REGIONAL AND COMMUNITY FORESTRY

Description
The purpose of the regional and community forestry (RCF) undergraduate degree program is to produce highly skilled and knowledgeable professionals with “career ready” skills problem solving, critical thinking, and effective oral and written communication in the areas of urban forestry management and plant and social sciences essential to managing natural resources in rural and urban environments. Students will be qualified for immediate employment upon graduation or for advancement in several fields of study including horticulture, forestry, or natural resources sciences.

Students will complete multidisciplinary coursework during the program. An emphasis on internships with partners including state agencies, regional companies, and nonprofits will draw on interdisciplinary linkages within UNL, and will capitalize on strong partnerships with state agencies, nonprofits, and the private sector to enhance experiential learning opportunities.

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 studies, and 2 units of foreign language. Students must also meet performance requirements: ACT composite of 20 or higher OR combined SAT score of 950 or higher 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.

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 UNL, or within the first calendar year at Nebraska, whichever takes longer, excluding foreign languages. Students have up to 60 credit hours to remove foreign 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 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.

Foreign Languages/Language Requirement
Two units of a foreign 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 (withdrawn), or NR (no report). If a course is no longer being offered, it is not eligible for the revised grade point average computation process.

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

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
- 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 is 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.** The University of Nebraska at Omaha (UNO) cooperates with CASNR in providing four-semester pre-agricultural sciences, pre-natural resources, pre-food science and technology, pre-horticulture, and pre-turfgrass and landscape management transfer programs.

A student enrolled in these programs may transfer all satisfactorily completed academic credits identified in the suggested program of study and enter CASNR to study toward a degree program leading to a bachelor of science degree. The total program would require a minimum of four years or eight semesters (16 credit hours/semester or 120 credit hours).

Nebraska CASNR faculty teach horticulture and food science and technology courses at UNO to assist an urban population in better understanding the food processing, horticulture, and landscape horticulture industries.

For more information, contact the CASNR Dean’s Office, 800-472-8800, ext. 2541.

**Non University of Nebraska–Lincoln Degree-Granting Programs**

CASNR cooperates with other institutions to provide coursework that is applied towards a degree at the cooperating institution. Pre-professional programs offered by CASNR allow students to complete the first two or three years of a degree program at the University prior to transferring and completing a degree at the cooperating institution.

- **Chadron State College—Range Science.** The 3+1 Program in range science allows Chadron State College students to pursue a range science degree through Chadron State College. Students complete three years of
coursework at Chadron State College and one year of specialized range science coursework (32 credit hours) at CASNR.

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

Residency
Students must complete at least 30 of the total hours for their degree using University of Nebraska–Lincoln credits. At least 18 of the 30 credit hours must be in courses offered through CASNR (≥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 UNL and participate in prior-approved education abroad programs. University of Nebraska–Lincoln open enrollment and summer independent study courses count toward residency.

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 regional and community forestry will be able to:
1. Demonstrate an understanding of tree genera and species in regard to their natural habitats, range, and cultural uses.
2. Apply the principles of woody plant identification to correctly identify trees, shrubs, and vines in urban and natural landscapes.
3. Demonstrate an understanding of the concepts and science involved in the study and practice of arboriculture, urban natural resources, and urban forestry necessary for employment.
4. Communicate abstract and technical concepts regarding trees, arboriculture, and urban forestry to laypersons in a clear and concise manner.
5. Analyze urban forest management plans using scientifically derived information.
6. Prepare detailed tree management plans through prioritization of site and species selection criteria to meet diverse community objectives.
7. Evaluate the quality and reliability of available information regarding urban environments.

Major Requirements
Core Requirements
The following basic courses are required for students in regional and community forestry. In addition, students must select and meet the requirements of one of the options, depending on their individual interests and career objectives.

College Integrative Course (ACE 8)
<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCIL 101</td>
<td>Science and Decision-Making for a Complex World (ACE 8)</td>
<td>3</td>
</tr>
<tr>
<td>NRES 101</td>
<td>Natural Resources Orientation</td>
<td>1</td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: 4

Mathematics
Select one of the following: 2-5

MATH 102  Trigonometry
MATH 103  College Algebra and Trigonometry
MATH 104  Applied Calculus
MATH 106  Calculus I (ACE 3)

Credit Hours Subtotal: 2-5

Statistics
STAT 218  Introduction to Statistics

Credit Hours Subtotal: 3

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

Credit Hours Subtotal: 3

Oral Communication (ACE 2)

Select one of the following: 3

ALEC 102  Interpersonal Skills for Leadership
COMM 101  Communication in the 21st Century
COMM 209  Public Speaking
COMM 210  Communicating in Small Groups
COMM 215  Visual Communication
COMM 283  Interpersonal Communication
COMM 286  Business and Professional Communication
MRKT 257  Sales Communication
NRES 301  Environmental Communication Skills

Credit Hours Subtotal: 6

Economics
Select one of the following: 3

AECN 141  Introduction to the Economics of Agriculture
ECON 200  Economic Essentials and Issues
ECON 211  Principles of Macroeconomics
ECON 212  Principles of Microeconomics

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

Credit Hours Subtotal: 9

Total Credit Hours 27-30

Specific Major Requirements

Requirements

ACE 10 Capstone
NRES 457  Green Space and Urban Forestry Management 3

Biological Science
LIFE 120  Fundamentals of Biology I 4
& LIFE 120L  and Fundamentals of Biology I laboratory
LIFE 121  Fundamentals of Biology II 4
& LIFE 121L  and Fundamentals of Biology II Laboratory

Chemistry

Select one of the following: 4

CHEM 105  Chemistry in Context I
CHEM 109  General Chemistry I

Physics
Select one of the following: 4

MSYM 109  Physical Principles in Agriculture and Life Sciences
PHYS 141  Elementary General Physics I
PHYS 151  Elements of Physics

Geographic Information Systems
Select one of the following: 3

ANTH 389  GIS in Archaeology
GEOG 217  Principles of GIS
NRES 312  Introduction to Spatial Sciences
NRES 412  Introduction to Geographic Information Systems

Ecology

Select two of the following: 7

BIOS 207  Ecology and Evolution
LARC 487  Introduction to Landscape Ecology
NRES 220  Principles of Ecology
& NRES 222  and Ecology Laboratory
NRES 424  Forest Ecology

Soil and Water Science

NRES 281  Introduction to Water Science 3
SOIL 153  Soil Resources 4

Policy

Select one of the following: 3

AECN 357  Natural Resource and Environmental Law
NRES 315  Human Dimensions of Fish and Wildlife Management
NRES 323  Natural Resources Policy
NRES 409  Human Dimensions of Natural Resources

Arboriculture and Forestry

NRES 302  Tree Biology 3
NRES 310  Introduction to Forest Management 4
NRES 321  Arboriculture: Maintenance & Selection of Landscape Trees 4

