PLANT BIOLOGY (CAS)

Description
Website: http://agronomy.unl.edu/plant-biology

The plant biology major is designed to provide a flexible entry for undergraduate students that have an interest in the plant sciences. Once enrolled in the program, students will take a core of classes that will allow them to continue in the plant biology major or would also allow them to easily transfer to other Life Sciences programs. Students will have the opportunity to interact with the faculty of the Center for Plant Science Innovation as well as other departments and schools for advising and research opportunities.

The goal of the plant biology program is to offer a field of study to students who are interested and talented in the basic sciences and mathematics and who:

1. may never have considered applying this knowledge to plants,
2. have always dreamed of this field of study, and/or
3. have always had an interest in plants but are uncertain that this field of study is right for them.

Studying plant biology will allow students to explore and understand plants at molecular, cellular, physiological, organismal, population, and community levels and by taking ecological, evolutionary, agricultural, and horticultural perspectives. This is accomplished through required courses in different scientific fields (e.g., biology, biochemistry, chemistry, agronomy, horticulture) and through different options in the major (ecology and management option and biotechnology option).

The plant biology program includes a career experience/internship course (AGRO 295/RNGE 295/SOIL 295, BIOS 395, HORT 395, NRES 497) which provides the opportunity to gain work experience in an off-campus setting related to a student’s academic and career objectives.

A research project initiated by the beginning of the junior year is required.

College Requirements
College Admission

College Admission
The entrance requirements for the College of Arts and Sciences are the same as the University of Nebraska–Lincoln General Admission Requirements. Students who are admitted through the Admission By Review process may have certain conditions attached to their enrollment at Nebraska. These conditions are explained under “Removal of Deficiencies.”

In addition to these requirements, the College of Arts and Sciences strongly recommends a third and fourth year of one foreign language. Four years of high school course work in the same language will fulfill the College of Arts and Sciences’ language requirement. It will also allow students to continue language study at a more advanced level at the University of Nebraska–Lincoln, and provide more opportunity to study abroad.

Transfer Students
To be considered for admission as a transfer student, Nebraska resident or nonresident, students 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 graduated from high school January 1997 and after must also meet the University of Nebraska–Lincoln General Admission Requirements. Those transfer students who graduated before January 1997 must have completed in high school, 3 years of English, 2 years of the same foreign language, 2 years of algebra, and 1 year of geometry. Transfer students who have completed less than 12 credit hours of college study must also submit either their ACT or SAT scores.

Ordinarily, hours earned at a similarly accredited college or university are applicable to the University of Nebraska–Lincoln degree. The College, however, will evaluate all hours submitted on an application for transfer, and reserves the right to accept or reject any of them, based upon its exclusion and restriction policies. Sixty (60) is the maximum number of hours the University will accept on transfer from a two-year college or international institution. Transfer credit in the major or minor must be approved by the departmental advisor on a Request for Substitution Form to meet specific course requirements, group requirements, or course level requirements in the major or minor. At least half of the hours in the major field must be completed at the University regardless of the number of hours transferred.

The College of Arts and Sciences will accept no more than 15 semester hours of C- and D grades from other schools. The C- and D grades cannot be applied toward requirements for a major or minor. This policy does not apply to the transfer of grades from UNO or UNK to the University of Nebraska–Lincoln. All D grades may be transferred from UNO or UNK, but they are not applicable to a major or minor.

Readmitted Students
University of Nebraska–Lincoln students who choose not to take courses for more than two consecutive terms, must reapply to the University of Nebraska–Lincoln. Students readmitted to the College of Arts and Sciences will follow the requirements stated in the catalog for the academic year of readmission and re-enrollment as a degree-seeking student in Arts and Sciences. In consultation with advisors, a student may choose to follow a catalog for any academic year in which they are admitted to and enrolled as a degree-seeking student at Nebraska in the College of Arts and Sciences. Students must complete all degree requirements from a single catalog year. Beginning in 1990-1991, the catalog which a student follows for degree requirements may not be more than 10 years old at the time of graduation.

