

PLANT BIOLOGY (CASNR)

Description

Website: <http://agronomy.unl.edu/plant-biology> (<http://agronomy.unl.edu/plant-biology/>)

The plant biology degree program provides 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 degree program or 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 the above departments and schools for advising, internships, and research opportunities.

Studying plant biology will allow students to explore their knowledge of plants at the following levels:

1. Molecular. (Biotechnology Option)
2. Cellular and organismal. (biological, biochemical/chemical sciences)
3. Whole plant/applied physiological. (horticulture and agronomy courses)
4. Ecological. (Ecology and Management Option)

Students may select a bachelor of science track through the College of Agricultural Sciences and Natural Resources or a bachelor of science or arts track through the College of Arts and Sciences. Every student must complete a set of core courses that provide breadth in basic sciences. Introduction to plant biology should be taken during the first semester in the program. Students also must complete an emphasis to provide depth in one of the following options: Biotechnology or Ecology and Management.

The plant biology program includes a career experience/internship course (AGRO 295/RNGE 295/SOIL 295; BIOS 395; HORT 395/TLMT 395T; 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. The presentation of this work will be part of the Plant Biology Portfolio and Assessment course.

Students interested in plant biology through the College of Agricultural Sciences and Natural Resources are advised to make an initial appointment with the chief academic advisor, Dr. Don Lee, who will then assign them to a faculty member in the College of Agricultural Sciences and Natural Resources.

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. For students entering the PGA Golf Management degree program, a certified golf handicap of 12 or better (e.g., USGA handicap card) or written ability (MS Word file) equivalent to a 12 or better handicap by a PGA professional or high school golf coach is required. For more information, please visit <http://pgm.unl.edu/requirements> (<http://pgm.unl.edu/requirements/>).

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.

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 (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 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 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 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 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 CASNR¹ (>299) including the appropriate ACE 10 degree requirement or an approved ACE 10 substitution offered through 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. University of Nebraska–Lincoln open enrollment and summer independent study courses count toward residence.

¹ *Includes courses taught by CASNR faculty through interdisciplinary prefixes (e.g., LIFE, MBIO, ENVR, SCIL, EAEP, HRTM, ENSC) and CASNR crosslisted courses taught by non-CASNR faculty.*

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 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 (<https://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. 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 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 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

The core requirements and one of the options must be completed.

Core Requirements

College Integrative Courses

SCIL 101	Science and Decision-Making for a Complex World	3
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Career Experience

Select one of the following: 1

AGRO 295 / Internship
HORT 295 /
RNGE 295 /
SOIL 295

BIOS 395 Internship

HORT 395 Internship in Horticulture

NRES 497 Career Experiences in Natural Resource Sciences

Independent Study/Current Project

Select one of the following: 1

AGRO 496 / Independent Study
RNGE 496 /
SOIL 496

BIOS 498 Independent Research in Biological Sciences

HORT 396 Current Projects and Topics in Horticulture
or HORT 399 Independent Study

NRES 496 Independent Study

PLPT 496 Independent Study

AGRO 92 / HORT 92 / NRES 92	Plant Biology Portfolio and Assessment	0
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Credit Hours Subtotal: 5

Mathematical and Statistics (ACE 3)

MATH 106	Calculus I	5
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STAT 218	Introduction to Statistics	3
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Credit Hours Subtotal: 8

Communications

Written Communication (ACE 1)

Select one of the following: 3

ENGL 150 Writing and Inquiry

ENGL 151 Writing and Argument

ENGL 254 Writing and Communities

JGEN 120 Basic Business Communication

JGEN 200 Technical Communication I

JGEN 300 Technical Communication II

Oral Communication (ACE 2)

Select one of the following: 3

COMM 209 Public Speaking

COMM 286 Business and Professional Communication

Credit Hours Subtotal: 6

Natural Sciences

AGRO 153 / HORT 153 / SOIL 153	Soil Resources	4
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BIOC 401 & BIOC 401L	Elements of Biochemistry and Laboratory for Elements of Biochemistry	4
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CHEM 109A & CHEM 109L	General Chemistry I and General Chemistry I Laboratory	4
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CHEM 110A & CHEM 110L	General Chemistry II and General Chemistry II Laboratory	4
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CHEM 251 & CHEM 253	Organic Chemistry I and Organic Chemistry I Laboratory	4
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PHYS 141 or PHYS 151	Elementary General Physics I Elements of Physics	4-5
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Credit Hours Subtotal: 25

Biological Sciences

AGRO 215 / HORT 215 / TLMT 215 or BIOS 206	Genetics General Genetics	4
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AGRO 278 / HORT 278	Botany	4
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AGRO 325	Introductory Plant Physiology	4
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LIFE 120 & LIFE 120L	Fundamentals of Biology I and Fundamentals of Biology I laboratory	4
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LIFE 121 & LIFE 121L	Fundamentals of Biology II and Fundamentals of Biology II Laboratory	4
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NRES 220 & NRES 222 or BIOS 207	Principles of Ecology and Ecology Laboratory Ecology and Evolution	4
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Credit Hours Subtotal: 24

Economics, Humanities and Social Sciences

ECON 211 or ECON 212	Principles of Macroeconomics (ACE 6) Principles of Microeconomics	3
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Select one course each from ACE outcomes 5, 7, 8, and 9 12

Credit Hours Subtotal: 15

Option Requirements

Complete requirements 37-38

Credit Hours Subtotal: 37

Total Credit Hours 120

Ecology and Management Option

Within this option one course must be taken to fulfill the ACE 10 outcome. Suggested courses are:

ACE 10 Courses

AGRO 403 / HORT 403	Scientific Writing and Communication
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BIOS 454 / NRES 454	Ecological Interactions
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BIOS 457 / GEOL 457	Ecosystem Ecology
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NRES 438	Grassland Conservation: Planning and Management
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Required Courses

AGRO 245 / NRES 245	Introduction to Grassland Ecology and Management	3-4
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or NRES 310	Introduction to Forest Management
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AGRO 444 / GRAS 444 / NRES 444 / RNGE 444	Ecosystem Monitoring and Assessment	3
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Credit Hours Subtotal: 6-7

Earth Sciences

Water/Climate

Select one of the following: 3-4

METR 100	Weather and Climate	
NRES 208	Climate Literacy in Natural Resources	
NRES 408 / AGRO 408 / GEOG 408 / HORT 408 / METR 408 / WATS 408	Microclimate: The Biological Environment	
WATS 281 / GEOG 281 / NRES 281	Introduction to Water Science	

Geospatial Information Sciences

Select one of the following: 3-4

GEOG 412 / NRES 412	Introduction to Geographic Information Systems	
GEOG 418 / NRES 418	Introduction to Remote Sensing	
NRES 218	Introduction to Geospatial Technologies	

Credit Hours Subtotal: 6-8

Biology

Plant Identification

AGRO 442 / GRAS 442 / NRES 442 / RNGE 442	Wildland Plants	3
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Plant-Animal-Organismal Interactions

Select one of the following: 3-4

AGRO 340 / GRAS 340 / RNGE 340	Range Management and Improvement	
AGRO 460 / BIOS 460 / NRES 460 / SOIL 460	Soil Microbial Ecology	
BIOS 317	The Biology of Plants	
BIOS 368	Plants in Human Medicine: Biological, Social, and Ethical Dimensions	
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	

Credit Hours Subtotal: 6-7

Ecology and Management

Select two of the following: 7-8

AGRO 204	Resource-Efficient Crop Management	
AGRO 240 / RNGE 240	Forage Crop and Pasture Management	
AGRO 440 / GRAS 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 / BIOS 459 / WATS 459	Limnology	
NRES 468 / BIOS 458 / BSEN 458 / WATS 468	Wetlands	

Credit Hours Subtotal: 7-8

Electives

Select 7-13 credits 7-13

Credit Hours Subtotal: 7-13

Total Credit Hours 32-43

Biotechnology Option

Within this option one course must be taken to fulfill the ACE 10 outcome. Suggested courses are:

ACE 10 Courses

AGRO 403 / HORT 403	Scientific Writing and Communication	
BIOS 454 / NRES 454	Ecological Interactions	
BIOS 457 / GEOL 457	Ecosystem Ecology	

Required Courses

BIOS 312	Microbiology	3
BIOS 478 / AGRO 478 / HORT 478	Plant Anatomy	4

Select one of the following: 3-4

BIOC 442 / STAT 442	Computational Biology	
BIOS 337	Applications of Bioinformatics	
BIOS 427	Practical Bioinformatics Laboratory	

Select at least 3 hours from each of the three categories below for a total of 17 hours or more: 17

Biological Sciences

AGRO 270 / HORT 270 / NRES 270 / PLPT 270	Biological Invaders
AGRO 434 / BIOC 434 / BIOS 434 / CHEM 434	Plant Biochemistry
AGRO 460 / BIOS 460 / NRES 460 / SOIL 460	Soil Microbial Ecology
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 / MBIO 420	Molecular Genetics
BIOS 425	Plant Biotechnology
BIOS 471	Plant Systematics
or BIOS 429	Phylogenetic Biology
BIOS 477	Bioinformatics and Molecular Evolution
<i>Applied Plant Biology</i>	
AGRO 131 / HORT 131 & AGRO 132	Plant Science and Agronomic Plant Science Laboratory & AGRO 132
	or HORT 133 Horticultural Plant Science Laboratory
AGRO 408 / GEOG 408 / HORT 408 / METR 408 / NRES 408 / WATS 408	Microclimate: The Biological Environment
AGRO 411	Crop Genetic Engineering
AGRO 412	Crop and Weed Genetics
BIOS 368	Plants in Human Medicine: Biological, Social, and Ethical Dimensions
HORT 221	Plant Propagation
NRES 406 / HORT 406 / AGRO 406	Plant Ecophysiology: Theory and Practice
PLPT 369 / BIOS 369	Introductory Plant Pathology
<i>Plant and Food System Management</i>	
AGRO 204	Resource-Efficient Crop Management
AGRO 240 / RNGE 240	Forage Crop and Pasture Management
	or AGRO 227/Introductory Turfgrass Management
HORT 227 / TLMT 227	
AGRO 405	Crop Management Strategies (ACE 10)
	or AGRO 435 Agroecology
HORT 435 / NRES 435	

AGRO 426 / HORT 426 / NRES 426	Invasive Plants
AGRO 437	Animal, Food and Industrial Uses of Grain
AGRO 438	Producing Grain for Animal, Food and Industrial Uses
ENTO 115 / BIOS 115 & ENTO 116 / BIOS 116	Insect Biology and Insect Identification
FDST 205	Food Composition and Analysis
HORT 306	Greenhouse Practices and Management
HORT 352	Production and Physiology of Horticultural Crops
HORT 355	Perennial, Pot and Bedding Plant Production Laboratory
HORT 362	Nursery Crop Production
Credit Hours Subtotal:	27-28
Electives	
Select 10-11 credits	10-11
Credit Hours Subtotal:	10-11
Total Credit Hours	37-39

Additional Major Requirements

Grade Rules

C- and D Grades

A grade of C or better is required in all courses (except free electives) in the major or minor.

Pass/No Pass

Students in plant biology may not take any of the core or option courses required for the degree Pass/No Pass except for the Exploring Plant Biology and Career Experience courses.

Program Assessment. To gauge the effectiveness of this program, students will be required to start and maintain an experiential portfolio throughout their program and complete an assessment survey.

Requirements for Minor Offered by Department

Requirements for the minor include a minimum of 19 hours of coursework with a minimum of 7 hours at the 300 level or above.

Requirements

AGRO 278	Botany	4
AGRO 325	Introductory Plant Physiology	4
Select one of the following:		4
AGRO 131 / HORT 131 & AGRO 132	Plant Science and Agronomic Plant Science Laboratory & AGRO 132	
AGRO 131 / HORT 131 & HORT 133	Plant Science and Horticultural Plant Science Laboratory & HORT 133	
Credit Hours Subtotal:		12
Focus		
Select one focus from the following:		7-8

Biotechnology Focus

AGRO 215 / Genetics
 HORT 215 /
 TLMT 215

or BIOS 206 General Genetics

Select any 300- or 400-level course listed under the Plant
 Biology Major–Biotechnology Option

Ecology and Management Focus

NRES 220 Principles of Ecology
 NRES 222 Ecology Laboratory

Select any 300- or 400-level course listed under the Plant
 Biology Major–Ecology & Management Option

Credit Hours Subtotal: 7

Total Credit Hours 19

AGRO 100 Plants, Landscapes, & the Environment

Crosslisted with: HORT 100, TLMT 100

Description: Introduction to a diverse range of plant and landscape systems and management strategies for balancing economic and environmental sustainability. Foundational principles of plant biology, landscape ecology, and environmental science explored within the context of these systems.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: FALL/SPR

ACE: ACE 4 Science

AGRO 102 Internship and Career Preparation

Crosslisted with: HORT 102, TLMT 102

Description: Group and individual activities to help formulate career goals, improve academic success skills, identify beneficial co-curricular activities, and select appropriate internships.