Pests and Pathogens

ENTO 115  Insect Biology 3
ENTO 116  Insect Identification 1
PLPT 369  Introductory Plant Pathology 3
PLPT 369L  Introductory Plant Pathology Lab 1

Plant Identification

Select two of the following: 6

HORT 213  Landscape Plants II
HORT 214  Herbaceous Landscape Plants
NRES 201  Dendrology: Study and Identification of Trees and Shrubs

Career Experience

NRES 497  Career Experiences in Natural Resource Sciences 1-6
Credit Hours Subtotal: 65
Total Credit Hours 65

**Urban Forestry Management Option**

**Urban Studies**
Select three of the following: 9

- CRPL 300 The Community and the Future
- CRPL 400 Introduction to Planning
- CRPL 460 Planning and Design in the Built Environment
- CRPL 489 Urbanization of Rural Landscapes
- GEOG 140 Introductory Human Geography
- NRES 289 People and the Land: Human Environmental Interactions on the Great Plains

**Communications**
Select two of the following: 6

- COMM 371 Communication in Negotiation and Conflict Resolution
- CRPL 420 Grant Writing and Fund-raising
- MNGT 300 Management Essentials For Contemporary Organizations
- NRES 301 Environmental Communication Skills
- NRES 434 Environmental Education and Interpretation

**Policy**
Select one of the following: 3

- AECN 357 Natural Resource and Environmental Law
- CRPL 470 Environmental Planning and Policy
- CRPL 471 Environmental Impact Assessment
- CRPL 472 Hazard Mitigation Planning

**Free Electives** 10
Total Credit Hours 28

**Arboriculture Option**

**Water Science**
Select one of the following: 3

- NRES 453 Hydrology
- NRES 468 Wetlands
- WATS 452 Irrigation Systems Management

**Soil Science**
Select one of the following: 3

- HORT 453 Urban Soil Properties and Management
- MSYM 354 Soil Conservation and Watershed Management

**Horticulture**
Select two of the following: 6

- HORT 100 Plants, Landscapes, & the Environment
- HORT 278 Botany
- HORT 478 Plant Anatomy

**Plant Science**
Select one of the following: 3

- HORT 221 Plant Propagation
- HORT 228 Introduction to Landscape Management

**Business**
Select one of the following: 3

- ACCT 201 Introductory Accounting I
- ACCT 202 Introductory Accounting II
- BLAW 371 Legal Environment
- MNGT 300 Management Essentials For Contemporary Organizations

**Free Electives** 10
Total Credit Hours 28

**NRES 101 Natural Resources Orientation**
Description: Introduction to natural resource disciplines. Fisheries, wildlife, forestry, grasslands, climate, and water science. Participate in field exercises in terrestrial and aquatic ecosystems.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded
Offered: FALL

**NRES 103 Introduction to Agricultural and Natural Resource Systems**
Crosslisted with: AGRI 103
Description: Agricultural and natural resource systems. The interrelationship and the impact of increased human involvement on these systems.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL/SPR

**NRES 104 Climate in Crisis**
Description: Past, present and future climate change. Climate science basics in the context of global changes (such as global warming, droughts, deforestation) that impact Earth and its inhabitants. Future climate change scenarios and possible impacts.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ACE: ACE 9 Global/Diversity

**NRES 107 Invasive Plant Species: Impacts on Ecosystems**
Crosslisted with: AGRO 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 the importance of invasive plants and 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
ACE: ACE 9 Global/Diversity
NRES 108 Earth's Natural Resource Systems Laboratory
Description: Introduction to Earth's natural resource systems. Interactions between the geosphere (solid earth) and the hydrosphere. The atmosphere and biosphere over many different spatial and temporal scales, and role of humans as part of the system.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
ACE: ACE 4 Science

NRES 109 Water in Society
Crosslisted with: SCIL 109, AECN 109, ENVR 109, GEOG 109
Description: Introduction to the scientific, social, and economic dimensions of historical and contemporary water systems. Students will develop an understanding of hydrologic systems and analyze and engage in decision-making about complex challenges associated with water resource use.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL
Prerequisite for: SCIL 300
ACE: ACE 8 Civic/Ethics/Stewardship ACE 4 Science

NRES 111 Natural Resource Conservation in Society
Description: Explore and distinguish the values, civics, and stewardship of natural resource conservation in agricultural and natural ecosystems. Examine the philosophies of ecosystem services and stewardship within a dynamic human dominated world. Students will discuss and critically analyze current issues related to conservation of natural resources.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NRES 130 People of Great Plains
Description: The Great Plains region offers considerable ecological and cultural diversity, encompassing more than 600 million acres which have been occupied by humans for over 12,000 years. Introduction to the different populations who have called the Great Plains home, and how they have made a living on this landscape. Investigate Native American life ways in the Great Plains from the time of initial colonization up to European contact and the dramatic changes experienced during the historic era. Select topics centered on contemporary socio-ecological systems on the Plains and how understanding of past Plains experiences can be used to inform on these contemporary issues.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: SCIL 300

NRES 163 Oh My Cod: Exploring Aquatic Ecology Careers
Prerequisites: Limited to Freshman or Sophomore classification only
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded with Option

NRES 170 Introduction to Great Plains Studies
Crosslisted with: ANTH 170, GEOG 170, GPSP 170, SOCI 170
Description: Interdisciplinary study of the natural environment, social environment, human heritage, arts and humanities of the Great Plains.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Groups: Regional Geography

NRES 201 Dendrology: Study and Identification of Trees and Shrubs
Crosslisted with: HORT 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

NRES 208 Applied Climate Sciences
Description: Role of the atmosphere in the natural resource system. Solar radiation, water, wind and energy, hazards and risk in the plant-soil atmosphere system. Role of weather and climate in crop zones, land use, and wildlife habitat.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3

NRES 210 Applied Ornithology
Description: To explore interactions between birds and people from economic and scientific perspectives, understand societal conflicts between feral cats and birds, hazards birds present to aircraft, the economics of bird feeding, how commercial bird hunting clubs work, how populations are affected by collisions with vehicles, windows and towers, the taxidermy industry and museum science, and hunting organizations such as Pheasants Forever and Ducks Unlimited.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded
Offered: SPRING

NRES 211 Introduction to Conservation Biology
Prerequisites: Sophomore standing.
Description: Introduction to problems faced in fulfilling the ever increasing human needs while maintaining ecosystem and biodiversity. The integration of biological fields such as wildlife biology, ecology, evolution, and genetics with non-biological fields such as economics, philosophy, and politics to the dilemma this presents.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
NRES 212 Landscape Plants I
Crosslisted with: HORT 212, LARC 212
Prerequisites: HORT 131
Notes: Requires Saturday off-campus field trips.
Description: Identification using botanical and common names for herbaceous annuals, perennials, grasses, ground covers, vines, trees, and shrubs commonly found in Great Plains gardens, parks, and landscapes is stressed through field visits.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: ARCH 467, ARCH 567, ARCH 867, LARC 467, HORT 467; HORT 213, NRES 213, LARC 213