Admission Deficiencies/Removal of Deficiencies
Students must remove entrance deficiencies in geometry and foreign language as soon as possible, and before graduating from the College of Arts and Sciences. For questions and more information, students should consult a college advisor in the Academic and Career Advising Center in 107 Oldfather Hall.

Removing Foreign Language Deficiencies
Students must complete the second semester of a first year language sequence to clear the deficiency and the second semester of the second year language sequence to complete the college graduation requirement in language.

Removing Geometry Deficiencies
A deficiency of one year of geometry can be removed by taking high school geometry courses through an approved independent study program, or by completing a geometry course from an accredited community college or a four-year institution. Neither of these options will count for college credit.
College Degree Requirements

College Distribution Requirements

Bachelor of Arts or Bachelor of Science (16 hours + Language)
The College of Arts and Sciences distribution requirements are designed to further the purposes of liberal education by encouraging study in several different areas within the College. All requirements are in addition to University ACE requirements. A student may not use a single course to satisfy more than one of the following five distribution requirements. A student cannot use a single course to satisfy both an ACE outcome and a College distribution requirement. A student cannot use a course from their primary major to satisfy the Breadth Requirement (F), but may apply an ancillary requirement of the primary major or a course from their second major toward this requirement. Independent study or reading courses and internships cannot be used to satisfy distribution requirements. To see a complete list of excluded courses, run a degree audit through MyRED.

Courses from interdisciplinary programs will count in the same area as courses from the home/cross-listed department(s).

College Distribution Requirements

| CDR A - Written Communication | 3 |
| Select from courses approved for ACE outcome 1. |

| CDR B and BL - Natural, Physical, and Mathematical Sciences with Lab | 4 |
| Select from biochemistry, biological sciences, chemistry, computer science, geology, meteorology, mathematics, physics and statistics. Must include one lab in the natural or physical sciences. Lab courses may be selected from biochemistry, biological sciences, chemistry, geology, meteorology and physics. |

Some courses from geography and anthropology may also be used to satisfy the lab requirement above. ¹

| CDR C - Humanities | 3 |
| Select from classics, English, history, modern languages and literatures, philosophy, and religious studies. ² |

| CDR D - Social Science | 3 |
| Select from: anthropology, communication studies, geography, political science, psychology, or sociology. ³ |

| CDR E - Language | 0-16 |
| Fulfilled by the completion of the 6-credit-hour second-year sequence in a single foreign language in one of the following departments: Classics and religious studies, modern languages and literatures, or anthropology. Instruction is currently available in Arabic, Chinese, Czech, French, German, Greek, Japanese, Latin, Omah, Russian, and Spanish. A student who has completed the fourth-year level of one foreign language in high school is exempt from the languages requirement. |

| CDR F - Additional Breadth | 3 |
| Select from: natural, physical and mathematical sciences (Area B), humanities (Area C), or social sciences (Area D). Cannot be a course from the primary major. |

Credit Hours Subtotal: 16-32

¹ See degree audit or College of Arts and Sciences advisor for approved geography and anthropology courses that apply as natural science.

² Language courses numbered 210 or below apply only for the foreign language requirement.

³ See degree audit or College of Arts and Sciences advisor for list of natural/physical science courses in anthropology, geography, and psychology that do not apply as social science.

Scientific Base

Bachelor of Science Only (60 hours)
The bachelor of science degree requires students to complete 60 hours in mathematical, physical and natural sciences. Approved courses for scientific base credit come from the following College of Arts and Sciences disciplines: actuarial science, anthropology (selected courses), astronomy, biochemistry (excluding BIOL 101), biological sciences (excluding BIOS 203), chemistry (excluding CHEM 101), computer science (excluding CSCE 10), geography (selected courses), geology, life sciences, mathematics (excluding courses below MATH 104), meteorology, microbiology, physics and statistics.

See your degree audit or a College of Arts and Sciences advisor for a complete list including individual classes that fall outside of the disciplines listed above. Up to 12 hours of scientific and technical courses offered by other colleges may be accepted toward this requirement with approval of a college advisor.