Credit Hours: 1

Max credits per semester: 1

Max credits per degree: 1

Grading Option: Graded with Option

Offered: FALL

AGRO 107 Invasive Plant Species: Impacts on Ecosystems

Crosslisted with: NRES 107

Notes: Online only

Description: The flora of the earth is constantly being re-distributed by natural and human forces. As plant species change locations, they affect ecosystems, but how? In this course, students will learn how invasive plants establish and spread in ecosystems and develop an understanding of their impacts on ecosystems from local to global scales.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded

Offered: FALL/SPR

ACE: ACE 9 Global/Diversity

AGRO 127 Survey of Turfgrass and Landscape Management

Crosslisted with: TLMT 127, HORT 127

Description: Introduction to careers, internships and co-curricular activities in turfgrass and landscape management.

Credit Hours: 1

Max credits per semester: 1

Max credits per degree: 1

Grading Option: Graded with Option

AGRO 131 Plant Science

Crosslisted with: HORT 131

Description: The biology of plants grown for food, feed, fuel, fiber and fun! Starting with natural and managed ecosystems and their interactions, the course then introduces how plants obtain and manage water and nutrients before giving a big picture view of carbon assimilation, metabolism and storage in terms of plant productivity and growth in variable environments. The way plants respond to endogenous and applied growth regulators as well as genetic signals is described, before considering the role of genetics in plant pest interactions and management.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: FALL/SPR

Prerequisite for: AGRO 134, HORT 134, TLMT 134; AGRO 204; AGRO 227, HORT 227, TLMT 227; AGRO 228, HORT 228, TLMT 228; AGRO 240, RNGE 240, GRAS 240; AGRO 278, HORT 278; AGRO 325; BIOS 369, PLPT 369; ENTO 308; HORT 133; HORT 221; HORT 352; HORT 353; HORT 354; HORT 355; HORT 362; NRES 220; NRES 302, HORT 302; NRES 310; PGAM 229; PLPT 210

ACE: ACE 4 Science

AGRO 132 Agronomic Plant Science Laboratory

Prerequisites: AGRO 131 or parallel

Description: Growth, development, morphology and staging of annual and perennial monocot and dicot plants produced for grain, forage and grazing. Evaluation of seed, grain and forage quality for plants of agronomic importance.

Credit Hours: 1

Max credits per semester: 1

Max credits per degree: 1

Grading Option: Graded with Option

Prerequisite for: ENTO 308; HORT 306; HORT 307

AGRO 134 Plant Sciences Laboratory

Crosslisted with: HORT 134, TLMT 134

Prerequisites: Prior or concurrent enrollment in AGRO/HORT 131 required.

Notes: Open to all majors and minors, except Agronomy or Horticulture.

Description: An exploration of plant morphology, physiology, and maturation with an emphasis on environmental, biotic, and human interactions within production and landscape systems. Not open to Agronomy or Horticulture majors or minors.

Credit Hours: 1

Max credits per semester: 1

Max credits per degree: 1

Grading Option: Graded

Prerequisite for: ENTO 308; HORT 306; HORT 307

AGRO 153 Soil Resources**Crosslisted with:** HORT 153, SOIL 153**Description:** Investigation into the physical, chemical and biological properties of soils, in relation to their appropriate uses, protection, and vital roles or functions in broader plant-soil systems. Apply exercises such as discussion, evidence-based writing, assessment, planning, problem-solving, and presentations in relation to principles and practices involving all aspects of soils.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Grading Option:** Graded with Option**Offered:** FALL/SPR**Prerequisite for:** AGEN 431, AGRO 431, MSYM 431; AGRO 204; AGRO 269, SOIL 269; AGRO 327, HORT 327, TLMT 327; AGRO 361, GEOL 361, NRES 361, SOIL 361, WATS 361; AGRO 366, SOIL 366; AGRO 453, HORT 453, LARC 453, SOIL 453; AGRO 455, AGRO 855, NRES 455, NRES 855, SOIL 455; AGRO 472, AGRO 872, NRES 472, NRES 872, SOIL 472, WATS 472; LARC 487, NRES 487; MSYM 354, SOIL 354, WATS 354; NRES 245, AGRO 245; NRES 319**AGRO 204 Resource-Efficient Crop Management****Prerequisites:** AGRO 131 and AGRO/SOIL 153**Description:** The integration of crop and soil science, plant breeding, climatology and integrated pest management disciplines to develop and evaluate crop management strategies that make the most efficient use of natural resources such as solar radiation, water, and soil, as well as other external inputs utilized for field crop management.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**Prerequisite for:** AGEN 431, AGRO 431, MSYM 431; AGRO 395; AGRO 405**AGRO 215 Genetics****Crosslisted with:** HORT 215, TLMT 215**Prerequisites:** 3 hrs biological sciences.**Description:** Discovery of the biology of genes and the application of genetics principles to understand the control and inheritance of traits in families and populations. Focus is on animals and plants that are important in medicine, agriculture and nature. Learning emphasis is problem solving via online, instant feedback assessments, group discussion, experimental data analysis and context-based exams.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Grading Option:** Graded with Option**Prerequisite for:** ASCI 330; ASCI 486; PLPT 418, PLPT 818**AGRO 216 Plant Breeding Principles and Practice****Crosslisted with:** HORT 216**Prerequisites:** High school biology and chemistry. BIOS 101 and 101L or 102 or equivalent recommended.**Description:** Plant breeding theory and technique. Application of genetic principles to plant improvement. Experience with breeding agronomic and horticultural plant species to illustrate plant mating systems and breeding principles.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded with Option**AGRO 227 Introductory Turfgrass Management****Crosslisted with:** HORT 227, TLMT 227**Prerequisites:** AGRO/HORT 131 or AGRO 278 or either concurrently.**Description:** Introduction to turfgrasses, their management and use, and to the turfgrass industry.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL**Prerequisite for:** AGRO 327, HORT 327, TLMT 327; TLMT 395T**AGRO 228 Introduction to Landscape Management****Crosslisted with:** HORT 228, TLMT 228**Prerequisites:** AGRO/HORT 131 or AGRO/HORT 278 or either concurrently.**Description:** An overview of landscape systems for human intent. Includes seasonal and materials-specific BMPs for assessment, soil work, irrigation, plants and hardscapes, pests and diseases, using a combination of site visits, collaborations, and applied case studies.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL**Prerequisite for:** AGRO 470, HORT 470, TLMT 470; TLMT 395L**AGRO 229 Introductory Turfgrass Management Laboratory****Crosslisted with:** TLMT 229, HORT 229**Description:** Laboratory covering turfgrass identification and management.**Credit Hours:** 1**Max credits per semester:** 1**Max credits per degree:** 1**Grading Option:** Graded with Option**Offered:** FALL**AGRO 230 Technical Reporting in Plant and Landscape Systems****Crosslisted with:** HORT 230**Notes:** This course is intended for first or second year students.**Description:** Learn introductory data science skills necessary to collect, manage, and analyze data. Gain the necessary skills to interpret and effectively communicate information derived from data.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded**Offered:** FALL/SPR**AGRO 240 Forage Crop and Pasture Management****Crosslisted with:** RUGE 240, GRAS 240**Prerequisites:** AGRO/HORT 131 or BIOS 101 or LIFE 120**Description:** Principles basic to the establishment, management, and utilization of forage crops and pastures. Plant identification and selection, seeding, fertilization, irrigation, forage quality and utilization, hay and silage preservation, and grazing management. The role of forages and ranges in developing a sustainable agriculture.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL/SPR**Prerequisite for:** AGRO 340, RUGE 340, GRAS 340; AGRO 395; AGRO 445, AGRO 845, ASCI 451, ASCI 851, RUGE 445, GRAS 445

AGRO 242 North American Wildland Plants**Crosslisted with:** HORT 242, RNGE 242, GRAS 242**Prerequisites:** Permission.**Notes:** AGRO/RNGE 240 recommended.**Description:** Identification and description of two-hundred important wildland plants of North America. Characteristics of these plants evaluated in terms of management implications.**Credit Hours:** 1**Max credits per semester:** 1**Max credits per degree:** 4**Grading Option:** Graded with Option**Offered:** FALL/SPR**AGRO 245 Introduction to Grassland Ecology and Management****Crosslisted with:** NRES 245**Prerequisites:** AGRO 153**Description:** Grassland ecology and management is relevant to students with education and career goals in managing natural resources in Nebraska and the Great Plains. About 50% of the land area in Nebraska is classified as grassland (or rangeland) and is the land type with the most opportunity for enhancing biodiversity and wildlife habitat. Applying ecological principles and social values to managing rangeland resources, students will develop a knowledge and appreciation for the various grassland management uses and techniques available to resource managers.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Prerequisite for:** AGRO 340, RNGE 340, GRAS 340**AGRO 269 Principles of Soil Management****Crosslisted with:** SOIL 269**Prerequisites:** AGRO 153.**Description:** Current state-of-knowledge of soil and water management; impacts of water and wind erosion on soil productivity, and nutrient dynamics; soil management in response to the increased climate variability; improved management practices such as conservation tillage (i.e., no-till), cropping systems, cover crops, crop residue management, perennial systems, water management and irrigation; nutrient cycling; and soil quality and health.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL**Prerequisite for:** AGRO 395; AGRO 405**AGRO 270 Biological Invaders****Crosslisted with:** HORT 270, NRES 270, PLPT 270**Prerequisites:** 3 hrs biological sciences.**Description:** Impact of exotic species and invasive organisms: agricultural and medical emerging disease; predicting biological invasions; biological control; regulatory, monitoring, and control efforts; ecological impact.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**AGRO 275 Agribusiness Entrepreneurial Finance****Crosslisted with:** AECN 275, EAEP 275, ENTR 275, HORT 275**Description:** Overview of financial issues for agribusiness start-ups. Business funding specific to new enterprises. Case studies on financial practices for start-up firms.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**AGRO 278 Botany****Crosslisted with:** HORT 278**Prerequisites:** BIOS 101 or LIFE 120 or AGRO/HORT 131**Description:** Introduction to the plant kingdom and to plants as biological organisms; structure and function of cells, tissues, and organs with emphasis on seed plants; the important processes and concepts of life cycles, evolution, and physiology.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Grading Option:** Graded with Option**Offered:** SPRING**Prerequisite for:** AGRO 227, HORT 227, TLMT 227; AGRO 228, HORT 228, TLMT 228**AGRO 279 Soil Evaluation****Crosslisted with:** NRES 279, SOIL 279**Notes:** AGRO/HORT/SOIL 153 - Soil Resources recommended, but not required. This course includes an inter-collegiate Soil Judging contest that takes place in the North Central region of the United States during the course of the class, or a course-based undergraduate research experience.**Description:** Apply fundamental knowledge to the description of soils in the field. Application of techniques employed in writing descriptions of soil morphology and in classifying and interpreting soils.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded with Option**Offered:** FALL**Prerequisite for:** NRES 379, AGRO 379, SOIL 379**AGRO 295 Internship****Crosslisted with:** RNGE 295, SOIL 295, HORT 295**Prerequisites:** Sophomore standing and completion of an internship contract. The internship contract is subject to approval by the department. Internships completed without a signed contract may not qualify for credit.**Notes:** Pass/No Pass only; requires advanced permission before registering for the course.**Description:** Professional experience in a plant, landscape or soil interest area. Experience may be with a business, government agency, organization, or a university research, extension, or teaching program.**Credit Hours:** 1-3**Min credits per semester:** 1**Max credits per semester:** 3**Max credits per degree:** 6**Grading Option:** Pass No Pass**Offered:** FALL/SPR