NRES 213 Landscape Plants II
Crosslisted with: HORT 213, LARC 213
Prerequisites: HORT/LARC/NRES 212.
Notes: Continuation of HORT/LARC/NRES 212.
Description: Site requirements, landscape use, natural history, and specific needs of herbaceous ornamentals, grasses, ground covers, vines, trees, and shrubs commonly found in Great Plains gardens, parks, and landscapes. Common cultivars and additional species not covered in HORT/LARC/NRES 212.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NRES 245 Introduction to Grassland Ecology and Management
Crosslisted with: AGRO 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

NRES 222 Ecology Laboratory
Prerequisites: NRES 220 or parallel.
Notes: May also be offered at Cedar Point Biological Station. Field trips to local ecosystems are required.
Description: Field and laboratory experiments in terrestrial and aquatic ecology.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded with Option
Prerequisite for: NRES 862, NRES 462; WATS 481, WATS 881, BIOS 481, NRES 481

NRES 233 Wildlife Field Techniques
Prerequisites: Sophomore status.
Notes: Offered off-campus during academic breaks at Cedar Point Biological Station. Course fee applies.
Description: Field and laboratory skills needed for wildlife management emphasizing wildlife and vegetation surveys, mark-recapture of wildlife, radio-telemetry, aging and forensic methods, and habitat assessment.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded

NRES 220 Principles of Ecology
Prerequisites: LIFE 121 or BIOS 101 or HORT 131; 3 hours MATH.
Notes: Not open to students who have completed BIOS 207. Will not count toward a major in BIOS.
Description: Ecology as a quantitative discipline that integrates the life and earth sciences to understand the dynamics of natural and managed ecosystems.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: BIOS 459, BIOS 859, NRES 459, NRES 859, WATS 459; LARC 487, NRES 487; NRES 222, NRES 311; NRES 862, NRES 462

NRES 249 Individual and Cultural Perspectives on the Environment
Crosslisted with: ENVR 249
Description: The influence of culture on individual perspectives related to the concepts of sustainability and the relationship that humans have with the environment. The role of ethics, religion, and historical setting on the individual and cultural perspectives related to environmental challenges at the local to global scales.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ACE: ACE 9 Global/Diversity
NRES 270 Biological Invaders
Crosslisted with: AGRO 270, HORT 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

NRES 279 Soil Evaluation
Crosslisted with: AGRO 279, SOIL 279
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 3
Grading Option: Graded with Option

NRES 281 Introduction to Water Science
Crosslisted with: GEOG 281, WATS 281
Prerequisites: High school chemistry or one semester college chemistry; one course in geology or physical geography or soil.
Description: Survey of the water science from the perspective of both natural and social sciences. Water budget, precipitation, evapotranspiration, runoff and stream flow, groundwater, water quality parameters, economics of water, water policy, water law and water politics.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: NRES 319
Groups: Physical Geography

NRES 289 People and the Land: Human Environmental Interactions on the Great Plains
Crosslisted with: GEOG 289
Description: Explore human environmental interaction on the Great Plains. Samples a variety of Great Plains cultures and time periods to explore past use of the Great Plains environment. Evaluation of attributes and related data critical to the operation of past social-ecological systems with reference to changing climatic/ecological dynamics, human environmental impacts, and the sustainability of various indigenous and western modes of land use on the Great Plains. Investigate knowledge of these processes and how they can be of relevance to contemporary issues of Great Plains land management and resource utilization.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NRES 299 Special Topics
Prerequisites: Permission.
Description: Special topics in natural resources.
Credit Hours: 1-4
Min credits per semester: 1
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option

NRES 300 Toxins in the Environment
Crosslisted with: BIOS 300, ENTO 300
Prerequisites: One semester BIOS and one semester CHEM
Description: Introduction to the principles of toxicology as they apply to environmental contaminants, agri-chemicals, and industrial and naturally occurring chemicals.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NRES 301 Environmental Communication Skills
Prerequisites: ACE 1 course. Sophomore or higher.
Description: Written and oral communication skills for natural resource management including writing for the media, grant writing, conflict resolution and advocacy.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: FALL
ACE: ACE 2 Communication Competence

NRES 302 Tree Biology
Crosslisted with: HORT 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

NRES 308 Biogeography
Crosslisted with: GEOG 308, GEOL 308
Prerequisites: GEOG 155 or BIOS 101 and 101L or GEOL 101.
Notes: Biogeography is a highly interdisciplinary science, relying heavily on ecology, geological science, and climatology. It is global in scope and offers the latest knowledge in understanding organism distributions, and the factors that determine those distributions.
Description: Introduction to the basic concepts of biogeography, the study of distributions of plants and animals, both past and present.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Groups: Physical Geography
NRES 310 Introduction to Forest Management
Prerequisites: BIOS 101, AGRO/HORT 131 or LIFE 120
Description: Discussion of the history, biology, and management of the world's forest resources with emphasis on the Great Plains region. Topics include: forest types and their relationship to site conditions, ecological principles of forest management, basic forest management practices, economic and policy decisions in forest management. The field-oriented lab emphasizes tree identification, forest ecology, forest management and wood products.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Offered: FALL

NRES 311 Wildlife Ecology and Management
Prerequisites: NRES 220 or BIOS 207, or concurrent with NRES 220 or BIOS 207.
Description: Applied ecology, conservation biology, population biology, and enhancement of vertebrate, non-domestic animal populations through management. Emphasis on policy, decision-making, and management options involving people, habitat, and wildlife.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING
Prerequisite for: ASCI 321

NRES 312 Introduction to Spatial Sciences
Crosslisted with: GEOG 312
Notes: Recommended to have basic computer skills
Description: Overview of digital technology and concepts in spatial sciences. Geographic Information Systems, Remote Sensing, Geographic position systems and other spatial technology.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL/SPR

NRES 315 Human Dimensions of Fish and Wildlife Management
Description: Introduction to the basic concepts and ideas relevant in the human dimension of fisheries and wildlife management. Covers social, cultural and economic values, attitudes and behavior of individuals and groups of various stakeholders in fisheries and wildlife management.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NRES 316 Case Studies in Theoretical Ecology
Crosslisted with: BIOS 316, MATH 316
Prerequisites: MATH 106 or higher OR LIFE 121. Parallel registration in BIOS 316L.
Description: Introduction to biological literature, applied mathematics, computer programming, and/or statistical techniques relevant to field questions in ecology, evolution, and behavior. Typical mathematical topics include discrete dynamics, systems of differential equations, matrix algebra, or statistical inference and probability.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ACE: ACE 4 Science
Groups: Advanced Mathematics Courses