Foreign Languages/Language Requirement

Languages Exemption Policy
The University of Nebraska–Lincoln and the College of Arts and Sciences will exempt or waive students from the Nebraska entrance requirement of two years of the same foreign language or from the College's language distribution requirement based on documentation only. The following are the options and procedures for documentation:

High School Transcripts

For the University entrance requirement, students must show an official high school transcript with two or more years of the same foreign language.

For the College of Arts and Sciences College Distribution Requirement

E-Language, students must show an official high school transcript with four or more years of the same foreign language in high school, or show evidence of graduation from a non-English-speaking foreign high school. Students whose native language is not English must show English as a Second Language study on an official high school transcript. Four years of ESL at the high school level (9th, 10th, 11th and 12th grades) will be the basis for a waiver of the CDR E Language requirement.

Proficiency Examination at UNL

For the University entrance requirement, students who do not have transcript documentation can request to take a proficiency exam in the language. (This is not the same test as the Modern Languages Placement Exam.) However, the University will provide testing only in the languages it teaches. Currently, these languages are: Arabic, French, German, Spanish, Russian, Czech, Japanese, Chinese.

For the College of Arts and Sciences College Distribution Requirement

E-Language, the Department of Modern Languages will oversee the test at the 202 level. If the student passes the test, the department will sign the College Request for Waiver form and indicate the level of proficiency. The form is then forwarded to the Arts and Sciences Advising Center for approval.

The Department of Modern Languages will oversee the test and provide written documentation to the Arts and Sciences Advising Center the level of proficiency passed.
University regulations for the Pass/No Pass (P/N) privilege state:

Pass/No Pass Privilege
requirements in a major or a minor. University of Nebraska–Lincoln C- and D grades can be applied toward
D grades can be applied toward requirements in a major or a minor. No
grades from other schools except for UNO and UNK. No transfer C- and
The College will accept no more than 15 semester hours of C- and D
Restrictions on C- and D Grades
least 2.0 is required.
Minimum Hours Required for Graduation
A minimum of 120 semester hours of credit is required for graduation from the College of Arts and Sciences. A total grade point average of at least 2.0 is required.
Grade Rules
Restrictions on C- and D Grades
The College will accept no more than 15 semester hours of C- and D grades from other schools except for UNO and UNK. No transfer C- and D grades can be applied toward requirements in a major or a minor. No University of Nebraska–Lincoln C- and D grades can be applied toward requirements in a major or a minor.
Pass/No Pass Privilege
University regulations for the Pass/No Pass (P/N) privilege state:

• The Pass/No Pass option is designed for your use by seeking to expand your intellectual horizons by taking courses in areas where you may have had minimal preparation.
• Neither the P nor the N grade contribute to your GPA.
• P is interpreted to mean C or above.
• A change to or from a Pass/No Pass may be made until mid-term (see academic calendar for specific dates per term).
• The Pass/No Pass or grade registration cannot conflict with the policy of the professor, department, college, or University governing the grading option.
• Changing to or from Pass/No Pass requires using the MyRED system to change the grading option or filing a Drop/Add form with the Office of the University Registrar, 107 Canfield Administration Building. After mid-term of the course, a student registered for Pass/No Pass cannot change to a grade registration unless the Pass/No Pass registration is in conflict with the policy of the professor, department, college, or University governing Pass/No Pass.

• The Pass/No Pass grading option cannot be used for the removal of C- or D or F grades.

Pass/No Pass privileges in the College of Arts and Sciences are extended to students according to the following additional regulations:

• Pass/No Pass hours can count toward fulfillment of University ACE requirements and college distribution requirements up to the 24-hour maximum.
• Most Arts and Sciences departments and programs do not allow courses graded Pass/No Pass to apply to the major or minor. Students should refer to the department's or program's section of the catalog for clarification. By college rule, departments can allow up to 6 hours of Pass/No Pass in the major or minor.
• Departments may specify that certain courses of theirs can be taken only on a P/N basis.
• The college will permit no more than a total of 24 semester hours of P/N grades to be applied toward degree requirements. This total includes all Pass grades earned at the University and other U.S. schools. NOTE: This 24-hour limit is more restrictive than the University regulation.