AGRO 325 Introductory Plant Physiology**Prerequisites:** AGRO/HORT 131 or LIFE 120**Description:** Introduction to physiological and developmental processes in plants. Topics include plant-water relations, photosynthesis, carbon metabolism and source-sink translocation, light responses, hormonal regulation during growth, development and environmental stresses such as drought, heat, salinity, flooding stress among others. Emphasizes the development of a broader knowledge of how crops respond to abiotic factors associated with changing climate through conceptual integration of physiological and molecular processes. Science communication skills and teamwork experience are developed through oral presentations and poster sessions.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Grading Option:** Graded with Option**Offered:** SPRING**Prerequisite for:** AGRO 441, AGRO 841, HORT 441, HORT 841, RNGE 441, GRAS 441**AGRO 326 Landscape Solutions****Crosslisted with:** HORT 326, TLMT 326**Description:** Using processes and problem-solving approach to identify and analyze common landscape management situations in commercial, public, and residential landscapes. Integrate design, environment, function, pest and disease, and existing management practices to produce recommendations.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**AGRO 327 Turfgrass Science and Management****Crosslisted with:** HORT 327, TLMT 327**Prerequisites:** AGRO/HORT/SOIL 153; CHEM 105 or CHEM 105A and 105L or CHEM 109 or CHEM 109A and 109L; and TLMT 227**Description:** Scientific principles of turf species adaptation, turf and/or soil relationships, establishment, fertility, mowing, irrigation, and pest control of turf species.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**AGRO 330 Pruning Ornamentals****Crosslisted with:** HORT 330, TLMT 330**Description:** Why, when and how to prune ornamental landscape plants. Demonstrations and field opportunities on how to choose and how to use pruning tools correctly.**Credit Hours:** 1**Max credits per semester:** 1**Max credits per degree:** 1**Grading Option:** Graded with Option**AGRO 340 Range Management and Improvement****Crosslisted with:** RNGE 340, GRAS 340**Prerequisites:** AGRO 240 or NRES 245**Description:** The principles of range management within the ecosystem framework. Range improvement practices and grazing systems; plant control using biological, chemical and mechanical factors; prescribed burning; range seeding; range fertilization; and the integration of range with other forage resources.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**Prerequisite for:** AGRO 445, AGRO 845, ASCI 451, ASCI 851, RNGE 445, GRAS 445**AGRO 361 Soils, Environment and Water Quality****Crosslisted with:** GEOL 361, NRES 361, SOIL 361, WATS 361**Prerequisites:** AGRO/HORT/SOIL 153; MATH 102 or 103; two semesters chemistry (CHEM 105 or CHEM 105A and 105L, CHEM 106 or CHEM 106A and 106L, CHEM 109 or CHEM 109A and 109L, CHEM 110 or CHEM 110A and 110L) and WATS/GEOG/NRES 281**Description:** Chemical and physical processes that influence the fate and transport of contaminants (inorganic, organic, microbial) in soil-water environments. Extent, fate, mitigation and impact of various sources of pollution. Remedial technologies used for environmental restoration of contaminated environments.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Prerequisite for:** AGRO 458, AGRO 858, NRES 458, NRES 858, SOIL 458**AGRO 366 Soil Nutrient Relationships****Crosslisted with:** SOIL 366**Prerequisites:** AGRO 153.**Description:** Explores nutrient behaviors in soil and factors affecting nutrient management. Students work on developing fertilizer plans for complex plant production systems that follow the right place, right amount, right source, right time philosophy and ensure production of healthy and nutritious plants, improve profits and enterprise sustainability, fulfill legal requirements, and protect soil and water quality.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Grading Option:** Graded with Option**Offered:** SPRING**Prerequisite for:** AGRO 405**AGRO 375 Innovations for Agriculture****Crosslisted with:** HORT 375, AGRI 375, EAEP 375, TLMT 375**Prerequisites:** Junior or Senior class standing.**Description:** Explore sustainability challenges in plant and animal agricultural systems, assess current solutions, and identify opportunities for innovation. Research, develop, prototype, test, and pitch an innovative product, service, or technology for agriculture.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded**Offered:** FALL

AGRO 379 Advanced Soil Evaluation**Crosslisted with:** NRES 379, SOIL 379**Prerequisites:** AGRO/NRES/SOIL 279**Notes:** This course includes a national- or regional-level inter-collegiate Soil Judging contest that takes place during the course of the class.**Description:** Apply fundamental knowledge and improve field techniques to the description and interpretation of soils in the field. Application of techniques employed in writing descriptions of soil morphology and in classifying and interpreting soils.**Credit Hours:** 1**Max credits per semester:** 1**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL/SPR**AGRO 388 Business Systems in Entrepreneurship****Crosslisted with:** HORT 388, ENTR 388, EAEP 388, ABUS 388**Description:** Introductory models for a startup business. Ideation, customer segments, value proposition, minimal viable product and market fit.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL/SPR**Prerequisite for:** HORT 301**AGRO 395 Internship in Agronomy****Prerequisites:** Junior standing; AGRO 204 or 240 or 269; and completion of an internship contract. Internships completed without a signed contract not may qualify for credit.**Notes:** Pass/No Pass only; requires advanced permission before registering for the course.**Description:** Advanced internship in an agronomic enterprise. Must be a business, government agency, organization or university research, teaching, or extension program in which the student does not have previous internship credit.**Credit Hours:** 1-3**Min credits per semester:** 1**Max credits per semester:** 3**Max credits per degree:** 6**Grading Option:** Pass No Pass**Offered:** FALL/SPR**AGRO 403 Scientific Writing and Communication****Crosslisted with:** AGRO 803, HORT 403, HORT 803**Prerequisites:** Senior standing or higher, an ACE 1 written communication course, an ACE 2 oral communication course, and permission of instructor.**Description:** Reading and critiquing, writing, and presenting scientific information. Use research data to compose a manuscript in standard scientific format, and prepare and present a poster to a general audience. Ethical issues in research and writing.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded**ACE:** ACE 10 Integrated Product**AGRO 405 Crop Management Strategies****Prerequisites:** Senior standing; AGRO 204, AGRO/SOIL 269 or SOIL 366; and permission.**Notes:** JGEN 200 and/or JGEN 300, and AECN 201 recommended; a pre-semester trip is required.**Description:** Application, expansion, and integration of principles from agricultural, economic and social sciences into systems-level the development and management of cropping systems.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL**ACE:** ACE 10 Integrated Product**AGRO 406 Plant Ecophysiology: Theory and Practice****Crosslisted with:** AGRO 806, HORT 406, HORT 806, NRES 406, NRES 806**Prerequisites:** Junior standing; 4 hrs ecology; and 4 hrs botany or plant physiology.**Description:** Principles of plant physiology which underlie the relationship between plants and their physical, chemical and biotic environments. An introduction to the ecological niche, limiting factors and adaptation. An overview of the seed germination and ecology, plant and soil water relations, nutrients, plant energy budgets, photosynthesis, carbon balance and plant-animal interactions. An introduction to various field equipment used in ecophysiological studies.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Grading Option:** Graded with Option**AGRO 408 Microclimate: The Biological Environment****Crosslisted with:** GEOG 408, HORT 408, METR 408, NRES 408, WATS 408, AGRO 808, GEOG 808, HORT 808, METR 808, NRES 808**Prerequisites:** Junior standing, MATH 106 or equivalent, 5 hrs physics, major in any of the physical or biological sciences or engineering.**Description:** Physical factors that create the biological environment. Radiation and energy balances of earth's surfaces, terrestrial and marine. Temperature, humidity, and wind regimes near the surface. Control of the physical environment through irrigation, windbreaks, frost protection, manipulation of light, and radiation. Applications to air pollution research. Instruments for measuring environmental conditions and remote sensing of the environment.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Prerequisite for:** AGRO 907, HORT 907, METR 907, NRES 907; BSEN 954, NRES 954

AGRO 409A Case studies in plant breeding: Breeding for Disease Resistance**Crosslisted with:** AGRO 809A, HORT 409A, HORT 809A**Notes:** A previous class in genetics is highly recommended.**Description:** The application of fundamental genetics principles in inheritance, gene mapping and DNA analysis to decision making by plant breeders with the goal of improving disease resistance in crop cultivars. Learning is structured by the genetics discovery story told in published research articles and the thinking process of plant breeders who will use these discoveries in their work.**Credit Hours:** 1**Max credits per semester:** 1**Max credits per degree:** 1**Grading Option:** Graded with Option**Offered:** FALL/SPR**AGRO 409B Case Studies in plant breeding: Transgenic strategies for disease resistance****Crosslisted with:** AGRO 809B, HORT 409B, HORT 809B**Description:** The application of basic science and technology by plant genetic engineering experts with the goal of teaming with plant breeders to improve disease resistance in crop cultivars. Learning is structured by the genetics discovery story told in published research articles and the thinking process of genetic engineers and plant breeders who will use these discoveries in their work.**Credit Hours:** 1**Max credits per semester:** 1**Max credits per degree:** 1**Grading Option:** Graded with Option**Offered:** FALL/SPR**AGRO 411 Crop Genetic Engineering****Crosslisted with:** AGRO 811**Notes:** A previous class in genetics is highly recommended.**Description:** Basic steps required to produce genetically engineered crops, genetic engineering procedures used to develop current crops and innovations that will lead to future products, genetic engineering process and predicting how changes in different steps of the process influence the final crop, and application of genetic engineering technology to plan the development of new genetically engineered crops.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded with Option**Offered:** FALL**AGRO 412 Crop and Weed Genetics****Crosslisted with:** AGRO 812**Notes:** A previous class in Genetics is highly recommended.**Description:** Application of classical and molecular genetic principles to the explanation of variation observed in plant families and populations. Interpretation of information gathered from whole plant trait observation and from molecular analysis. Relationships between crops and weeds. Examples from genetic studies on both crop and weed species are the basis of course.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded with Option**Offered:** SPRING**AGRO 414 Turfgrass Disease Management****Crosslisted with:** AGRO 814, HORT 414, HORT 814, PLPT 414, PLPT 814, TLMT 414, TLMT 814**Prerequisites:** BIOS/PLPT 369 or one semester of introductory plant pathology.**Description:** Pathogens, epidemiology, and control of diseases specific to turfgrass.**Credit Hours:** 1**Max credits per semester:** 1**Max credits per degree:** 1**Grading Option:** Graded with Option**AGRO 419 Applications of Remote Sensing in Agriculture and Natural Resources****Crosslisted with:** GEOG 419, GEOL 419, NRES 420, AGRO 819, GEOG 819, GEOL 819, NRES 820**Notes:** GEOG 418/NRES 418 recommended**Description:** Introduction to the practical uses of remote electromagnetic sensing in dealing with agricultural and water-resources issues.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Grading Option:** Graded with Option**AGRO 420 Bioinformatics Applications in Agriculture****Crosslisted with:** AGRO 820**Prerequisites:** AGRO 215 Genetics or equivalent. Undergraduate students must be at the senior class level standing.**Description:** Introduction to applied computational methods to analyze biological data, efficiently manipulate large data sets, and automate workflows. Learn strategies for assembling and analyzing data generated by modern high throughput sequencing platforms.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL**AGRO 425 Cover Crops in Agroecosystems****Crosslisted with:** AGRO 825**Prerequisites:** AGRO/HORT 131 or AGRO/HORT 278 ; AGRO/HORT/SOIL 153 (or equivalent)**Description:** Explore the management, environmental, economic, and social considerations of cover crops across a diversity of agricultural production systems and regions. Grow cover crops, measure benefits and tradeoffs, and apply knowledge to make management and policy recommendations.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded**Offered:** FALL

AGRO 426 Invasive Plants**Crosslisted with:** AGRO 826, HORT 426, HORT 826, NRES 426, NRES 826**Prerequisites:** AGRO/HORT/SOIL 153; AGRO/HORT 131**Description:** Identification, biology and ecology of weedy and invasive plants. Principles of invasive plant management by preventative, cultural, biological, mechanical and chemical means using an adaptive management framework. Herbicide terminology and classification, plant-herbicide and soil-herbicide interactions, equipment calibration and dosage calculations.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**AGRO 427 Turfgrass Systems Management****Crosslisted with:** HORT 427, TLMT 427, AGRO 827, HORT 827, TLMT 827**Prerequisites:** TLMT 227 and TLMT 327**Description:** Critical evaluation of turfgrass settings to create economical and environmentally friendly management systems for professionally managed turf areas.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**ACE:** ACE 10 Integrated Product**AGRO 429 Plant Biotechnology Applications****Crosslisted with:** AGRO 829**Prerequisites:** Faculty Permission**Description:** Application of plant biotechnology to answer biological questions. Development of writing and thinking skills with a working knowledge of plant biology and biotechnology. Learning in a lab focused setting to solidify skills used in molecular biology, biochemistry, cell biology, and computational biology.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded**Offered:** SPRING**AGRO 429A Food Security: A Global Perspective****Crosslisted with:** ANTH 429A, ANTH 829A, AGRO 829A, HORT 429A,