NRES 319 Fundamentals of Environmental Sampling
Prerequisites: SOIL 153, WATS 281, CHEM 105 or 109. Recommend taking STAT 218.
Description: Development of sampling plans and quality assurance project plans (QAPP). Stepwise procedures for correct sampling of soil-air-water environments. Data quality assessment.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Graded with Option
Prerequisite for: NRES 320

NRES 320 Fundamentals of Environmental Sampling Laboratory
Prerequisites: NRES 319 or concurrent enrollment
Notes: Outdoor and analytical laboratory field trips required.
Description: Demonstrations and hands on participation in sampling of soil-air-water environments.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded with Option

NRES 321 Arboriculture: Maintenance & Selection of Landscape Trees
Crosslisted with: HORT 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
NRES 322 Environmental Education Curricula
Description: National curricula are available to formal and non-formal educational and STEM (science, technology, engineering, and math) educators. Become certified in a series of national environmental education curricula such as Project WILD, Project WET, Project Aquatic Wild and Project Learning Tree. Apply skills and curricula by teaching others through experiential service learning.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: FALL/SPR

NRES 323 Natural Resources Policy
Prerequisites: Junior standing.
Description: Conflicts and common ground perpetuated by increasing demands on our natural resources. Policy development and issue analysis stressed. Historical policy actions reviewed and evaluated.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NRES 330 Environmental Health
Crosslisted with: NUTR 330
Prerequisites: Class standing of sophomore or above with at least one semester of chemistry and biology.
Description: Provides a comprehensive understanding of how environmental exposures to physical, chemical and biological hazards influence human health. Offers basic knowledge in the core concepts of toxicology, exposure and risk, vulnerable populations and the interrelationship between human, animal and environmental health.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL/SPR
ACE: ACE 8 Civic/Ethics/Stewardship

NRES 348 Wildlife Damage Management
Description: Fundamentals of prevention and control of damage caused by vertebrate pests, principally birds and mammals. Philosophical, ecological, and behavioral basis for controlling population levels or individuals of pest species.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NRES 361 Soils, Environment and Water Quality
Crosslisted with: AGRO 361, GEOL 361, SOIL 361, WATS 361
Prerequisites: AGRO/HORT/SOIL 153; MATH 102 or 103; two semesters of chemistry (CHEM 105, 106 or CHEM 109,110) and WATS/GEOG/
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

NRES 370 Applied Climatology
Crosslisted with: METR 370
Prerequisites: Junior or Senior Standing
Description: Processes that give rise to spatial and temporal differences in climate. Various interrelationships between humans and climate. Influence of climate on building styles, the economy, water resources, human health, and society. Humans’ inadvertent and purposeful modification of the atmosphere.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL

NRES 380 Geography of Africa
Crosslisted with: GEOG 380, ETHN 380
Description: Overview of the major physical and human landscapes in Africa. Prominent past and current events will be placed into a spatial context in an attempt to develop insight into the interrelationships that exist among people, cultures, countries, economies, and the environment, not only within Africa, but between Africa and the rest of the world.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ACE: ACE 9 Global/Diversity
Groups: Regional Geography

NRES 386 Vertebrate Zoology
Crosslisted with: BIOS 386
Prerequisites: LIFE 121 & LIFE 121L
Description: Evolutionary origin and relationships, natural history, and ecological adaptations of vertebrates. Comparative form and function, particularly of bone and muscle systems among and the diversity within vertebrate groups.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option

NRES 388 Employment Seminar
Crosslisted with: AGRI 388
Prerequisites: Sophomore standing.
Description: Efficient job-hunting. Resumes, cover letters, mock interviews, and dining etiquette.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Pass No Pass
Prerequisite for: AGRI 395
NRES 393 Digital Imaging and Storytelling in Agriculture and Natural Resources
Crosslisted with: ALEC 393
Prerequisites: Consent of instructor(s). One college level course in photography or equivalent, and knowledge of the basics of shooting still photographs or video using digital cameras. Open only to College of Agricultural Sciences and Natural Resources students.
Notes: Can be repeated for a maximum of 9 credit hours by consent of instructor.
Description: Concepts and techniques related to use of remote and automated digital camera technology to capture images in agriculture and natural resources contexts to communicate a narrative/story. Completion of individual project using a variety of technologies including camera traps, time-lapse camera systems, remote triggered cameras, as well as traditional audio and video and conventional photography.
Credit Hours: 1-9
Min credits per semester: 1
Max credits per semester: 9
Max credits per degree: 9
Grading Option: Graded

NRES 399 Independent Research
Prerequisites: 8 hrs NRES or closely related areas.
Notes: To be supervised and evaluated by a NRES faculty member.
Description: 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: 6
Grading Option: Graded with Option

NRES 402 Aquatic Insects
Crosslisted with: BIOS 485, BIOS 885, ENTO 402, ENTO 802, NRES 802
Prerequisites: 12 hrs biological sciences.
Description: Biology and ecology of aquatic insects.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Graded with Option
Prerequisite for: BIOS 485L, BIOS 885L, ENTO 402L, ENTO 802L, NRES 402L, NRES 802L

NRES 402L Identification of Aquatic Insects
Crosslisted with: BIOS 485L, BIOS 885L, ENTO 402L, ENTO 802L, NRES 802L
Prerequisites: Parallel ENTO 802, NRES 402/802, BIOS 485/885.
Description: Identification of aquatic insects to the family level.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded with Option

NRES 404 Forestry, Fisheries and Wildlife Seminar
Prerequisites: Junior standing or above in natural resources.
Description: Seminar involving technical aspects of forestry, fisheries, and wildlife management.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 2
Grading Option: Graded with Option

NRES 406 Plant Ecophysiology: Theory and Practice
Crosslisted with: AGRO 806, HORT 806, 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

NRES 408 Microclimate: The Biological Environment
Crosslisted with: AGRO 408, GEOG 408, HORT 408, METR 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
Groups: Physical Geography

NRES 409 Human Dimensions of Natural Resources
Crosslisted with: GEOG 409
Prerequisites: Junior standing; 12 credit hours in natural resources, environmental studies, or closely related fields
Description: Overview of the human dimensions of natural resources issues. Exploration of the socioeconomic, cultural, and political aspects of human behavior and how these interact with, might influence, or are influenced by the environment.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NRES 412 Introduction to Geographic Information Systems
Crosslisted with: GEOG 412, GEOG 812, NRES 812
Description: Introduction to conceptual foundations and applications of computer-based geographic information systems (GIS). GIS database development, spatial data analysis, spatial modeling, GIS implementation and administration.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Prerequisite for: GEOG 422, GEOG 822, GEOG 922, NRES 922
Groups: Techniques
NRES 413 Environmental Leadership
Crosslisted with: ALEC 410, ALEC 810, NRES 813
Prerequisites: Junior standing.
Notes: Offered on the World Wide Web (WWW) fall semester of odd-numbered years and in the classroom fall semester of even numbered-years.
Description: Major leaders in conservation and ecology that emphasizes agricultural and cultural issues and relationships with the environment.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NRES 415 GIS for Agriculture and Natural Resources
Crosslisted with: NRES 815
Prerequisites: NRES 312
Description: Principles of digitizing earth observations. Manipulate spatial data, create maps, and conduct spatial analyses. Use GIS to analyze and solve real-world questions in agriculture and natural resources.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded
Offered: FALL