Grading Appeals
A student who feels that he/she has been unfairly graded must ordinarily take the following sequential steps in a timely manner, usually by initiating the appeal in the semester following the awarding of the grade:

1. Talk with the instructor concerned. Most problems are resolved at this point.
2. Talk to the instructor’s department chairperson.
3. Take the case to the Grading Appeal Committee of the department concerned. The Committee should be contacted through the department chairperson.
4. Take the case to the College Grading Appeals Committee by contacting the Dean’s Office, 1223 Oldfather Hall.

Course Level Requirements
Courses Numbered above 299
Thirty of the 120 semester hours of credit must be in courses numbered above 299. Of the 30 hours above 299, 15 hours (1/2) must be completed in residence at UNL.
Graduate Courses
Seniors in the University who have obtained in advance the approval of the dean for Graduate Studies may receive up to 12 hours credit for graduate courses taken in addition to the courses necessary to complete their undergraduate work, provided that such credits are earned within the calendar year prior to receipt of the baccalaureate. For procedures, inquire at the Office of Graduate Studies.

Course work taken prior to receipt of the baccalaureate may not always be accepted for transfer to other institutions as graduate work.

Residency
Residency Requirement and Open Enrollment and Summer Independent Study Courses
Students must complete at least 30 of the 120 total hours for their degree at the University of Nebraska–Lincoln. Students must complete at least 1/2 of their major course work including 6 hours above 299 in their major, and 15 of the 30 hours required above 299 in residence. Credit earned during education abroad may be used toward the residency requirement if students register through the University and participate in
prior-approved education abroad programs. The University of Nebraska—
Lincoln open enrollment and summer independent study courses count
toward residence.

**ACE Requirements**

Consistent with the mission and values of the University, ACE is based
on a shared set of four institutional objectives and ten student learning
outcomes. The ACE program was approved by faculty in all eight
undergraduate colleges and endorsed by the Faculty Senate, the student
government, and the Academic Planning Committee in January 2008
for implementation in the fall 2009. ACE aligns with current national
initiatives in general education.

Key characteristics of ACE demonstrate the benefits of the program to
students:

- Students receive a broad education with exposure to multiple
disciplines, critical life skills and important reasoning, inquiry, and
civic capacities.
- ACE is simple and transparent for students, faculty and advisors.
  Students complete the equivalent of 3 credit hours for each of the ten
  student learning outcomes.
- Students connect and integrate their ACE experiences with their
  selected major.
- Students can transfer all ACE certified courses across colleges
  within the institution to meet the ACE requirement and any course
  from outside the institution that is directly equivalent to a University
  of Nebraska—Lincoln ACE-certified course. Courses from outside
  institutions without direct equivalents may be considered with
  appropriate documentation for ACE credit (see academic advisor).

ACE allows faculty to assess and improve their effectiveness and
facilitate students’ learning.

**ACE Institutional Objectives and Student Learning Outcomes**

To meet the ACE Program requirement, a student will complete a
minimum of 3 credit hours for each of the ten ACE Student Learning
Outcomes (a total of 30 ACE credit hours). See the ACE website at: http://
ace.unl.edu for the most current information and the most recently
certified courses.

**Catalog Rule**

Students must fulfill the requirements stated in the catalog for the
academic year in which they are first admitted to and enrolled as a
degree-seeking student at the University of Nebraska—Lincoln. In
consultation with advisors, a student may choose to follow a subsequent
catalog for any academic year in which they are admitted to and enrolled
as a degree-seeking student at Nebraska in the College of Arts and
Sciences. Students must complete all degree requirements from a single
catalog year. Beginning in 1990-1991 the catalog which a student follows
for degree requirements may not be more than 10 years old at the time of
graduation.

**Learning Outcomes**

Majors in plant biology will be able to:

1. Be confident in explaining how various plants grow and reproduce
   and predict how they will respond to their growing environment.
2. Plan and conduct experiments that are designed to test hypotheses
   and then communicate their discoveries in formats designed for other
   scientists or for the public.
3. Use the principles of ecology to analyze and interpret the interactions
   of the plant, animal, environmental, and economic aspects of
   grassland ecosystems. (Ecology and Management Option)
4. Identify management strategies for grasslands that ensure sustained
   productivity and resilience. (Ecology and Management Option)
5. Envision and design genetic and production improvements in plants
   to better meet the needs of people or changes in plant production
   environments (Biotechnology Option)
6. Be competitive applicants for graduate programs worldwide in plant
   biology.