HORT 829A, NRES 429A, NRES 829A, NUTR 429A, NUTR 829A

Prerequisites: Junior standing**Description:** Overview of the technical and sociocultural dimensions of global food insecurity.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**AGRO 431 Site-specific Crop Management****Crosslisted with:** AGEN 431, MSYM 431**Prerequisites:** Senior standing; AGRO/SOIL 153; AGRO 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**AGRO 434 Plant Biochemistry****Crosslisted with:** BIOC 434, BIOS 434, CHEM 434, AGRO 834, BIOC 834, BIOS 834, CHEM 834**Prerequisites:** BIOC/BIOS/CHEM 431/831.**Description:** Biochemical metabolism unique to plants. Relationships of topics previously acquired in general biochemistry to biochemical processes unique to plants. Biochemical mechanisms behind physiological processes discussed in plant or crop physiology.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**AGRO 435 Agroecology****Crosslisted with:** AGRO 835, HORT 435, NRES 435, NRES 835**Prerequisites:** For AGRO/HORT/NRES 435: Senior standing. For AGRO/NRES 835: 12 hrs biological or agricultural sciences.**Description:** Integration of principles of ecology, plant and animal sciences, crop protection, and rural landscape planning and management for sustainable agriculture. Includes natural and cultivated ecosystems, population and community ecology, nutrient cycling, pest management, hydrologic cycles, cropping and grazing systems, landscape ecology, biodiversity, and socioeconomic evaluation of systems.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**ACE:** ACE 10 Integrated Product**AGRO 436 Agroecosystems Analysis****Crosslisted with:** AGRO 836, HORT 436, HORT 836**Prerequisites:** Senior standing.**Notes:** Cost of travel required. Summer travel course with multi-state faculty. Farm visits to Iowa, Minnesota and Nebraska.**Description:** Analysis of production, economics, environmental impacts, and social integration aspects of farms and farming systems**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**AGRO 437 Animal, Food and Industrial Uses of Grain****Crosslisted with:** AGRO 837**Prerequisites:** CHEM 105 or CHEM 105A and CHEM 105L or CHEM 109 or CHEM 109A and 109L, and one of the following: AGRO 204 or ASCI 250.**Description:** Identification and comparison of grain quality characteristics desired by livestock feeders, human food processors and industrial users, and methods used to measure these characteristics.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded with Option

AGRO 438 Producing Grain for Animal, Food and Industrial Uses**Crosslisted with:** AGRO 838**Prerequisites:** CHEM 109 or CHEM 109A and 109L and one of the following: AGRO 204 or ASCI 250.**Notes:** AGRO 215 and 437/837 recommended.**Description:** Genetic development, production practices, and grain handling and storage procedures to deliver quality grain to livestock feeders, human food processors and industrial uses.**Credit Hours:** 1**Max credits per semester:** 1**Max credits per degree:** 1**Grading Option:** Graded with Option**AGRO 439 Organic Farming and Food Systems****Crosslisted with:** AGRO 839, HORT 439, HORT 839**Prerequisites:** 12 credits of agricultural or biological science, economics, or natural resources**Description:** History of organic farming and horticultural systems, organic certification, nutrient and pest management in organic systems, planning organic enterprises including production and marketing, resilience of organic systems in ecological, economic, and social terms; future issues and potentials of organic food systems.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**AGRO 440 Great Plains Ecosystem****Crosslisted with:** AGRO 840, NRES 840, RNGE 440, NRES 440, GRAS 440**Prerequisites:** Junior standing.**Description:** Characteristics of Great Plains ecosystems, interrelationships of ecological factors and processes, and their application in the management of grasslands. Interactions of fire, vegetation, grazing animals and wildlife.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**AGRO 441 Perennial Plant Function, Growth, and Development****Crosslisted with:** AGRO 841, HORT 441, HORT 841, RNGE 441, GRAS 441**Prerequisites:** AGRO 325 or equivalent.**Description:** Principles of crop physiology and developmental morphology in relation to function, growth, development, and survival of perennial forage, range, and turf plants. The relationship of physiology and morphological development on plant use and management.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**AGRO 442 Wildland Plants****Crosslisted with:** AGRO 842, NRES 842, RNGE 442, NRES 442, GRAS 442**Prerequisites:** Junior standing.**Notes:** AGRO/HORT 131 or LIFE 121 and 121L or equivalent recommended**Description:** Wildland plants that are important to grassland and shrubland ecosystem management and production. Distribution, utilization, classification, identification (including identification by vegetative parts), uses by Native Americans, and recognition of grasses, forbs, shrubs, exotic and wetland plants.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL**AGRO 444 Ecosystem Monitoring and Assessment****Crosslisted with:** AGRO 844, NRES 844, RNGE 444, NRES 444, GRAS 444**Prerequisites:** Junior standing.**Notes:** NRES 220 or equivalent, recommended.**Description:** Measurement and monitoring of the important vegetation and environmental factors used to develop management guidelines in grasslands, savannas, woodlands, and wetlands. Emphasis on using ecosystem monitoring protocols for assessment of wildlife habitat, fuels management for wild-land fire, livestock production, and watershed function. Requires field sampling and travel to local field sites.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL**AGRO 445 Livestock Management on Range and Pasture****Crosslisted with:** AGRO 845, ASCI 451, ASCI 851, RNGE 445, GRAS 445**Prerequisites:** ASCI 250 and AGRO 240 or 340; AECN 201 recommended.**Notes:** AECN 201 recommended. Capstone course. All students required to participate in a one-week field trip in central or western Nebraska prior to beginning of fall semester. Therefore, students must notify instructor at time of early registration (Dates are given in class schedule.)**Description:** Analyzing the plant and animal resources and economic aspects of pasturage. Management of pasture and range for continued high production emphasized.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL**ACE:** ACE 10 Integrated Product**AGRO 450 Climate and Society****Crosslisted with:** GEOG 450, METR 450, NRES 452, AGRO 850, GEOG 850, METR 850, NRES 852**Prerequisites:** Junior standing or above.**Notes:** Offered spring semester of even-numbered calendar years.**Description:** Impact of climate and extreme climatic events on society and societal responses to those events. Global in scope and interdisciplinary.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING

AGRO 452 Irrigation Systems Management**Crosslisted with:** MSYM 452, MSYM 852, WATS 452**Prerequisites:** MSYM 109 or PHYS 141 or PHYS 151 or PHYS 211**Notes:** AGRO/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, MSYM 854; AGEN 955, AGRO 955, CIVE 955, GEOL 985; MSYM 855**AGRO 453 Urban Soil Properties and Management****Crosslisted with:** HORT 453, LARC 453, SOIL 453**Prerequisites:** AGRO/HORT/SOIL 153.**Description:** Characteristics of soils in urban settings. Evaluation of soils intended for intensive human uses and strategies for their use. Identification of specific issues related to urban soils. Manipulation or remediation of soils subject to construction and other stresses.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**AGRO 455 Soil Chemistry and Mineralogy****Crosslisted with:** AGRO 855, NRES 455, NRES 855, SOIL 455**Prerequisites:** AGRO/HORT/SOIL 153 or GEOL 101; CHEM 109A/L and 110A/L; CHEM 221 or 251.**Description:** Chemical and mineralogical properties of soil components. Inorganic colloidal fraction. Structures of soil minerals as a means of understanding properties, such as ion exchange and equilibria; release and supply of nutrient and toxic materials; and soil acidity and alkalinity. Forms and functions of organic matter in soil.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**AGRO 458 Soil Physical Determinations****Crosslisted with:** AGRO 858, NRES 458, NRES 858, SOIL 458**Prerequisites:** SOIL/AGRO/GEOL/WATS 361; PHYS 141 or equivalent; MATH 102 or 103.**Description:** Survey of measurement techniques and principles used in characterizing the physical properties of soils. Includes analysis of experimental design and sources of experimental error. Techniques include: particle size analysis, soil water content, pore size analysis, field sampling techniques, soil strength, and saturated hydraulic conductivity.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded with Option**AGRO 460 Soil Microbial Ecology****Crosslisted with:** BIOS 460, NRES 460, SOIL 460, AGRO 860, BIOS 860, NRES 860**Prerequisites:** Senior standing.**Notes:** Recommend having a strong science background, including courses from the agronomic, environmental, microbiology, engineering or medicine disciplines.**Description:** Soil from a microbe's perspective-growth, activity and survival strategies; principles governing methods to study microorganisms and biochemical processes in soil; mechanisms controlling organic matter cycling and stabilization with reference to C, N, S, and P; microbial interactions with plants and animals; and agronomic and environmental applications of soil microorganisms.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**AGRO 461 Soil Physics****Crosslisted with:** GEOL 461, NRES 461, SOIL 461, WATS 461, AGRO 861, GEOL 861, NRES 861**Prerequisites:** AGRO/SOIL 153; PHYS 141 or equivalent, one semester of calculus.**Description:** Principles of soil physics. Movement of water, air, heat, and solutes in soils. Water retention and movement, including infiltration and field water regime. Movement of chemicals in soils.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Prerequisite for:** AGEN 955, AGRO 955, CIVE 955, GEOL 985**AGRO 462 Cannabis Growth, Production and Breeding Basics****Crosslisted with:** HORT 462, AGRO 862, HORT 862**Prerequisites:** AGRO/HORT 131 or LIFE 121; AGRO 215 or BIOS 206**Notes:** HORT 221 recommended**Description:** History, breeding and production of cannabis for medicinal marijuana and hemp for fiber use when grown using a growth room, greenhouse, high tunnel and/or field. Clarification between scientific evidence and casual information.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded**Offered:** FALL/SPR**AGRO 469 Bio-Atmospheric Instrumentation****Crosslisted with:** GEOG 469, HORT 407, METR 469, MSYM 469, NRES 469, AGRO 869, GEOG 869, HORT 807, METR 869, MSYM 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

AGRO 470 Critical Thinking in Landscape Management**Crosslisted with:** HORT 470, TLMT 470**Prerequisites:** HORT 228, TLMT 228**Description:** Use processes and strategies to develop complete landscape management plans for public and/or private clients. Use data to evaluate and compare issues; make practical, science-based recommendations; and prepare cost estimates. Develop and present a complete landscape management plan for a public client.**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**AGRO 472 Applied Soil Physics****Crosslisted with:** AGRO 872, NRES 472, NRES 872, SOIL 472, WATS 472**Prerequisites:** AGRO/HORT/SOIL 153; MATH 102 or MATH 104 or MATH 106.**Description:** Emphasis on applied soil physics. Discussion of theoretical principles followed by field and laboratory exercises and applications. Fluxes of water, solutes, air, and heat through the soil. Emphasis on water infiltration, water retention, other soil hydraulic properties. Components of soil water balance. Management of soil water.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL**AGRO 475 Water Quality Strategy****Crosslisted with:** NRES 475, NRES 875, SOCI 475, SOCI 875, SOIL 475, WATS 475, AGRO 875, CIVE 475, CIVE 875, CRPL 475, CRPL 875, GEOL 475, GEOL 875, MSYM 475, MSYM 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**AGRO 477 Great Plains Field Pedology****Crosslisted with:** GEOG 467, NRES 477, SOIL 477, GEOG 867, NRES 877**Prerequisites:** AGRO/SOIL 153.**Description:** Spatial relationship of soil properties on various parts of landscape typical of the Plains, causal factors, and predictions of such relationships on other landscapes. Grouping these properties into classes, naming the classes, and the taxonomy that results from this grouping. Application of a taxonomy to a real situation through making a field soil survey in a region representative of the Plains border, predicting land use response of various mapped units as it affects the ecosystem, and evaluating the effectiveness of the taxonomic system used in the region surveyed.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Grading Option:** Graded with Option**AGRO 478 Plant Anatomy****Crosslisted with:** BIOS 478, BIOS 878, AGRO 878, HORT 478, HORT 878**Prerequisites:** 8 hrs biological sciences**Notes:** BIOS 109 recommended.**Description:** Development, structure, and function of tissues and organs of the higher plants. Relationships of structure to physiology and ecology of plants.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Grading Option:** Graded with Option**Prerequisite for:** BIOS 879**AGRO 480 Modified Root Zones****Crosslisted with:** HORT 480, TLMT 480, TLMT 880, AGRO 880, HORT 880**Prerequisites:** SOIL 153**Notes:** Recommend CHEM 105A/105L or 109A/109L, AGRO/HORT 131, TLMT 227, and AGRO/HORT 453 or AGRO 472**Description:** Modified root zones and their applications in the turfgrass and landscape management industry. Correct applications and construction techniques.**Credit Hours:** 1**Max credits per semester:** 1**Max credits per degree:** 1**Grading Option:** Graded with Option**Offered:** SPRING**AGRO 484 Water Resources Seminar****Crosslisted with:** GEOG 484, GEOL 484, NRES 484, WATS 484, NRES 884, AGRO 884, GEOG 884, GEOL 884, WATS 884**Prerequisites:** Junior or above standing**Description:** Seminar on current water resources research and issues in Nebraska and the region.**Credit Hours:** 1**Max credits per semester:** 1**Max credits per degree:** 1**Grading Option:** Graded with Option**AGRO 488 Entrepreneurship and Enterprise Development****Crosslisted with:** HORT 488, HORT 888, EAEP 488, ENTR 488, EAEP 888, AGRO 888, ENTR 888, ABUS 488**Description:** The process of starting your own enterprise. Competitive environment, risk management, finance for business startups, funding, and business plan writing.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL/SPR**ACE:** ACE 10 Integrated Product

AGRO 489 Urbanization of Rural Landscapes

Crosslisted with: AGRO 889, CRPL 489, HORT 489, HORT 889, CRPL 889

Prerequisites: Senior standing or graduate standing.

