Practices and Management
- PLAS 307 Hydroponics for Growing Populations
- PLAS 340 Range Management and Improvement
- PLAS 361 Soils, Environment and Water Quality
- PLAS 366 Soil Nutrient Relationships
- PLAS 405 Crop Management Strategies
- PLAS 419 Applications of Remote Sensing in Agriculture and Natural Resources
- PLAS 425 Cover Crops in Agroecosystems
- PLAS 426 Invasive Plants
- PLAS 435 Agroecology
- PLAS 439 Organic Farming and Food Systems
- PLAS 445 Livestock Management on Range and Pasture

### Option Electives

Select 0-3 hours from the following:

- AGST 395 Internship in Agricultural Systems Technology
- MATH 104 Applied Calculus

Business or agricultural economics course (ACCT, AECN, BLAW, EAEP, ENTR, ECON, FINA, MNGT, MRKT class any level)

Credit Hours Subtotal: 33-36

**Total Credit Hours** 33-36

1 Please contact advisor to discuss selection of classes.

### Business Option

The business option is for students interested in business-related careers such as marketing, sales, and management in agriculture and related industries. This option integrates coursework in agricultural systems technology with additional business courses. Students can easily pursue a business minor with this option.

**Option Requirements**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 200</td>
<td>Accounting for Business Decisions</td>
<td>3</td>
</tr>
<tr>
<td>PLAS 204</td>
<td>Resource-Efficient Crop Management</td>
<td>3</td>
</tr>
<tr>
<td>or ASCI 250</td>
<td>Animal Management</td>
<td>3</td>
</tr>
<tr>
<td>MATH 104</td>
<td>Applied Calculus</td>
<td>3</td>
</tr>
</tbody>
</table>

**Agricultural Systems Technology Electives**

Select 9 hours from the following:

- AGST 342 Animal Housing Systems
- AGST 395 Internship in Agricultural Systems Technology
- AGST 400E Biorenewable Systems Technology
- AGST 412 Hydraulic Power Systems
- AGST 431 / AGEN 431 / PLAS 431 Site-specific Crop Management
- AGST 452 / PLAS 452 / WATS 452 Irrigation Systems Management

**Business Law Elective**

Select one of the following:

- AECN 256 Legal Aspects in Agriculture
- AECN 357 / NREE 357 Natural Resource and Environmental Law
- BLAW 300 Business, Government & Society

**Finance Elective**

- AECN 452 Agricultural Finance
  - or FINA 300 Financial Decision Making

**Marketing Elective**

Select one of the following:

- AECN 225 / EAEP 225 / MRKT 225 Agribusiness Entrepreneurship in Food Products Marketing
- AECN 235 / MRKT 235 Introduction to Commodity Marketing
- MRKT 300 Contemporary Marketing
Management Electives
Select two of the following: 6-7
- AECN 201 Farm and Ranch Management
- AECN 316 Agribusiness Management
- MNGT 300 Management Essentials For Contemporary Organizations
- MNGT 322 / ENTR 322 Family Business
- MNGT 361 Human Resource Management
Credit Hours Subtotal: 33-34

Technical Option
The technical option is for students interested in hands-on technical careers such as test engineers, product support specialists, and service managers. This option integrates coursework in agricultural systems technology with additional coursework in engineering. This option will also prepare students for graduate study.

Option Requirements
- MATH 106 Calculus I 5
- AGST 395 Internship in Agricultural Systems Technology 1-3
  or AGST 400A Occupational Safety
- AGST 412 Hydraulic Power Systems 3
- AGST 433 Equipment and Tractor Testing 3
Select one of the following: 3
- PLAS 204 Resource-Efficient Crop Management
- ASCI 250 Animal Management
- ASCI 210 Animal Products

Management Electives
Select two of the following: 6
- AECN 316 Agribusiness Management
- MNGT 300 Management Essentials For Contemporary Organizations
- MNGT 361 Human Resource Management

Option Electives
Select four of the following: 12
- ENSC 220 Introduction to Energy Systems
- CNST 305 / ARCH 333 Building Environmental Technical Systems
- AGST 342 Animal Housing Systems
- AGST 431 / AGEN 431 / PLAS 431 Site-specific Crop Management
- AGST 400E Biorenewable Systems Technology
- AGST 436 / AGEN 436 Embedded Controls for Agricultural Applications
- AGST 452 / PLAS 452 / WATS 452 Irrigation Systems Management
Credit Hours Subtotal: 33-34

Total Credit Hours 33-34

Processing Operations Option
The processing operations option is for students interested in careers in operations management for food, feed, and fuel companies. This option integrates coursework in agricultural systems technology, with business, agricultural sciences, and food sciences. This option will also prepare students for graduate study.