NRES 417 Agroforestry Systems in Sustainable Agriculture
Crosslisted with: HORT 418, HORT 818, 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

NRES 418 Introduction to Remote Sensing
Crosslisted with: GEOG 418, GEOG 818, NRES 818
Prerequisites: 9 hours of GEOL, NRES or GEOG.
Notes: Advanced standing in geography, natural resources, environmental sciences, engineering or agronomy recommended.
Description: Introduction to remote sensing of the earth from aerial and satellite platforms. Aerial photography, multispectral scanning, thermal imaging and microwave remote sensing techniques. Physical foundations of remote sensing using electromagnetic energy, energy-matter interactions, techniques employed in data acquisition and methods of image analysis. Weekly laboratory provides practical experience in visual and digital interpretation of aerial photography, satellite imagery, thermal and radar imagery. Applications in geographic, agricultural, environmental and natural resources analyses.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Prerequisite for: GEOG 420, GEOG 820; GEOG 421, GEOG 821, NRES 421, NRES 821
Groups: Techniques

NRES 419 Chemistry of Natural Waters
Crosslisted with: GEOL 418, GEOL 818, NRES 819, WATS 418
Prerequisites: CHEM 109 and 110, 113 and 114, or CHEM 111.
Description: Principles of water chemistry and their use in precipitation, surface water, and groundwater studies. Groundwater applications used to determine the time and source of groundwater recharge, estimate groundwater residence time, identify aquifer mineralogy, examine the degree of mixing between waters of various sources and evaluate what types of biological and chemical processes have occurred during the water’s journey through the aquifer system.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: GEOL 418L, GEOL 818L, NRES 419L, NRES 819L, WATS 418L; GEOL 917, NRES 917

NRES 419L Chemistry of Natural Waters Laboratory
Crosslisted with: GEOL 418L, GEOL 818L, NRES 819L, WATS 418L
Prerequisites: CHEM 109 and 110 or CHEM 113 and 114; GEOL 418 or parallel.
Description: Basic laboratory techniques used to perform water analysis including various wet chemical techniques, instrument use (AA, IC, UV-Visible) and computer modeling. Techniques for sample collection and preservation, parameter estimation and chemical analysis.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded with Option

NRES 420 Applications of Remote Sensing in Agriculture and Natural Resources
Crosslisted with: AGRO 419, GEOG 419, GEOL 419, 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
Groups: Techniques

NRES 421 Field Techniques in Remote Sensing
Crosslisted with: GEOG 421, GEOG 821, NRES 821
Prerequisites: NRES 418/818
Description: Field techniques as they relate to remote-sensing campaigns. Research methods, systematic approaches to data collection, field spectroscopy, collecting ancillary information linked with spectroscopic data sets as well as aircraft or satellite missions and subsequent analyses of acquired data.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Groups: Techniques
NRES 422 Laboratory Earth: Earth's Changing Systems
Crosslisted with: NRES 822
Description: Fundamental concepts related to understanding Earth's changing natural systems in the past, present, and the future. The cycling of matter and energy, the relationship between human activity and environmental change; and the consequence of these relationships.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NRES 423 Integrated Resources Management
Crosslisted with: NRES 823
Prerequisites: Senior standing, natural resources or related major.
Description: Integrated and multiple-use management. Economic, political, social, and physical impacts on natural resources management priorities.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NRES 424 Forest Ecology
Crosslisted with: NRES 824
Prerequisites: NRES 220 or BIOS 207
Description: The structure and function of forest ecosystems including their response to global change; emphasis on forest succession and disturbance regimes in order to understand the dynamics of forested landscapes.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING

NRES 426 Invasive Plants
Crosslisted with: AGRO 426, AGRO 826, HORT 426, HORT 826, 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

NRES 427 Introduction to the Global Positioning System (GPS)
Crosslisted with: GEOG 427, GEOG 827, NRES 827
Prerequisites: Junior standing.
Notes: Familiarity with mapping and GIS recommended.
Description: Integrated lectures, lab exercises and field experience provide an understanding of GPS technology and applications. Students will learn to collect, correct and use GPS data in a geographic information system (GIS) environment.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Graded with Option

NRES 428 Leadership in Public Organizations
Crosslisted with: ALEC 428, ALEC 828, NRES 828
Prerequisites: Junior standing
Description: Leadership in theories, research, and practices in public organizations and natural resource agencies.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NRES 429A Food Security: A Global Perspective
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

NRES 431 Waterfowl Ecology and Management
Crosslisted with: NRES 831
Prerequisites: NRES 311
Description: Ecology and identification of North American waterfowl, management of habitats and populations, and current management issues.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NRES 433 Wildlife Management Techniques
Crosslisted with: NRES 833
Prerequisites: NRES 311
Description: Survey of methods used to obtain data and make decisions for wildlife management. Scientific methods for wildlife science; monitoring and surveys; construction of management plans; habitat use, classification, and management; harvest management.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ACE: ACE 10 Integrated Product

NRES 434 Environmental Education and Interpretation
Crosslisted with: NRES 834, ENVR 434
Notes: Requires 20 hours of service.
Description: Examination of formal and informal environmental education and interpretation. Knowledge, application and practice relevant to science teachers and park, extension, museums, and zoo educators.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
NRES 435 Agroecology  
Crosslisted with: AGRO 435, AGRO 835, HORT 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  

NRES 436 Evolution of Cenozoic Mammals  
Crosslisted with: GEOL 436, GEOL 836, NRES 836  
Prerequisites: GEOL 103  
Description: Survey of mammalian evolution with emphasis on the origin, radiation, and phylogenetic relationships of Cenozoic fossil mammals. Overview of climatic and ecological changes affecting mammalian adaptations and hands on experience with specimens.  
Credit Hours: 3  
Max credits per semester: 3  
Max credits per degree: 3  
Grading Option: Graded with Option  

NRES 438 Grassland Conservation: Planning and Management  
Crosslisted with: NRES 838  
Prerequisites: UG: Junior Standing; Grad: None  
Notes: Recommended: introductory ecology and introductory soils courses  
Description: Apply fundamental grassland ecology principles to grassland conservation and identify grassland establishment and management practices appropriate for different environmental and cultural situations. Based on field study, critically analyze management options and outcomes for several grasslands and develop a management plan for a grassland resource.  
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  

NRES 440 Great Plains Ecosystem  
Crosslisted with: AGRO 440, AGRO 840, NRES 840, RNGE 440, GRAS 440  
Prerequisites: Junior standing.  
Notes: BIOS 101 and 101L, or equivalent, recommended.  
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  