Description: Development converts rural landscapes into housing, roads, malls, parks, and commercial uses. This process fragments landscapes and changes ecosystem functions, drives up land prices, and pushes agriculture into more marginal areas. This multi-disciplinary, experiential course guides students in learning about the urbanization process, the impacts on landscapes, people, and the community, and the choices that are available to informed citizens.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

AGRO 495 Grasslands Seminar

Crosslisted with: ENTO 495, GRAS 495, HORT 495, NRES 495, RNGE 495, SOIL 495

Prerequisites: Junior standing.

Description: Topic varies and deals with different aspects of forage and/or range and/or livestock, turf and/or landscape grasses, natural habitats, and wetlands.

Credit Hours: 1-2

Min credits per semester: 1

Max credits per semester: 2

Max credits per degree: 4

Grading Option: Graded with Option

AGRO 496 Independent Study

Crosslisted with: AGRO 896, RNGE 496, SOIL 496

Credit Hours: 1-6

Min credits per semester: 1

Max credits per semester: 6

Max credits per degree: 12

Grading Option: Graded with Option

AGRO 498 Senior Project

Crosslisted with: SOIL 498

Prerequisites: Senior standing.

Notes: A two-semester sequence. Students should select one credit hour the first semester and three credits the second semester. The first semester will be used for planning, topic selection, and identifying a project adviser. The second semester will be used to carry out the research project, prepare a written report, and possibly an oral presentation.

Description: Carry out and report on a research project.

Credit Hours: 1-3

Min credits per semester: 1

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

AGRO 499H Honors Thesis

Crosslisted with: RNGE 499H, SOIL 499H

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

HORT 100 Plants, Landscapes, & the Environment

Crosslisted with: AGRO 100, TLMT 100

Description: Introduction to a diverse range of plant and landscape systems and management strategies for balancing economic and environmental sustainability. Foundational principles of plant biology, landscape ecology, and environmental science explored within the context of these systems.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: FALL/SPR

ACE: ACE 4 Science

HORT 102 Internship and Career Preparation

Crosslisted with: AGRO 102, TLMT 102

Description: Group and individual activities to help formulate career goals, improve academic success skills, identify beneficial co-curricular activities, and select appropriate internships.

Credit Hours: 1

Max credits per semester: 1

Max credits per degree: 1

Grading Option: Graded with Option

Offered: FALL

HORT 127 Survey of Turfgrass and Landscape Management

Crosslisted with: TLMT 127, AGRO 127

Description: Introduction to careers, internships and co-curricular activities in turfgrass and landscape management.

Credit Hours: 1

Max credits per semester: 1

Max credits per degree: 1

Grading Option: Graded with Option

HORT 131 Plant Science

Crosslisted with: AGRO 131

Description: The biology of plants grown for food, feed, fuel, fiber and fun! Starting with natural and managed ecosystems and their interactions, the course then introduces how plants obtain and manage water and nutrients before giving a big picture view of carbon assimilation, metabolism and storage in terms of plant productivity and growth in variable environments. The way plants respond to endogenous and applied growth regulators as well as genetic signals is described, before considering the role of genetics in plant pest interactions and management.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: FALL/SPR

Prerequisite for: AGRO 134, HORT 134, TLMT 134; AGRO 204; AGRO 227, HORT 227, TLMT 227; AGRO 228, HORT 228, TLMT 228; AGRO 240, RNGE 240, GRAS 240; AGRO 278, HORT 278; AGRO 325; BIOS 369, PLPT 369; ENTO 308; HORT 133; HORT 221; HORT 352; HORT 353; HORT 354; HORT 355; HORT 362; NRES 220; NRES 302, HORT 302; NRES 310; PGAM 229; PLPT 210

ACE: ACE 4 Science

HORT 133 Horticultural Plant Science Laboratory**Prerequisites:** AGRO 131 or parallel**Description:** Horticulture plant morphology, physiology, cell anatomy and plant growth are explored through application of practices used in industry. Emphasis on intensive production systems appropriate to specialty and greenhouse grown horticultural plants**Credit Hours:** 1**Max credits per semester:** 1**Max credits per degree:** 1**Grading Option:** Graded with Option**Offered:** FALL/SPR**Prerequisite for:** HORT 306; HORT 307**HORT 134 Plant Sciences Laboratory****Crosslisted with:** AGRO 134, TLMT 134**Prerequisites:** Prior or concurrent enrollment in AGRO/HORT 131 required**Notes:** Open to all majors and minors, except Agronomy or Horticulture.**Description:** An exploration of plant morphology, physiology, and maturation with an emphasis on environmental, biotic, and human interactions within production and landscape systems. Not open to Agronomy or Horticulture majors or minors.**Credit Hours:** 1**Max credits per semester:** 1**Max credits per degree:** 1**Grading Option:** Graded**Prerequisite for:** ENTO 308; HORT 306; HORT 307**HORT 153 Soil Resources****Crosslisted with:** AGRO 153, SOIL 153**Description:** Investigation into the physical, chemical and biological properties of soils, in relation to their appropriate uses, protection, and vital roles or functions in broader plant-soil systems. Apply exercises such as discussion, evidence-based writing, assessment, planning, problem-solving, and presentations in relation to principles and practices involving all aspects of soils.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Grading Option:** Graded with Option**Offered:** FALL/SPR**Prerequisite for:** AGEN 431, AGRO 431, MSYM 431; AGRO 204; AGRO 269, SOIL 269; AGRO 327, HORT 327, TLMT 327; AGRO 361, GEOL 361, NRES 361, SOIL 361, WATS 361; AGRO 366, SOIL 366; AGRO 453, HORT 453, LARC 453, SOIL 453; AGRO 455, AGRO 855, NRES 455, NRES 855, SOIL 455; AGRO 472, AGRO 872, NRES 472, NRES 872, SOIL 472, WATS 472; LARC 487, NRES 487; MSYM 354, SOIL 354, WATS 354; NRES 245, AGRO 245; NRES 319**HORT 170 Residential Landscape Design****Description:** Introductory course in home landscaping focusing on basic design elements and processes. Students prepare a program, analyze a dwelling and site, determine a phased budget, conceptualize a layout, and select detailed elements and techniques to implement a design for an actual residence.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded with Option**HORT 200 Landscape and Environmental Appreciation****Crosslisted with:** GEOG 200, LARC 200**Description:** Values and processes in human landscapes and natural environments. Concepts and tools to understand the context of local and global environments and significant historical landscapes. Landscape as an indicator of aesthetic quality, design principles and processes as integrators of humans and nature, and the garden as a model for creating sustainable landscapes.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**ACE:** ACE 7 Arts ACE 9 Global/Diversity**HORT 201 Dendrology: Study and Identification of Trees and Shrubs****Crosslisted with:** NRES 201, LARC 201**Description:** An introduction to the naming, identification, and natural history of woody trees and shrubs in North American with emphasis on trees common to Nebraska. Covers morphology, natural site conditions, wildlife and human uses of woody trees and shrubs.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL**HORT 212 Woody Plants for Landscapes: Identification, Management, and Use****Crosslisted with:** NRES 212, LARC 212**Description:** Identification, basic management and design uses of trees and shrubs for sustainable landscapes, with an emphasis on native plants and plants adapted to the Plains states. Emphasis is on live specimens in outdoor environments, supported by online resources.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL**HORT 213 Cultivars and Varieties of Woody Plants for Landscapes****Crosslisted with:** NRES 213, LARC 213**Description:** Characteristics of commercially available trees and shrubs used in urban landscapes. Compares differences among cultivars, design uses, and management issues using a combination of live specimens in outdoor environments and online resources.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**HORT 214 Herbaceous Landscape Plants****Crosslisted with:** NRES 214**Description:** Identification of herbaceous plants with ornamental value in the landscape including native and introduced annuals, perennials, grasses and cultivars. Typical ecological associations, environmental tolerances and/or intolerance, cultural requirements, and design characteristics.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option

HORT 215 Genetics

Crosslisted with: AGRO 215, TLMT 215

Prerequisites: 3 hrs biological sciences

Description: Discovery of the biology of genes and the application of genetics principles to understand the control and inheritance of traits in families and populations. Focus is on animals and plants that are important in medicine, agriculture and nature. Learning emphasis is problem solving via online, instant feedback assessments, group discussion, experimental data analysis and context-based exams.

Credit Hours: 4

Max credits per semester: 4

Max credits per degree: 4

Grading Option: Graded with Option

Prerequisite for: ASCI 330; ASCI 486; PLPT 418, PLPT 818

HORT 216 Plant Breeding Principles and Practice

Crosslisted with: AGRO 216

Prerequisites: High school biology and chemistry. BIOS 101 and 101L or 102 or equivalent recommended.

Description: Plant breeding theory and technique. Application of genetic principles to plant improvement. Experience with breeding agronomic and horticultural plant species to illustrate plant mating systems and breeding principles.

Credit Hours: 2

Max credits per semester: 2

Max credits per degree: 2

Grading Option: Graded with Option

HORT 221 Plant Propagation

Prerequisites: AGRO/HORT 131

Notes: Recommend AGRO/HORT 278 taken previously or concurrently

Description: Practice different methods of plant propagation and explore the effects of environmental management on propagation success using the scientific method.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: SPRING

Prerequisite for: HORT 395

HORT 227 Introductory Turfgrass Management

Crosslisted with: AGRO 227, TLMT 227

Prerequisites: AGRO/HORT 131 or AGRO 278 or either concurrently.

Description: Introduction to turfgrasses, their management and use, and to the turfgrass industry.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: FALL

Prerequisite for: AGRO 327, HORT 327, TLMT 327; TLMT 395T

HORT 228 Introduction to Landscape Management

Crosslisted with: AGRO 228, TLMT 228

Prerequisites: AGRO/HORT 131 or AGRO/HORT 278 or either concurrently.

Description: An overview of landscape systems for human intent. Includes seasonal and materials-specific BMPs for assessment, soil work, irrigation, plants and hardscapes, pests and diseases, using a combination of site visits, collaborations, and applied case studies.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: FALL

Prerequisite for: AGRO 470, HORT 470, TLMT 470; TLMT 395L

HORT 229 Introductory Turfgrass Management Laboratory

Crosslisted with: TLMT 229, AGRO 229

Description: Laboratory covering turfgrass identification and management.

Credit Hours: 1

Max credits per semester: 1

Max credits per degree: 1

Grading Option: Graded with Option

Offered: FALL

HORT 230 Technical Reporting in Plant and Landscape Systems

Crosslisted with: AGRO 230

Notes: This course is intended for first or second year students.