**Major Requirements**

**Core Requirements**

<table>
<thead>
<tr>
<th>Mathematics and Statistics</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>MATH 106 Calculus I</td>
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<td>STAT 218 Introduction to Statistics</td>
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<td>PHYS 141 Elementary General Physics I</td>
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<thead>
<tr>
<th>Chemistry</th>
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<tbody>
<tr>
<td>CHEM 109 General Chemistry I</td>
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<tr>
<td>CHEM 110 General Chemistry II</td>
</tr>
<tr>
<td>CHEM 255 Biological Organic Chemistry</td>
</tr>
<tr>
<td>&amp; CHEM 257 and Biological Organic Chemistry Laboratory</td>
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<tr>
<td>or CHEM 251 Organic Chemistry I</td>
</tr>
<tr>
<td>&amp; CHEM 253 and Organic Chemistry I Laboratory</td>
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<table>
<thead>
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<th>Biochemistry</th>
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<tr>
<td>BIOC 321 Elements of Biochemistry</td>
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<tr>
<td>&amp; BIOC 321L and Laboratory for Elements of Biochemistry</td>
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<td><strong>Credit Hours Subtotal:</strong></td>
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<tr>
<th>Plant Biology Core</th>
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<tbody>
<tr>
<td>Select one of the following:</td>
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<tr>
<td>AGRO 131 / HORT 131 / &amp; AGRO 132 Plant Science and Agronomic Plant Science Laboratory</td>
</tr>
<tr>
<td>HORT 131 / AGRO 131 &amp; HORT 133 Plant Science and Horticultural Plant Science Laboratory</td>
</tr>
<tr>
<td>NRES 220 / NRES 222 Principles of Ecology and Ecology Laboratory</td>
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<tr>
<td>or BIOS 207 Ecology and Evolution</td>
</tr>
<tr>
<td>AGRO 153 / HORT 153 / SOIL 153 Soil Resources</td>
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<td><strong>Credit Hours Subtotal:</strong></td>
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<td>Course</td>
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<tr>
<td>AGRO 215 / HORT 215 / TLMT 215 or BIOS 206</td>
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<td>AGRO 325</td>
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<tr>
<td>AGRO 92 / HORT 92 / NRES 92</td>
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</table>

Credit Hours Subtotal: 20

### Plant Biology Internship/Career Experience

Select one of the following:

- BIOS 395 Internship
- HORT 395 Career Experience
- AGRO 295 / RNGE 295 / SOIL 295 Internship in Agronomy
- NRES 497 Career Experiences in Natural Resource Sciences

Credit Hours Subtotal: 1

### Plant Biology Independent Study/Current Project

Select one of the following:

- BIOS 498 Independent Research in Biological Sciences
- AGRO 496 / RNGE 496 / SOIL 496 Independent Study
- HORT 396 Current Projects and Topics in Horticulture or HORT 399 Independent Study
- NRES 496 Independent Study
- PLPT 496 Independent Study

Credit Hours Subtotal: 1-3

Total Credit Hours: 59-61

### Specific Major Requirements

Select either the Ecology and Management Option or the Biotechnology Option as described below.

#### Ecology and Management Option

**Required Courses**

- AGRO 245 / NRES 245 or NRES 310 Introduction to Grassland Ecology and Management | 3-4
- AGRO 444 / NRES 444 / RNGE 444 Ecosystem Monitoring and Assessment | 3

Credit Hours Subtotal: 6-7

**Additional Ecology and Management Option Courses**

Select at least 3 hours from each of the following five areas:

- **Water/Climate**
  - METR 100 Weather and Climate | 3-4
  - NRES 208 Applied Climate Sciences

- **Microclimate: The Biological Environment**
  - NRES 408
  - AGRO 408
  - GEOG 408
  - HORT 408
  - METR 408
  - WATS 408