NRES 441 Zoo Keeping and Management  
Crosslisted with: AGRO 441, AGRO 841, NRES 441, RNGE 441, GRAS 441  
Prerequisites: 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  

NRES 444 Ecosystem Monitoring and Assessment  
Crosslisted with: AGRO 444, AGRO 844, NRES 444, RNGE 444, GRAS 444  
Prerequisites: Junior standing.  
Notes: BIOS 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  

NRES 445 Human Remains in Forensic Science  
Crosslisted with: FORS 445, FORS 845, NRES 845  
Prerequisites: LIFE 120/L and LIFE 121/L, CHEM 109, CHEM 110, and FORS 120/L.  
Description: Forensic anthropolgy within the broader context of forensic sciences and physical anthropology. Decomposition and bone modification through artificial means. Determination of individual identity, diet, chronic pathology and cause of death from human remains.  
Credit Hours: 4  
Max credits per semester: 4  
Max credits per degree: 4  
Grading Option: Graded with Option  
Offered: FALL
NRES 446 Pollen Analysis for Behavioral, Biological and Forensic Science
Crosslisted with: FORS 446, FORS 486, NRES 846
Prerequisites: BIOS 109 and FORS 120.
Description: Collection, processing, identification of common North American pollen types. Pollination ecology relating to scene reconstruction. Fundamental statistics and presentation requirements for a legal and scientific audience.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Offered: FALL

NRES 447 Archaeoparasitology: The Archaeology of Disease
Crosslisted with: NRES 847
Description: Study of parasites, their hosts, and the relationship between them. Human parasitology is especially interesting due to the adaptation of human populations to a great variety of parasites over long periods of time in the global diversity of environments. Fundamental understanding of human-parasite relations and methods of recovery of parasites from a variety of archaeological remains.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL

NRES 448 Advanced Topics in Wildlife Damage Management
Crosslisted with: NRES 848
Prerequisites: NRES 348.
Description: Economic, global, and public policy issues relative to situations in which wildlife damage personal property or natural resources, threaten human health and safety, or are a nuisance. Demonstration and discussion of technological advances in fertility control, damage resistance, toxicology, behavioral modification, and biological management.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Graded with Option

NRES 450 Biology of Wildlife Populations
Crosslisted with: BIOS 450, BIOS 850, NRES 850
Prerequisites: NRES 311; MATH 104 or above; STAT 218 or equivalent
Description: Principles of population dynamics. Management strategies (for consumptive and nonconsumptive fish and wildlife species) presented utilizing principles developed.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Offered: SPRING

NRES 451 Soils, Water, and Environmental Chemistry
Crosslisted with: ENVE 851, NRES 851
Prerequisites: NRES/WATS/AGRO/GEOL 361 or graduate standing
Description: Environmental chemistry related to the fate and transport of organic contaminants in soil-water environments. Application of computer simulation models (i.e., MODFLOW) for predicting contaminant fate in aquifers. Basic chemical and biological principles of remediating contaminated soil and water.
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

NRES 452 Climate and Society
Crosslisted with: AGRO 450, GEOG 450, METR 450, 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
Groups: Physical Geography

NRES 453 Hydrology
Crosslisted with: NRES 853
Prerequisites: MATH 106
Notes: Not available for credit for engineering students and not a substitute for CIVE 456.
Description: Introduction to the principles of hydrology, with emphasis on the components of the hydrologic cycle: precipitation, evaporation, groundwater flow, surface runoff, infiltration, precipitation runoff relationships.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NRES 454 Ecological Interactions
Crosslisted with: BIOS 454, BIOS 854, NRES 854
Prerequisites: LIFE 121; LIFE 121L; BIOS 207 or NRES 220; Senior Standing
Description: Nature and characteristics of populations and communities. Interactions within and between populations in community structure and dynamics. Direct and indirect interactions and ecological processes, competition, predation, parasitism, herbivory, and pollination. Structure, functioning and persistence of natural communities, foodweb dynamics, succession, and biodiversity.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
ACE: ACE 10 Integrated Product
<table>
<thead>
<tr>
<th>Course</th>
<th>Crosslisted with</th>
<th>Prerequisites</th>
<th>Description</th>
<th>Credit Hours</th>
<th>Max credits per semester</th>
<th>Max credits per degree</th>
<th>Grading Option</th>
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<tbody>
<tr>
<td>NRES 455 Soil Chemistry and Mineralogy</td>
<td>AGRO 455, AGRO 855, NRES 855, SOIL 455</td>
<td>AGRO/HORT/SOIL 153 or GEOL 101; CHEM 109 and 110; CHEM 221 or 251; or equivalent</td>
<td>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.</td>
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<tr>
<td>NRES 456 Mathematical Models in Biology</td>
<td>BIOS 456, BIOS 856, NRES 856</td>
<td>LIFE 120; LIFE 120L; LIFE 121; LIFE 121L; MATH 107</td>
<td>Biological systems, from molecules to ecosystems, are analyzed using mathematical techniques. Strengths and weaknesses of mathematical approaches to biological questions. Brief review of college level math; introduction to modeling; oscillating systems in biology; randomness in biology; review of historically important and currently popular models in biology.</td>
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<td>Graded with Option</td>
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<tr>
<td>NRES 457 Green Space and Urban Forestry Management</td>
<td>NRES 857, HORT 457</td>
<td>Junior or senior standing, Graduate student or permission</td>
<td>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.</td>
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<td>NRES 458 Soil Physical Determinations</td>
<td>AGRO 458, AGRO 858, NRES 858, SOIL 458</td>
<td>SOIL/AGRO/GEOL/WATS 361; PHYS 141 or equivalent; MATH 102 or 103.</td>
<td>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.</td>
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<td>Graded with Option</td>
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<td>NRES 459 Limnology</td>
<td>BIOS 459, BIOS 859, NRES 859, WATS 459</td>
<td>12 hrs BIOS, including BIOS/NRES 220/BIOS220x; two semesters CHEM.</td>
<td>Physical, chemical, and biological processes that occur in fresh water. Organisms occurring in fresh water and their ecology; biological productivity of water and its causative factors; eutrophication and its effects.</td>
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<td>Graded with Option</td>
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<tr>
<td>NRES 460 Soil Microbiology</td>
<td>AGRO 460, BIOS 460, SOIL 460, AGRO 860, BIOS 860, NRES 860</td>
<td>One semester microbiology; one semester biochemistry or organic chemistry.</td>
<td>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.</td>
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<td>Graded with Option</td>
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<tr>
<td>NRES 461 Soil Physics</td>
<td>AGRO 461, GEOL 461, SOIL 461, WATS 461, AGRO 861, GEOL 861, NRES 861</td>
<td>AGRO/SOIL 153; PHYS 141 or equivalent, one semester of calculus.</td>
<td>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.</td>
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<td>Graded with Option</td>
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<tr>
<td>NRES 462 Conservation Biology</td>
<td>NRES 862</td>
<td>12 hours of biological sciences, including NRES 220 and NRES 222 or equivalent.</td>
<td>Current issues in conservation biology. Theoretical principles from the areas of ecology and genetics to effectively preserve and manage biological diversity and small populations.</td>
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<td>Graded with Option</td>
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### NRES 463 Fisheries Science
Crosslisted with: NRES 863
**Description:** Fisheries biology emphasizing the determination and evaluation of vital statistics for the management of fish populations. Basis of specific management techniques. May also be offered at Cedar Point Biological Station.
**Credit Hours:** 3
- **Max credits per semester:** 3
- **Max credits per degree:** 3
- **Grading Option:** Graded with Option
- **ACE:** ACE 10 Integrated Product