Description: Learn introductory data science skills necessary to collect, manage, and analyze data. Gain the necessary skills to interpret and effectively communicate information derived from data.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded

Offered: FALL/SPR

HORT 242 North American Wildland Plants

Crosslisted with: AGRO 242, RNGE 242, GRAS 242

Prerequisites: Permission.

Notes: AGRO/RNGE 240 recommended.

Description: Identification and description of two-hundred important wildland plants of North America. Characteristics of these plants evaluated in terms of management implications.

Credit Hours: 1

Max credits per semester: 1

Max credits per degree: 4

Grading Option: Graded with Option

Offered: FALL/SPR

HORT 261 Floral Design I

Description: Principles, interpretation, and emotional responses of floral design are explored and practical experience in all aspects of flower arranging. Includes floral product identification, care, handling, marketing and critiquing of floral designs.

Credit Hours: 4

Max credits per semester: 4

Max credits per degree: 4

Grading Option: Graded with Option

Offered: FALL/SPR

Prerequisite for: HORT 262

ACE: ACE 7 Arts

HORT 262 Floral Design II**Prerequisites:** HORT 261**Description:** Advanced styles of floral design, foliage plant care and retail shop layout, as well as practical business knowledge in managing a small business. Topics include personnel, advertising, sales and floral marketing.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**HORT 265 Visual Communication for Landscape Design****Description:** Graphic and oral presentation techniques for landscape design. Introduction to use of various media and technologies, including hand graphics and computer programs.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL**Prerequisite for:** HORT 267**HORT 267 Introduction to Landscape Design Studio****Prerequisites:** HORT 265**Notes:** Individual and team projects, in-class exercises and presentations. Includes site visits to urban landscapes.**Description:** Process and elements used to design sustainable residential and small urban landscapes.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**Prerequisite for:** HORT 300; HORT 301; TLMT 395L**Groups:** Techniques**HORT 270 Biological Invaders****Crosslisted with:** AGRO 270, NRES 270, PLPT 270**Prerequisites:** 3 hrs biological sciences.**Description:** Impact of exotic species and invasive organisms: agricultural and medical emerging disease; predicting biological invasions; biological control; regulatory, monitoring, and control efforts; ecological impact.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**HORT 275 Agribusiness Entrepreneurial Finance****Crosslisted with:** AECN 275, EAEP 275, ENTR 275, AGRO 275**Description:** Overview of financial issues for agribusiness start-ups. Business funding specific to new enterprises. Case studies on financial practices for start-up firms.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**HORT 278 Botany****Crosslisted with:** AGRO 278**Prerequisites:** BIOS 101 or LIFE 120 or AGRO/HORT 131**Description:** Introduction to the plant kingdom and to plants as biological organisms; structure and function of cells, tissues, and organs with emphasis on seed plants; the important processes and concepts of life cycles, evolution, and physiology.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Grading Option:** Graded with Option**Offered:** SPRING**Prerequisite for:** AGRO 227, HORT 227, TLMT 227; AGRO 228, HORT 228, TLMT 228**HORT 295 Internship****Crosslisted with:** AGRO 295, RNGE 295, SOIL 295**Prerequisites:** Sophomore standing and completion of an internship contract. The internship contract is subject to approval by the department. Internships completed without a signed contract may not qualify for credit.**Notes:** Pass/No Pass only; requires advanced permission before registering for the course.**Description:** Professional experience in a plant, landscape or soil interest area. Experience may be with a business, government agency, organization, or a university research, extension, or teaching program.**Credit Hours:** 1-3**Min credits per semester:** 1**Max credits per semester:** 3**Max credits per degree:** 6**Grading Option:** Pass No Pass**Offered:** FALL/SPR**HORT 300 Introduction to Landscape Construction****Prerequisites:** HORT 267 or concurrent**Description:** Materials, systems, and methods for constructing sustainable residential and small urban landscapes. Includes site grading, hardscapes, irrigation, lighting, ponds and water features, using a combination of guest speakers, site visits and online resources.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**HORT 301 Introduction to Landscape Contracting****Prerequisites:** HORT 267 and HORT 388 or concurrent**Notes:** Offered Spring of even years and alternate with HORT 300.**Description:** Overview of the landscape contracting business and administration of contracts, cost estimation and bidding.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded**Offered:** SPRING**Groups:** Techniques

HORT 302 Tree Biology**Crosslisted with:** NRES 302**Prerequisites:** BIOS 101 or LIFE 120 or HORT 131**Description:** The study of the structure and function of woody plants, with a focus on trees growing in temperate climates. Covers the basics of wood physiology in terms of the biological, physical, and chemical processes utilized by tree to function. The anatomy and morphology of trees with a focus on the impacts of tree maintenance to the structure and function of landscape trees.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL**HORT 306 Greenhouse Practices and Management****Prerequisites:** AGRO 132 or HORT 133 or AGRO/HORT 134 or LIFE 120**Description:** Principles and practices involved in the development, operation and use of greenhouses and other protected plant growth environments.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**HORT 307 Hydroponics for Growing Populations****Prerequisites:** AGRO 132 or AGRO 134 or HORT 133 or LIFE 120**Description:** Globally diverse peoples are explored through culture, diets, food production systems, and environment with emphasis on the application of hydroponic plant production systems to address food needs that are culturally conscious. Hydroponic methodologies are investigated and prototypes are designed, built, and tested for proof of concept.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded**Offered:** FALL/SPR**ACE:** ACE 9 Global/Diversity**HORT 319 Edible Landscapes****Prerequisites:** Junior Standing or permission**Description:** Identification, environmental requirements, and sustainable care and management of herbaceous perennial and woody plants with both edible and aesthetic landscape value. Historical and human cultural ties or ethnobotanical traditions associated with the plants will be utilized for appropriate plant selection and use.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**ACE:** ACE 9 Global/Diversity**HORT 321 Arboriculture: Maintenance & Selection of Landscape Trees****Crosslisted with:** NRES 321**Prerequisites:** Junior standing**Description:** Covers practical application of the science of tree growth, development, and management in human dominated landscapes. Tree selection for varying landscapes and objectives, proper planting and pruning, identification and correction of tree defects, and working with tree pest issues.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Grading Option:** Graded with Option**Offered:** SPRING**Groups:** Laboratory and Field Training**HORT 326 Landscape Solutions****Crosslisted with:** AGRO 326, TLMT 326**Description:** Using processes and problem-solving approach to identify and analyze common landscape management situations in commercial, public, and residential landscapes. Integrate design, environment, function, pest and disease, and existing management practices to produce recommendations.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**HORT 327 Turfgrass Science and Management****Crosslisted with:** AGRO 327, TLMT 327**Prerequisites:** AGRO/HORT/SOIL 153; CHEM 105 or CHEM 105A and 105L or CHEM 109 or CHEM 109A and 109L; and TLMT 227**Description:** Scientific principles of turf species adaptation, turf and/or soil relationships, establishment, fertility, mowing, irrigation, and pest control of turf species.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**HORT 330 Pruning Ornamentals****Crosslisted with:** AGRO 330, TLMT 330**Description:** Why, when and how to prune ornamental landscape plants. Demonstrations and field opportunities on how to choose and how to use pruning tools correctly.**Credit Hours:** 1**Max credits per semester:** 1**Max credits per degree:** 1**Grading Option:** Graded with Option**HORT 352 Production and Physiology of Horticultural Crops****Prerequisites:** AGRO/HORT 131**Notes:** HORT 353 or HORT 354 or HORT 355 parallel enrollment suggested**Description:** The physiological principles underlying the management and production of floricultural, fruit, vegetable and specialty crops.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded with Option**Offered:** FALL**Prerequisite for:** HORT 395

HORT 353 Vegetable Crop Production Laboratory**Prerequisites:** AGRO/HORT 131.**Notes:** HORT 133, HORT 221, and HORT 352 recommended.**Description:** Vegetable crop production principles and practices, both locally and from a global perspective. Experience with seeding, transplant production, and growing of vegetables in field and greenhouse.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded with Option**Offered:** FALL**HORT 354 Fruit Production Laboratory****Prerequisites:** AGRO/HORT 131**Notes:** HORT 133, HORT 221, and HORT 352 recommended.**Description:** Fruit crop production principles and practices, both locally and from a global perspective. Experience with planting, pruning and layout of orchard, vineyard and small fruit crops, greenhouse propagation, and production practices.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded with Option**Offered:** FALL**HORT 355 Perennial, Pot and Bedding Plant Production Laboratory****Prerequisites:** AGRO/HORT 131**Notes:** HORT 133, HORT 221, and HORT 352 recommended.**Description:** Growing conditions of specific perennial, annual, pot plants, cut flowers. How to schedule and cost account plant production. Care of post-production plants. Experience propagating and growing perennial, pot and bedding plants and cut flowers in the greenhouse.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded with Option**Offered:** FALL**HORT 362 Nursery Crop Production****Prerequisites:** AGRO/HORT 131**Notes:** HORT 133, 221, and HORT 352 recommended.**Description:** Principles underlying the production of nursery crops. Propagation, crop scheduling, transplanting, handling, and transportation of nursery crops. Cultural considerations such as media, fertilizers, irrigation, and pest control.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded with Option**Offered:** SPRING**HORT 375 Innovations for Agriculture****Crosslisted with:** AGRI 375, AGRO 375, EAEP 375, TLMT 375**Prerequisites:** Junior or Senior class standing.**Description:** Explore sustainability challenges in plant and animal agricultural systems, assess current solutions, and identify opportunities for innovation. Research, develop, prototype, test, and pitch an innovative product, service, or technology for agriculture.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded**Offered:** FALL**HORT 388 Business Systems in Entrepreneurship****Crosslisted with:** AGRO 388, ENTR 388, EAEP 388, ABUS 388**Description:** Introductory models for a startup business. Ideation, customer segments, value proposition, minimal viable product and market fit.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL/SPR**Prerequisite for:** HORT 301**HORT 395 Internship in Horticulture****Prerequisites:** Junior Standing; HORT 221 or HORT 352 and completion of an internship contract. Internships completed without a signed contract may not qualify for credit**Notes:** Pass/No Pass only; requires advanced permission before registering for the course.**Description:** Advanced internship experience in a horticulture enterprise. Must be a business, government agency, organization or university research, teaching, or extension program in which the student does not have previous internship credit.**Credit Hours:** 1-3**Min credits per semester:** 1**Max credits per semester:** 3**Max credits per degree:** 6**Grading Option:** Pass No Pass**Offered:** FALL/SPR**HORT 396 Current Projects and Topics in Horticulture****Prerequisites:** Sophomore standing; 12 hours in subject areas dealing with plant sciences; and permission.**Notes:** A completed and approved study plan contract is required.**Description:** Independent or group projects, readings, or research focusing on current aspects of horticulture.**Credit Hours:** 1-5**Min credits per semester:** 1**Max credits per semester:** 5**Max credits per degree:** 5**Grading Option:** Graded with Option**HORT 399 Independent Study****Prerequisites:** Junior standing; 12 hrs plant science; and permission.**Notes:** Requires advance approval of plan of work and is to be under the supervision and evaluation of a Horticulture departmental faculty member. Oral and written reports are mandatory at the completion of this Independent Study.**Description:** Individual or group projects in research, literature review, or extension of course work.**Credit Hours:** 1-5**Min credits per semester:** 1**Max credits per semester:** 5**Max credits per degree:** 12**Grading Option:** Graded with Option

HORT 403 Scientific Writing and Communication

Crosslisted with: AGRO 403, AGRO 803, HORT 803

Prerequisites: Senior standing or higher, an ACE 1 written communication course, an ACE 2 oral communication course, and permission of instructor.

Description: Reading and critiquing, writing, and presenting scientific information. Use research data to compose a manuscript in standard scientific format, and prepare and present a poster to a general audience. Ethical issues in research and writing.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded

ACE: ACE 10 Integrated Product

HORT 406 Plant Ecophysiology: Theory and Practice

Crosslisted with: AGRO 806, HORT 806, NRES 406, NRES 806, AGRO 406

Prerequisites: Junior standing; 4 hrs ecology; and 4 hrs botany or plant physiology.

Description: Principles of plant physiology which underlie the relationship between plants and their physical, chemical and biotic environments. An introduction to the ecological niche, limiting factors and adaptation. An overview of the seed germination and ecology, plant and soil water relations, nutrients, plant energy budgets, photosynthesis, carbon balance and plant-animal interactions. An introduction to various field equipment used in ecophysiological studies.