- **Introduction to Water Science**
  - WATS 281
  - GEOG 281
  - NRES 281

- **Geospatial Information Sciences**
  - Select at least 3 hours from the following: GEOG 412 / NRES 412 Systems
  - GEOG 418 / NRES 418
  - NRES 312 / Introduction to Geospatial Information
  - GEOG 312 Sciences

- **Plant Identification**
  - AGRO 442 / NRES 442 / RNGE 442 Wildland Plants

- **Plant-Animal-Organismal Interactions**
  - Select at least 3 hours from the following: AGRO 340 / RNGE 340 Range Management and Improvement
  - AGRO 460 / SOIL 460 / NRES 460 Soil Microbiology
  - BIOS 317 The Biology of Plants
  - BIOS 475 Avian Biology
  - BIOS 476 / NRES 476 Mammalogy
  - ENTO 115 / BIOS 115 & ENTO 116 / BIOS 116 Insect Biology and Insect Identification
  - NRES 211 Introduction to Conservation Biology
  - NRES 311 Wildlife Ecology and Management
  - NRES 348 Wildlife Damage Management

- **Great Plains Ecosystem**
  - AGRO 204 Resource-Efficient Crop Management
  - AGRO 240 / RNGE 240 Forage Crop and Pasture Management
  - AGRO 440 / NRES 440 / RNGE 440 Great Plains Ecosystem
  - BIOS 454 / NRES 454 Ecological Interactions
  - BIOS 457 / GEOL 457 Ecosystem Ecology
  - BIOS 470 Prairie Ecology
  - NRES 310 Introduction to Forest Management
  - NRES 417 / HORT 418 Agroforestry Systems in Sustainable Agriculture

#### Biotechnology Option

**Required Courses**

- AGRO 245 / NRES 245 or NRES 310 Introduction to Grassland Ecology and Management | 3-4
- AGRO 444 / NRES 444 / RNGE 444 Ecosystem Monitoring and Assessment | 3

Credit Hours Subtotal: 6-7

**Additional Biotechnology Option Courses**

Select at least 3 hours from each of the following five areas:

- **Water/Climate**
  - METR 100 Weather and Climate | 3-4
  - NRES 208 Applied Climate Sciences

- **Microclimate: The Biological Environment**
  - NRES 408
  - AGRO 408
  - GEOG 408
  - HORT 408
  - METR 408
  - WATS 408

- **Introduction to Water Science**
  - WATS 281
  - GEOG 281
  - NRES 281

- **Geospatial Information Sciences**
  - Select at least 3 hours from the following: GEOG 412 / NRES 412 Systems
  - GEOG 418 / NRES 418
  - NRES 312 / Introduction to Geospatial Information
  - GEOG 312 Sciences

- **Plant Identification**
  - AGRO 442 / NRES 442 / RNGE 442 Wildland Plants

- **Plant-Animal-Organismal Interactions**
  - Select at least 3 hours from the following: AGRO 340 / RNGE 340 Range Management and Improvement
  - AGRO 460 / SOIL 460 / NRES 460 Soil Microbiology
  - BIOS 317 The Biology of Plants
  - BIOS 475 Avian Biology
  - BIOS 476 / NRES 476 Mammalogy
  - ENTO 115 / BIOS 115 & ENTO 116 / BIOS 116 Insect Biology and Insect Identification
  - NRES 211 Introduction to Conservation Biology
  - NRES 311 Wildlife Ecology and Management
  - NRES 348 Wildlife Damage Management

- **Great Plains Ecosystem**
  - AGRO 204 Resource-Efficient Crop Management
  - AGRO 240 / RNGE 240 Forage Crop and Pasture Management
  - AGRO 440 / NRES 440 / RNGE 440 Great Plains Ecosystem
  - BIOS 454 / NRES 454 Ecological Interactions
  - BIOS 457 / GEOL 457 Ecosystem Ecology
  - BIOS 470 Prairie Ecology
  - NRES 310 Introduction to Forest Management
  - NRES 417 / HORT 418 Agroforestry Systems in Sustainable Agriculture
NRES 424  Forest Ecology
NRES 459 /  Limnology
BIOS 459 /  WATS 459