Option Requirements
- PLAS 437 Animal, Food and Industrial Uses of Grain 2
- AECN 235 / MRKT 235 Introduction to Commodity Marketing 3
- ASCI 210 Animal Products 3
- MATH 104 Applied Calculus 3-5
  or MATH 106 Calculus I
- AGST 395 Internship in Agricultural Systems Technology 1-3
  or AGST 400A Occupational Safety
- MNGT 300 Management Essentials For Contemporary Organizations 3
  or AECN 316 Agribusiness Management
- AGST 363 / FDST 363 Heat and Mass Transfer 3
- AGST 412 Hydraulic Power Systems 3
- AGST 465 / FDST 465 Food Engineering Unit Operations 3

Processing Electives
Select 7-9 hours from the following: 7-9
- PLAS 438 Producing Grain for Animal, Food and Industrial Uses
- ASCI 410 Processed Meats
- ENSC 220 Introduction to Energy Systems
- FDST 205 Food Composition and Analysis
- FDST 403 Food Quality Assurance
- FDST 412 Cereal Technology
- FDST 413 Baking Technology
- FDST 420 Fruit and Vegetable Technology
- FDST 429 Dairy Products Technology
Credit Hours Subtotal: 33-37

Total Credit Hours 33-37

Electives
Students can select 9 credit hours of personal development electives. These electives can be used to foster a greater understanding of a topic of interest, to develop an inherent skill, or to pursue a minor.

Requirements for Minor Offered by Department
Mechanized Systems Management 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
- AGST 232 Power and Machinery Principles 3
- AGST 245 Fundamentals of Electrical Systems 3
Credit Hours Subtotal: 6
### Technical electives

Select 6 hours from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGST 412</td>
<td>Hydraulic Power Systems</td>
</tr>
<tr>
<td>AGST 416</td>
<td>Sensors and Control Systems for Agriculture</td>
</tr>
<tr>
<td>AGST 433</td>
<td>Equipment and Tractor Testing</td>
</tr>
<tr>
<td>AGST 436</td>
<td>Embedded Controls for Agricultural Applications</td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: 6

### Agricultural Systems Electives

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>
</tr>
<tr>
<td>AGST 354</td>
<td>Soil Conservation and Watershed Management</td>
</tr>
<tr>
<td>AGST 364</td>
<td>Agricultural Products Processing and Handling</td>
</tr>
<tr>
<td>AGST 431</td>
<td>Site-specific Crop Management</td>
</tr>
<tr>
<td>AGST 432</td>
<td>Irrigation Systems Management</td>
</tr>
<tr>
<td>PLAS 431</td>
<td></td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: 6

### Total Credit Hours

18

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**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 PHYS 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

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**AGST 245 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

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**AGST 256 Problem Solving in Agricultural Systems Technology**

**Prerequisites:** AGST 109 or PHYS 141 or PHYS 151 or PHYS 211

**Notes:** Open to AGST majors only.

**Description:** Use of computational tools to solve problems relevant to mechanized systems management. Professional communication of technical information. Discussion of current and emerging issues relevant to the major.

**Credit Hours:** 1

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**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

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**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

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**AGST 109L Physical Principles in Agriculture and Life Sciences Laboratory**

**Prerequisite for:** AGST 412; AGST 416

**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
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
Min credits per semester: 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
Min credits per semester: 3
Max credits per semester: 3
Grading Option: Graded with Option
Offered: FALL

AGST 354 Soil Conservation and Watershed Management
Crosslisted with: SOIL 354, WATS 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
Min credits per semester: 3
Max credits per semester: 3
Grading Option: Graded with Option
Offered: FALL

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

AGST 364 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 pyschrometrics. 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 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: AGEN 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, WATS 452, 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 Equipment Systems  
**Crosslisted with:** AGST 862  
**Prerequisites:** Senior standing in AGST  
**Notes:** Capstone course.  
**Description:** Team-based activities to evaluate equipment systems, make technical and economic recommendations, develop professional written and oral reports. Topics include equipment 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, WATS 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

PLEASE NOTE  
This document represents a sample 4-year plan for degree completion with this major. Actual course selection and sequence may vary and should be discussed individually with your college or department academic advisor. Advisors also can help you plan other experiences to enrich your undergraduate education such as internships, education abroad, undergraduate research, learning communities, and service learning and community-based learning.

**Agricultural Systems Technology - Business**

**Agricultural Systems Technology - Processing Operations**

**Agricultural Systems Technology - Production**

**Agricultural Systems Technology - Technical**

**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