Credit Hours: 4

Max credits per semester: 4

Max credits per degree: 4

Grading Option: Graded with Option

HORT 407 Bio-Atmospheric Instrumentation

Crosslisted with: AGRO 469, GEOG 469, METR 469, MSYM 469, NRES 469, AGRO 869, GEOG 869, HORT 807, METR 869, MSYM 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

HORT 408 Microclimate: The Biological Environment

Crosslisted with: AGRO 408, GEOG 408, METR 408, NRES 408, WATS 408, AGRO 808, GEOG 808, HORT 808, METR 808, NRES 808

Prerequisites: Junior standing, MATH 106 or equivalent, 5 hrs physics, major in any of the physical or biological sciences or engineering.

Description: Physical factors that create the biological environment.

Radiation and energy balances of earth's surfaces, terrestrial and marine. Temperature, humidity, and wind regimes near the surface. Control of the physical environment through irrigation, windbreaks, frost protection, manipulation of light, and radiation. Applications to air pollution research. Instruments for measuring environmental conditions and remote sensing of the environment.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Prerequisite for: AGRO 907, HORT 907, METR 907, NRES 907; BSEN 954, NRES 954

HORT 409A Case studies in plant breeding: Breeding for Disease**Resistance**

Crosslisted with: AGRO 409A, AGRO 809A, HORT 809A

Notes: A previous class in genetics is highly recommended.

Description: The application of fundamental genetics principles in inheritance, gene mapping and DNA analysis to decision making by plant breeders with the goal of improving disease resistance in crop cultivars. Learning is structured by the genetics discovery story told in published research articles and the thinking process of plant breeders who will use these discoveries in their work.

Credit Hours: 1

Max credits per semester: 1

Max credits per degree: 1

Grading Option: Graded with Option

Offered: FALL/SPR

HORT 409B Case Studies in plant breeding: Transgenic strategies for disease resistance

Crosslisted with: AGRO 409B, AGRO 809B, HORT 809B

Description: The application of basic science and technology by plant genetic engineering experts with the goal of teaming with plant breeders to improve disease resistance in crop cultivars. Learning is structured by the genetics discovery story told in published research articles and the thinking process of genetic engineers and plant breeders who will use these discoveries in their work.

Credit Hours: 1

Max credits per semester: 1

Max credits per degree: 1

Grading Option: Graded with Option

Offered: FALL/SPR

HORT 414 Turfgrass Disease Management

Crosslisted with: AGRO 414, AGRO 814, HORT 814, PLPT 414, PLPT 814, TLMT 414, TLMT 814

Prerequisites: BIOS/PLPT 369 or one semester of introductory plant pathology.

Description: Pathogens, epidemiology, and control of diseases specific to turfgrass.

Credit Hours: 1

Max credits per semester: 1

Max credits per degree: 1

Grading Option: Graded with Option

HORT 418 Agroforestry Systems in Sustainable Agriculture**Crosslisted with:** HORT 818, NRES 417, NRES 817**Prerequisites:** 12 hours biological or agricultural sciences.**Description:** The roles of woody plants in sustainable agricultural systems of temperate regions. Emphasis on the ecological and economic benefits of trees and shrubs in the agricultural landscape. Topics include: habitat diversity and biological control; shelterbelts structure, function, benefits and design; intercropping systems; silvopastoral systems; riparian systems; and production of timber and specialty crops. Comparison of temperate agroforestry systems to those of tropical areas.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**HORT 426 Invasive Plants****Crosslisted with:** AGRO 426, AGRO 826, HORT 826, NRES 426, NRES 826**Prerequisites:** AGRO/HORT/SOIL 153; AGRO/HORT 131**Description:** Identification, biology and ecology of weedy and invasive plants. Principles of invasive plant management by preventative, cultural, biological, mechanical and chemical means using an adaptive management framework. Herbicide terminology and classification, plant-herbicide and soil-herbicide interactions, equipment calibration and dosage calculations.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**HORT 427 Turfgrass Systems Management****Crosslisted with:** AGRO 427, TLMT 427, AGRO 827, HORT 827, TLMT 827**Prerequisites:** TLMT 227 and TLMT 327**Description:** Critical evaluation of turfgrass settings to create economical and environmentally friendly management systems for professionally managed turf areas.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**ACE:** ACE 10 Integrated Product**HORT 429A Food Security: A Global Perspective****Crosslisted with:** ANTH 429A, ANTH 829A, AGRO 429A, AGRO 829A, HORT 829A, NRES 429A, NRES 829A, NUTR 429A, NUTR 829A**Prerequisites:** Junior standing**Description:** Overview of the technical and sociocultural dimensions of global food insecurity.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**HORT 435 Agroecology****Crosslisted with:** AGRO 435, AGRO 835, NRES 435, NRES 835**Prerequisites:** For AGRO/HORT/NRES 435: Senior standing. For AGRO/NRES 835: 12 hrs biological or agricultural sciences.**Description:** Integration of principles of ecology, plant and animal sciences, crop protection, and rural landscape planning and management for sustainable agriculture. Includes natural and cultivated ecosystems, population and community ecology, nutrient cycling, pest management, hydrologic cycles, cropping and grazing systems, landscape ecology, biodiversity, and socioeconomic evaluation of systems.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**ACE:** ACE 10 Integrated Product**HORT 436 Agroecosystems Analysis****Crosslisted with:** AGRO 436, AGRO 836, HORT 836**Prerequisites:** Senior standing.**Notes:** Cost of travel required. Summer travel course with multi-state faculty. Farm visits to Iowa, Minnesota and Nebraska.**Description:** Analysis of production, economics, environmental impacts, and social integration aspects of farms and farming systems**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**HORT 439 Organic Farming and Food Systems****Crosslisted with:** AGRO 839, AGRO 439, HORT 839**Prerequisites:** 12 credits of agricultural or biological science, economics, or natural resources**Description:** History of organic farming and horticultural systems, organic certification, nutrient and pest management in organic systems, planning organic enterprises including production and marketing, resilience of organic systems in ecological, economic, and social terms; future issues and potentials of organic food systems.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**HORT 441 Perennial Plant Function, Growth, and Development****Crosslisted with:** AGRO 441, AGRO 841, HORT 841, RNGE 441, GRAS 441**Prerequisites:** AGRO 325 or equivalent.**Description:** Principles of crop physiology and developmental morphology in relation to function, growth, development, and survival of perennial forage, range, and turf plants. The relationship of physiology and morphological development on plant use and management.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING

HORT 453 Urban Soil Properties and Management**Crosslisted with:** AGRO 453, LARC 453, SOIL 453**Prerequisites:** AGRO/HORT/SOIL 153.**Description:** Characteristics of soils in urban settings. Evaluation of soils intended for intensive human uses and strategies for their use. Identification of specific issues related to urban soils. Manipulation or remediation of soils subject to construction and other stresses.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**HORT 457 Green Space and Urban Forestry Management****Crosslisted with:** NRES 457, NRES 857**Prerequisites:** Junior or senior standing, Graduate student.**Description:** A focus on the management of trees, parks, and green infrastructure in rural and urban communities. Perspectives from community planning, landscape architecture, urban forestry, natural resources, horticulture, and environmental policy. Development and implementation of green space and forest management plans encompassing societal needs and biological limitations in rural and urban communities.**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**HORT 462 Cannabis Growth, Production and Breeding Basics****Crosslisted with:** AGRO 462, AGRO 862, HORT 862**Prerequisites:** AGRO/HORT 131 or LIFE 121; AGRO 215 or BIOS 206**Notes:** HORT 221 recommended**Description:** History, breeding and production of cannabis for medicinal marijuana and hemp for fiber use when grown using a growth room, greenhouse, high tunnel and/or field. Clarification between scientific evidence and casual information.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded**Offered:** FALL/SPR**HORT 467 Planting Design****Crosslisted with:** ARCH 467, ARCH 567, ARCH 867, LARC 467**Description:** Processes, principles, and elements using plant materials as a key component of landscapes designed for human intent. Focus is on a systems approach, combining environmental attributes with functional needs to create aesthetic, functional, and sustainable landscapes for parks, commercial property, and residences using a combination of site visits and online resources.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Grading Option:** Graded with Option**Offered:** FALL**HORT 469 Ecological Landscape Design****Crosslisted with:** ARCH 469**Prerequisites:** Permission**Description:** Integration of ecological and environmental assessment, design process and management considerations to create detailed landscape plans for public, private, and commercial clients. Includes dream landscape project. Individuals and collaborative teams will develop concepts and details, conduct client meetings and studio critiques, and communicate graphically and verbally through presentations.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Grading Option:** Graded with Option**Offered:** SPRING**ACE:** ACE 10 Integrated Product**HORT 470 Critical Thinking in Landscape Management****Crosslisted with:** AGRO 470, TLMT 470**Prerequisites:** HORT 228, TLMT 228**Description:** Use processes and strategies to develop complete landscape management plans for public and/or private clients. Use data to evaluate and compare issues; make practical, science-based recommendations; and prepare cost estimates. Develop and present a complete landscape management plan for a public client.**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**HORT 471 Vines, Wines and You****Crosslisted with:** HORT 871, NUTR 471, NUTR 871, HRTM 471, HRTM 871**Prerequisites:** 6 hrs science or equivalent experience; 21 years of age or older**Notes:** Proof of age is required.**Description:** Origin, botany, historical and cultural significance of the grapevine and related species. Principles and practices of vineyard establishment, management and processing of grape products, importance and/or scope of grape and wine industry; global and local significance. Culinary applications, health, environmental and safety-related issues, business and industry relations and experience.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**HORT 478 Plant Anatomy****Crosslisted with:** BIOS 478, BIOS 878, AGRO 478, AGRO 878, HORT 878**Prerequisites:** 8 hrs biological sciences**Notes:** BIOS 109 recommended.**Description:** Development, structure, and function of tissues and organs of the higher plants. Relationships of structure to physiology and ecology of plants.**Credit Hours:** 4**Max credits per semester:** 4**Max credits per degree:** 4**Grading Option:** Graded with Option**Prerequisite for:** BIOS 879

HORT 480 Modified Root Zones**Crosslisted with:** AGRO 480, TLMT 480, TLMT 880, AGRO 880, HORT 880**Prerequisites:** SOIL 153**Notes:** Recommend CHEM 105A/105L or 109A/109L, AGRO/HORT 131, TLMT 227, and AGRO/HORT 453 or AGRO 472**Description:** Modified root zones and their applications in the turfgrass and landscape management industry. Correct applications and construction techniques.**Credit Hours:** 1**Max credits per semester:** 1**Max credits per degree:** 1**Grading Option:** Graded with Option**Offered:** SPRING**HORT 488 Entrepreneurship and Enterprise Development****Crosslisted with:** HORT 888, EAEP 488, AGRO 488, ENTR 488, EAEP 888, AGRO 888, ENTR 888, ABUS 488**Description:** The process of starting your own enterprise. Competitive environment, risk management, finance for business startups, funding, and business plan writing.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL/SPR**ACE:** ACE 10 Integrated Product**HORT 489 Urbanization of Rural Landscapes****Crosslisted with:** AGRO 489, AGRO 889, CRPL 489, HORT 889, CRPL 889**Prerequisites:** Senior standing or graduate standing.**Description:** Development converts rural landscapes into housing, roads, malls, parks, and commercial uses. This process fragments landscapes and changes ecosystem functions, drives up land prices, and pushes agriculture into more marginal areas. This multi-disciplinary, experiential course guides students in learning about the urbanization process, the impacts on landscapes, people, and the community, and the choices that are available to informed citizens.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**HORT 495 Grasslands Seminar****Crosslisted with:** AGRO 495, ENTO 495, GRAS 495, NRES 495, RNGE 495, SOIL 495**Prerequisites:** Junior standing.**Description:** Topic varies and deals with different aspects of forage and/or range and/or livestock, turf and/or landscape grasses, natural habitats, and wetlands.**Credit Hours:** 1-2**Min credits per semester:** 1**Max credits per semester:** 2**Max credits per degree:** 4**Grading Option:** Graded with Option**HORT 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 undergraduate thesis.**Credit Hours:** 3-6**Min credits per semester:** 3**Max credits per semester:** 6**Max credits per degree:** 6**Grading Option:** Graded**PLPT 110 Molds and Man****Prerequisites:** Non-science major.**Description:** Impact of fungi on human welfare. Historical and current perspective. Toxic molds and indoor air quality. Fungi as agents of human disease. Fungi and food security. High value drugs produced by fungi. Role of fungi in biodiversity. Fungi and the development of modern biology.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**PLPT 210 Plant Pathogens and Disease****Prerequisites:** AGRO 131, BIOS 101, ENTO 115, HORT 131, or LIFE 120.**Description:** Introduction to fungi, bacteria, nematodes and viruses that cause plant diseases. The impact that plant diseases can have on society and the environment. Strategies used in managing plant diseases in agricultural and landscape environments.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded with Option**PLPT 270 Biological Invaders****Crosslisted with:** AGRO 270, HORT 270, NRES 270**Prerequisites:** 3 hrs biological sciences.**Description:** Impact of exotic species and invasive organisms: agricultural and medical emerging disease; predicting biological invasions; biological control; regulatory, monitoring, and control efforts; ecological impact.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**PLPT 369 Introductory Plant Pathology****Crosslisted with:** BIOS 369**Prerequisites:** AGRO 131/HORT 131, or LIFE 120 and 120L, or BIOS 109.**Description:** Relation of plant disease to crop production, the environment, and society. Organisms that cause disease and their interactions with plants. Strategies for plant disease management.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**PLPT 369L Introductory Plant Pathology Lab****Prerequisites:** Must enroll in both PLPT 369 (lecture) and PLPT 369L (lab)**Description:** Optional lab for PLPT 369.**Credit Hours:** 1**Max credits per semester:** 1**Max credits per degree:** 1**Grading Option:** Graded with Option

PLPT 414 Turfgrass Disease Management

Crosslisted with: AGRO 414, AGRO 814, HORT 414, HORT 814, PLPT 814, TLMT 414, TLMT 814

Prerequisites: BIOS/PLPT 369 or one semester of introductory plant pathology.