NRES 468 /  Wetlands
BIOS 458 /  WATS 468

Credit Hours Subtotal:  15
Total Credit Hours  21-22

Biotechnology Option

Required Courses
BIOS 312  Microbiology  3
Select one of the following:  3-4
BIOS 337  Applications of Bioinformatics
BIOC 442 /  Computational Biology
STAT 442
BIOS 427  Practical Bioinformatics Laboratory

Credit Hours Subtotal:  6-7

Additional Biotechnology Courses 1
Select at least 17 hours from the following three areas with at least 3 hours in each area:

Biological Sciences
Select at least 3 hours from the following:  3-6
AGRO 270 /  Biological Invaders
HORT 270 /  NRES 270 /  PLPT 270
AGRO 460 /  Soil Microbiology
BIOS 460 /  NRES 460 /  SOIL 460
BIOS 205  Genetics, Molecular and Cellular Biology Laboratory
BIOS 302  Cell Biology
BIOS 317  The Biology of Plants
BIOS 407  Biology of Cells and Organelles
BIOS 418  Advanced Genetics
BIOS 420 /  Molecular Genetics
MBIO 420
BIOS 425  Plant Biotechnology
BIOS 471  Plant Systematics
or BIOS 429  Phylogenetic Biology
BIOS 477  Bioinformatics and Molecular Evolution

Applied Plant Biology
Select at least 3 hours from the following:  3-6
AGRO 131 /  Plant Science
HORT 131 /  and Agronomic Plant Science Laboratory
& AGRO 132
or HORT 131 Plant Science
& HORT 133 and Horticultural Plant Science Laboratory

AGRO 408 /  Microclimate: The Biological Environment
GEOG 408 /  HORT 408 /  METR 408 /  NRES 408 /  WATS 408
AGRO 411  Crop Genetic Engineering
AGRO 412  Crop and Weed Genetics
HORT 221  Plant Propagation
NRES 406 /  AGRO 406 /  HORT 406
PLPT 369 /  Introductory Plant Pathology
BIOS 369

Plant and Food System Management
Select at least 3 hours from the following:  3-6
AGRO 204  Resource-Efficient Crop Management
AGRO 240 /  Forage Crop and Pasture Management
RNGE 240
or AGRO 227  Introductory Turfgrass Management
HORT 227 /  PGAM 227 /  TLMT 227

AGRO 405  Crop Management Strategies
or AGRO 435  Agroecology
HORT 435 /  NRES 435
AGRO 426 /  Invasive Plants
HORT 426 /  NRES 426
AGRO 437  Animal, Food and Industrial Uses of Grain
AGRO 438  Producing Grain for Animal, Food and Industrial Uses
ENTO 115 /  Insect Biology
& BIOS 115 /  and Insect Identification
& ENTO 116 /  BIOS 116
FDST 205  Food Composition and Analysis
HORT 325  Greenhouse Practices and Management
HORT 352  Production and Physiology of Horticultural Crops
HORT 355  Perennial, Pot and Bedding Plant Production Laboratory
HORT 462  Nursery Management and Crop Production

Credit Hours Subtotal:  17
Total Credit Hours  23-24

1 Students considering graduate school should also take BIOS 478.

Additional Major Requirements

Grade Rules

C- and D Grades
A grade of C or better is required in all courses in the major or minor.
Pass/No Pass
No course taken Pass/No Pass will count toward the major or minor, except for the Career Experience courses.

Requirements for the minor Offered by Department
Requirements for the minor include 19 hours of course work, with a minimum of 7 hours at the 300 level or above.

Requirements
Select one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AGRO 131 / HORT 131 &amp; AGRO 132</td>
<td>Plant Science and Agronomic Plant Science Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>HORT 131 / AGRO 131 &amp; HORT 133</td>
<td>Plant Science and Horticultural Plant Science Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>AGRO 278</td>
<td>Botany</td>
<td>4</td>
</tr>
<tr>
<td>AGRO 325</td>
<td>Introductory Plant Physiology</td>
<td>4</td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: 12

Focus
Select either the Biotechnology Focus or Ecology and Management Focus

Biotechnology Focus

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRO 215 / HORT 215 / TLMT 215</td>
<td>Genetics</td>
<td>4</td>
</tr>
<tr>
<td>or BIOS 206 General Genetics</td>
<td>Biotechnology Option</td>
<td></td>
</tr>
<tr>
<td>Any 300- or 400-level course listed under the Plant Biology Major—Biotechnology Option</td>
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<td></td>
</tr>
</tbody>
</table>

Ecology and Management Focus

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRES 220</td>
<td>Principles of Ecology</td>
<td>4</td>
</tr>
<tr>
<td>NRES 222</td>
<td>Ecology Laboratory</td>
<td></td>
</tr>
<tr>
<td>Any 300- or 400-level course listed under the Plant Biology Major—Ecology and Management Option</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: 7-8

Total Credit Hours 19-20

Grade Rules

C- and D Grades
A grade of C or better is required in all courses in the major or minor.

Pass/No Pass
No course taken Pass/No Pass will count toward the major or minor, except for the Career Experience courses.

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.

Plant Biology - Ecology and Management (B.S.)

Plant Biology - Biotechnology (B.S.)

Career Information

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

Transferable Skills

- Communicate results of scientific experiments to scientific and non-scientific audiences
- Apply mathematical and scientific skills to solve real-world problems
- Make predictions using mathematical, statistical, and scientific modeling methods
- Define problems and identifying causes
- Understand and use proper laboratory and technical skills and instruments
- Collaborate with a team to develop solutions
- Confidently navigate complex, ambiguous projects and environments
- Design and implement research experiments
- Document and replicate processes and procedures

Jobs of Recent Graduates

- North American Trait Integration Breeder, Monsanto - Chesterfield MO
- Plant Protection Technician, USDA - Lincoln NE
- Data Analyst, Zoex Corporation - Houston TX
- Associate Sales Manager, Theisen Seed LLC - Atkinson NE
- Distance Education Instructor, University of Nebraska-Lincoln - Lincoln NE
- Site Manager, Sustainable Agriculture Education - Berkeley CA
- Groundskeeper, Burr Oak Lodge - Eagle NE
- Graduate Research Assistant, University of Nebraska-Lincoln - Lincoln NE
- Student of Doctor of Health Program, University of Nebraska-Lincoln - Lincoln NE

Internships

- Intern, DuPont Pioneer - Johnston IA
- Research Assistant, University of Nebraska-Lincoln Plant Pathology - Lincoln NE
- Cover Crop Research Intern, University of Nebraska-Lincoln Agronomy and Horticulture - Lincoln NE
- Research Intern, Nebraska Forest Service - Lincoln NE
- Intern, Grassland Ecology - Wood River NE
- Pioneer Sales Associate Intern, Theisen Seed LLC - Atkinson NE
- Crop Production Intern, University of Nebraska-Lincoln Agronomy and Horticulture - Lincoln NE
- Research Intern, University of Nebraska-Lincoln Molecular Plant Physiology - Lincoln NE

Graduate & Professional Schools

- Ph.D., Genetics, Iowa State University - Ames IA
- Ph.D., Evolutionary Ecology, Colorado State University - Fort Collins CO
• Ph.D., Plant Breeding and Genetics, Purdue University - Lafayette IN
• Ph.D., Entomology, University of Arkansas - Fayetteville AR
• Ph.D., Agronomy and Horticulture, University of Nebraska-Lincoln - Lincoln NE
• Master's Degree, Agronomy, University of Nebraska-Lincoln - Lincoln NE
• Master's Degree, Plant Breeding and Genetics, University of Nebraska-Lincoln - Lincoln NE
• Master's Degree, Biological Sciences, University of Nebraska-Lincoln - Lincoln NE
• Master's Degree, Entomology and Plant Pathology, Colorado State University - Fort Collins CO
• Master's Degree, Horticulture, University of Nebraska-Lincoln - Lincoln NE
• Ph.D., Horticulture, University of Nebraska-Lincoln - Lincoln NE