Description: Pathogens, epidemiology, and control of diseases specific to turfgrass.

Credit Hours: 1

Max credits per semester: 1

Max credits per degree: 1

Grading Option: Graded with Option

PLPT 418 Microbial Genetics & Genomics

Crosslisted with: PLPT 818

Prerequisites: BIOS 206 or AGRO 215.

Notes: BIOS 312 recommended.

Description: Inheritance, exchange, and regulation of genes in prokaryotic microorganisms: gene structure and function; gene transfer and the elements (plasmids, phages, and transposons) involved; DNA mutations, repair, and genetic analysis; genome sequencing, microbial genome databases, and global gene expression analysis.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded

PLPT 495 Internship in Plant Pathology

Prerequisites: Junior standing.

Description: Experience in a work place setting that is directly related to Plant Pathology.

Credit Hours: 1-3

Min credits per semester: 1

Max credits per semester: 3

Max credits per degree: 5

Grading Option: Pass No Pass

PLPT 496 Independent Study

Prerequisites: Advanced approval of the plan of study and permission.

Description: Research, literature review, extension of course work, or preparation of teaching materials.

Credit Hours: 1-5

Min credits per semester: 1

Max credits per semester: 5

Max credits per degree: 5

Grading Option: Graded with Option

PLPT 498 Independent Research

Prerequisites: Permission.

Description: Independent research in areas of plant pathology.

Credit Hours: 1-3

Min credits per semester: 1

Max credits per semester: 3

Max credits per degree: 6

Grading Option: Graded with Option

PLPT 499H Honors Thesis

Prerequisites: Admission to the University Honors Program and permission, AGRI 299H recommended.

Description: Conduct a scholarly research project and write a University Honors Program or undergraduate thesis.

Credit Hours: 3-6

Min credits per semester: 3

Max credits per semester: 6

Max credits per degree: 6

Grading Option: Graded

TLMT 100 Plants, Landscapes, & the Environment

Crosslisted with: HORT 100, AGRO 100

Description: Introduction to a diverse range of plant and landscape systems and management strategies for balancing economic and environmental sustainability. Foundational principles of plant biology, landscape ecology, and environmental science explored within the context of these systems.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

Offered: FALL/SPR

ACE: ACE 4 Science

TLMT 102 Internship and Career Preparation

Crosslisted with: AGRO 102, HORT 102

Description: Group and individual activities to help formulate career goals, improve academic success skills, identify beneficial co-curricular activities, and select appropriate internships.

Credit Hours: 1

Max credits per semester: 1

Max credits per degree: 1

Grading Option: Graded with Option

Offered: FALL

TLMT 127 Survey of Turfgrass and Landscape Management

Crosslisted with: AGRO 127, HORT 127

Description: Introduction to careers, internships and co-curricular activities in turfgrass and landscape management.

Credit Hours: 1

Max credits per semester: 1

Max credits per degree: 1

Grading Option: Graded with Option

TLMT 134 Plant Sciences Laboratory

Crosslisted with: AGRO 134, HORT 134

Prerequisites: Prior or concurrent enrollment in AGRO/HORT 131 required

Notes: Open to all majors and minors, except Agronomy or Horticulture.

Description: An exploration of plant morphology, physiology, and maturation with an emphasis on environmental, biotic, and human interactions within production and landscape systems. Not open to Agronomy or Horticulture majors or minors.

Credit Hours: 1

Max credits per semester: 1

Max credits per degree: 1

Grading Option: Graded

Prerequisite for: ENTO 308; HORT 306; HORT 307

TLMT 215 Genetics

Crosslisted with: AGRO 215, HORT 215

Prerequisites: 3 hrs biological sciences

Description: Discovery of the biology of genes and the application of genetics principles to understand the control and inheritance of traits in families and populations. Focus is on animals and plants that are important in medicine, agriculture and nature. Learning emphasis is problem solving via online, instant feedback assessments, group discussion, experimental data analysis and context-based exams.

Credit Hours: 4

Max credits per semester: 4

Max credits per degree: 4

Grading Option: Graded with Option

Prerequisite for: ASCI 330; ASCI 486; PLPT 418, PLPT 818

TLMT 227 Introductory Turfgrass Management**Crosslisted with:** AGRO 227, HORT 227**Prerequisites:** AGRO/HORT 131 or AGRO 278 or either concurrently.**Description:** Introduction to turfgrasses, their management and use, and to the turfgrass industry.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL**Prerequisite for:** AGRO 327, HORT 327, TLMT 327; TLMT 395T**TLMT 228 Introduction to Landscape Management****Crosslisted with:** AGRO 228, HORT 228**Prerequisites:** AGRO/HORT 131 or AGRO/HORT 278 or either concurrently.**Description:** An overview of landscape systems for human intent. Includes seasonal and materials-specific BMPs for assessment, soil work, irrigation, plants and hardscapes, pests and diseases, using a combination of site visits, collaborations, and applied case studies.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** FALL**Prerequisite for:** AGRO 470, HORT 470, TLMT 470; TLMT 395L**TLMT 229 Introductory Turfgrass Management Laboratory****Crosslisted with:** AGRO 229, HORT 229**Description:** Laboratory covering turfgrass identification and management.**Credit Hours:** 1**Max credits per semester:** 1**Max credits per degree:** 1**Grading Option:** Graded with Option**Offered:** FALL**TLMT 326 Landscape Solutions****Crosslisted with:** AGRO 326, HORT 326**Description:** Using processes and problem-solving approach to identify and analyze common landscape management situations in commercial, public, and residential landscapes. Integrate design, environment, function, pest and disease, and existing management practices to produce recommendations.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**Offered:** SPRING**TLMT 327 Turfgrass Science and Management****Crosslisted with:** AGRO 327, HORT 327**Prerequisites:** AGRO/HORT/SOIL 153; CHEM 105 or CHEM 105A and 105L or CHEM 109 or CHEM 109A and 109L; and TLMT 227**Description:** Scientific principles of turf species adaptation, turf and/or soil relationships, establishment, fertility, mowing, irrigation, and pest control of turf species.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded with Option**TLMT 330 Pruning Ornamentals****Crosslisted with:** AGRO 330, HORT 330**Description:** Why, when and how to prune ornamental landscape plants. Demonstrations and field opportunities on how to choose and how to use pruning tools correctly.**Credit Hours:** 1**Max credits per semester:** 1**Max credits per degree:** 1**Grading Option:** Graded with Option**TLMT 375 Innovations for Agriculture****Crosslisted with:** HORT 375, AGRI 375, AGRO 375, EAEP 375**Prerequisites:** Junior or Senior class standing.**Description:** Explore sustainability challenges in plant and animal agricultural systems, assess current solutions, and identify opportunities for innovation. Research, develop, prototype, test, and pitch an innovative product, service, or technology for agriculture.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded**Offered:** FALL**TLMT 391T Special Topics in Turfgrass Science and Management****Prerequisites:** Permission**Notes:** Requires advanced permission before registering for the course**Description:** Topics vary.**Credit Hours:** 1-6**Min credits per semester:** 1**Max credits per semester:** 6**Max credits per degree:** 12**Grading Option:** Graded with Option**Offered:** FALL/SPR**TLMT 395L Internship in Landscape Design and Management****Prerequisites:** Junior standing; TLMT 228 or HORT 267; and completion of an internship contract. Internships completed without a signed contract not may qualify for credit.**Notes:** Pass/No Pass only; requires advanced permission before registering for the course.**Description:** Advanced professional experience in a landscape design and/or management enterprise. Experience must be with a business, government agency, organization, or a university research, extension, or teaching program in which the student does not have previous internship credit.**Credit Hours:** 1-3**Min credits per semester:** 1**Max credits per semester:** 3**Max credits per degree:** 6**Grading Option:** Pass No Pass**Offered:** FALL/SPR

TLMT 395T Internship in Turfgrass Science and Management

Prerequisites: Junior standing; TLMT 227 and completion of an internship contract. Internships completed without a signed contract may not qualify for credit.

Notes: Pass/No Pass only; requires advanced permission before registering for the course.

Description: Advanced internship experience in a turfgrass enterprise. Must be a business, government agency, organization, or university research, teaching or extension program in which the student does not have previous internship credit.

Credit Hours: 1-3

Min credits per semester: 1

Max credits per semester: 3

Max credits per degree: 6

Grading Option: Pass No Pass

Offered: FALL/SPR

TLMT 414 Turfgrass Disease Management

Crosslisted with: AGRO 414, AGRO 814, HORT 414, HORT 814, PLPT 414, PLPT 814, TLMT 814

Prerequisites: BIOS/PLPT 369 or one semester of introductory plant pathology.

Description: Pathogens, epidemiology, and control of diseases specific to turfgrass.

Credit Hours: 1

Max credits per semester: 1

Max credits per degree: 1

Grading Option: Graded with Option

TLMT 427 Turfgrass Systems Management

Crosslisted with: AGRO 427, HORT 427, AGRO 827, HORT 827, TLMT 827

Prerequisites: TLMT 227 and TLMT 327

Description: Critical evaluation of turfgrass settings to create economical and environmentally friendly management systems for professionally managed turf areas.

Credit Hours: 3

Max credits per semester: 3

Max credits per degree: 3

Grading Option: Graded with Option

ACE: ACE 10 Integrated Product

TLMT 470 Critical Thinking in Landscape Management

Crosslisted with: AGRO 470, HORT 470

Prerequisites: HORT 228, TLMT 228

Description: Use processes and strategies to develop complete landscape management plans for public and/or private clients. Use data to evaluate and compare issues; make practical, science-based recommendations; and prepare cost estimates. Develop and present a complete landscape management plan for a public client.

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

TLMT 480 Modified Root Zones

Crosslisted with: AGRO 480, HORT 480, TLMT 880, AGRO 880, HORT 880

Prerequisites: SOIL 153

Notes: Recommend CHEM 105A/105L or 109A/109L, AGRO/HORT 131, TLMT 227, and AGRO/HORT 453 or AGRO 472

Description: Modified root zones and their applications in the turfgrass and landscape management industry. Correct applications and construction techniques.

Credit Hours: 1

Max credits per semester: 1

Max credits per degree: 1

Grading Option: Graded with Option

Offered: SPRING

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 - Biotechnology

Plant Biology - Ecology & Management

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 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, UNL - Lincoln NE

Internships

- Intern, DuPont Pioneer - Johnston IA
- Research Assistant, UNL Plant Pathology - Lincoln NE
- Cover Crop Research Intern, UNL 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, UNL Agronomy and Horticulture - Lincoln NE
- Research Intern, UNL 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