### NRES 463L Fisheries Science Lab
Crosslisted with: NRES 863L
**Description:** Field and laboratory skills needed for fisheries biology emphasizing the determination and evaluation of vital statistics for the management of fish populations. Applied data collection and fish sampling techniques will be used. May also be offered at Cedar Point Biological Station.
**Credit Hours:** 1
- **Max credits per semester:** 1
- **Max credits per degree:** 1
- **Grading Option:** Graded with Option

### NRES 464 Fisheries Biology
Crosslisted with: BIOS 464, BIOS 864, NRES 864
**Prerequisites:** BIOS/NRES 489/889 or equivalent.
**Description:** Biology of fishes. Factors that affect fishes in the natural environment. Techniques used in the analysis and management of fish populations.
**Credit Hours:** 3
- **Max credits per semester:** 3
- **Max credits per degree:** 3
- **Grading Option:** Graded with Option

### NRES 465 Soil Geomorphology and Paleopedology
Crosslisted with: GEOL 465, GEOL 865, NRES 865
**Prerequisites:** GEOL 450/850 and NRES 477/877.
**Description:** Soils and paleosols as evidence in reconstruction landscape evolution and paleoenvironments. Role of paleosols in stratigraphy.
**Credit Hours:** 3
- **Max credits per semester:** 3
- **Max credits per degree:** 3
- **Grading Option:** Graded with Option

### NRES 467 Global Climate Change
Crosslisted with: METR 483, METR 883, NRES 867
**Prerequisites:** Junior standing; and METR 475/875.
**Notes:** Offered fall semester of even-numbered calendar years.
**Description:** Elements of climate systems, El Nino/LaNina cycle and monsoons, natural variability of climate on interannual and interdecadal scales. Paleoclimate, and future climate, developed climate change scenarios and climate change impacts on natural resources and the environment.
**Credit Hours:** 3
- **Max credits per semester:** 3
- **Max credits per degree:** 3
- **Grading Option:** Graded with Option

### NRES 468 Wetlands
Crosslisted with: BIOS 458, NRES 868, WATS 468, BSEN 468, BSEN 868
**Prerequisites:** CHEM 109 and CHEM 110, or CHEM 105 and CHEM 106; Junior or Senior Standing.
**Notes:** Offered even-numbered calendar years.
**Description:** Physical, chemical and biological processes that occur in wetlands; the hydrology and soils of wetland systems; organisms occurring in wetlands and their ecology wetland creation, delineation, management and ecotoxicology.
**Credit Hours:** 4
- **Max credits per semester:** 4
- **Max credits per degree:** 4
- **Grading Option:** Graded with Option

### NRES 469 Bio-Atmospheric Instrumentation
Crosslisted with: AGRO 469, GEOG 469, HORT 407, METR 469, MSYM 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
- **Groups:** Physical Geography

### NRES 470 Lake and Reservoir Restoration
**Prerequisites:** 12 hrs NRES or related fields.
**Description:** Theory, processes, and mechanisms underlying lake and reservoir water quality degradation and/or pollution and remediation of eutrophications and its effects. Current techniques used to restore and protect degraded lakes.
**Credit Hours:** 3
- **Max credits per semester:** 3
- **Max credits per degree:** 3
- **Grading Option:** Graded with Option

### NRES 472 Applied Soil Physics
Crosslisted with: AGRO 472, AGRO 872, NRES 872, SOIL 472, WATS 472
**Prerequisites:** AGRO/HORT/SOIL 153 or equivalent; MATH 104 or MATH 106 or equivalent.
**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

### NRES 477 Regional and Community Forestry
**Prerequisites:** Junior or Senior Standing.
**Description:** Emphasis on regional and community forestry. Discussion of the role of forestry in regional development and economic spin-offs. Includes case studies of regional and local impacts of forestry.
**Credit Hours:** 3
- **Max credits per semester:** 3
- **Max credits per degree:** 3
- **Grading Option:** Graded with Option
NRES 474 Herpetology
Crosslisted with: BIOS 474, BIOS 874, NRES 874
Prerequisites: BIOS/NRES 386 and permission.
Notes: BIOS 388 recommended.
Description: Fossil and living amphibians and reptiles. Anatomy, classification, ecology and evolution.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option

NRES 475 Water Quality Strategy
Crosslisted with: NRES 875, SOCI 475, SOCI 875, SOIL 475, WATS 475, AGRO 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

Groups: American Government&Public Pol

NRES 476 Mammalogy
Crosslisted with: BIOS 476, BIOS 876, NRES 876
Prerequisites: 8 hrs BIOS, BIOS/NRES 386 or NRES 311.
Notes: May also be offered at Cedar Point Biological Station. Field trips are required and may occur outside of scheduled class time. Lab and field time emphasize diversity of mammalian families and species identification of Nebraska mammals.
Description: Evolution, natural history, ecology, and functional morphology of planetary mammals and mammals of the Northern Great Plains.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option

NRES 477 Great Plains Field Pedology
Crosslisted with: AGRO 477, GEGG 467, SOIL 477, GEGG 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
Groups: Physical Geography

NRES 478 Regional Climatology
Crosslisted with: METR 478, METR 878, NRES 878
Prerequisites: NRES/METR 370.
Description: Regional differentiation of the climates of the earth on both a descriptive and dynamic basis. The chief systems of climatic classification.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NRES 479 Hydroclimatology
Crosslisted with: METR 479, WATS 479, BSEN 479, NRES 879, METR 879, BSEN 879
Prerequisites: NRES 208 or METR 100 or METR/NRES 370.
Notes: Offered spring semester of even-numbered calendar years.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NRES 481 Stream and River Ecology
Crosslisted with: WATS 481, WATS 881, BIOS 481
Prerequisites: NRES 222 or equivalent.
Description: Fundamental physical drivers operating in stream and river ecosystems and how those vary in space and time. Major classes of organisms associated with stream ecosystems and their functional roles. Fundamental controls on biotic diversity in stream and river ecosystems and its variance. Major aspects of stream ecosystem function including energy flow and nutrient cycling. Ecosystem services provided by stream and river ecosystems and causes and consequences of human impacts on streams and rivers. Underlying principles of bioassessment and current methods of stream restoration.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded

NRES 482 Ecophysiology of Wildlife
Crosslisted with: NRES 882
Prerequisites: NRES 220 or BIOS 207; AGRO 215/BIOS 206; BIOS 386
Description: Evaluation of the conserved physiological principles that are broadly used across animal groups, as well as the many unique adaptations used by specific taxa. Focuses on all major vertebrate groups, including fish, birds, mammals, reptiles and amphibians, and links the physiological mechanisms that allow them to survive to the environments in which they live. Highlights methods scientists use to gather physiological information, and the ways in which this information can be used by scientists in a variety of different fields.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: FALL
NRES 484 Water Resources Seminar
Crosslisted with: AGRO 484, GEOG 484, GEOL 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

NRES 487 Introduction to Landscape Ecology
Crosslisted with: LARC 487
Prerequisites: AGRO/HORT/SOIL 153 and BIOS/NRES 220.
Notes: HORT/LARC/GEOG 200, CIVE 353/853/NRES 853, and CRPL 470 recommended.
Description: The history, principles, and concepts of landscape ecology. Use and application of landscape structure, function in the planning, the design, and management of human and natural landscapes.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

NRES 488 Groundwater Geology
Crosslisted with: GEOL 488, GEOL 888, NRES 888
Prerequisites: GEOL 100-level course; MATH 106 or equivalent.
Description: Occurrence, movement, and development of water in the geologic environment.
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; GEOL 470, GEOL 870; GEOL 889, NRES 887; GEOL 986; NRES 918

NRES 489 Ichthyology
Crosslisted with: BIOS 489, BIOS 889, NRES 889
Prerequisites: LIFE 120 and LIFE 121
Notes: May also be offered at Cedar Point Biological Station.
Description: Fishes, their taxonomy, physiology, behavior, and ecology. Dynamics of fish stocks and factors regulating their production.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Prerequisite for: BIOS 464, BIOS 864, NRES 464, NRES 864

NRES 491 Geography Field Tour
Crosslisted with: GEOG 491, GEOG 891
Description: Group educational tours to specific sites that illustrate aspects of physical and cultural geography. Off-campus travel required.
Credit Hours: 2-3
Min credits per semester: 2
Max credits per semester: 3
Max credits per degree: 6
Grading Option: Graded
Groups: Physical Geography

NRES 492 International Study Tours in Natural Resource Management
Crosslisted with: NRES 492H, NRES 892
Prerequisites: Permission.
Notes: Off-campus travel may be required. Choice of subject matter and coordination of on- and off-campus study is at the discretion of the instructor.
Description: Group educational tours to sites that illustrate the diversity of approaches to natural resources management found around the world.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 6
Grading Option: Graded with Option
ACE: ACE 9 Global/Diversity

NRES 492H International Study Tours in Natural Resource Management
Crosslisted with: NRES 492, NRES 892
Prerequisites: Permission.
Notes: Off-campus travel may be required. Choice of subject matter and coordination of on- and off-campus study is at the discretion of the instructor.
Description: Group educational tours to sites that illustrate the diversity of approaches to natural resources management found around the world.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 6
Grading Option: Graded with Option
ACE: ACE 9 Global/Diversity

NRES 495 Grasslands Seminar
Crosslisted with: AGRO 495, ENTO 495, GRAS 495, HORT 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

NRES 496 Independent Study
Prerequisites: 12 hrs natural resource sciences or closely-related fields, and permission.
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
Groups: Physical Geography
NRES 497 Career Experiences in Natural Resource Sciences
Prerequisites: Sophomore standing; School of Natural Resources (SNR) majors; permission and advanced approval of a plan of work.
Description: Off-campus work experiences sponsored by natural resource agencies, companies, and organizations. Students collaborate in the development of a plan of work that will identify student responsibilities, including a final written report.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Graded with Option

NRES 498 Special Topics in Natural Resources
Crosslisted with: NRES 898
Prerequisites: 6 hrs NRES or equivalent.
Description: Current issues in natural resource sciences.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 12
Grading Option: Graded with Option

NRES 499 Thesis Research
Prerequisites: Admission to the University Honors Program and permission.
Notes: Requires conducting a scholarly research project and writing an undergraduate thesis.
Credit Hours: 3-6
Min credits per semester: 3
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Graded with Option

NRES 499H Honors Thesis
Prerequisites: Admission to the University Honors Program and permission.
Notes: AGRI 299H recommended.
Description: Conduct a scholarly research project and write a University Honors Program or undergraduate thesis.
Credit Hours: 3-6
Min credits per semester: 3
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Graded

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 using real-world case studies.
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 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: Biology of plants grown for food, fiber, fun, or fuel. Plant life cycles in managed ecosystems and their role in global carbon and water cycles. Mechanisms plants use to drive and control their growth, propagate, and change to compete with other organisms in their environment.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
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; BIOS 369, PLPT 369; HORT 212, NRES 212, LARC 212; HORT 352; 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
Crosslisted with: AGRO 134, TLMT 134
Description: Growth, anatomy, morphology, and physiology of fruits, vegetables, woody plants, ornamentals and turf. Emphasis on both field and greenhouse grown horticultural plants.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded with Option
Prerequisite for: AGRO 131, HORT 131

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: HORT 306, HORT 307
HORT 153 Soil Resources
Crosslisted with: AGRO 153, SOIL 153
Prerequisites: High school chemistry or one semester college chemistry.
Description: Characteristics of soils in relation to their appropriate uses and protection. Principles and practices using cooperative exercises including discussion, assessment, planning, problem-solving, writing, and presentation involving all aspects of soils.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Prerequisite for: AGRO 153, 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
Prerequisite for: HORT 215; HORT 265; HORT 267
ACE: ACE 7 Arts ACE 9 Global/Diversity
Groups: Human-Economic Geography

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 202 Landscape Plants I
Crosslisted with: NRES 212, LARC 212
Prerequisites: HORT 131
Notes: Requires Saturday off-campus field trips.
Description: Identification using botanical and common names for herbaceous annuals, perennials, grasses, ground covers, vines, trees, and shrubs commonly found in Great Plains gardens, parks, and landscapes is stressed through field visits.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: ARCH 467, ARCH 567, ARCH 867, LARC 467, HORT 467; HORT 213, NRES 213, LARC 213

HORT 212 Landscape Plants II
Crosslisted with: NRES 213, LARC 213
Prerequisites: HORT/LARC/NRES 212.
Notes: Continuation of HORT/LARC/NRES 212.
Description: Site requirements, landscape use, natural history, and specific needs of herbaceous ornamentals, grasses, ground covers, vines, trees, and shrubs commonly found in Great Plains gardens, parks, and landscapes. Common cultivars and additional species not covered in HORT/LARC/NRES 212.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

HORT 213 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 214 Herbaceous Landscape Plants
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
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 278 taken previously or concurrently
Description: Principles and practices involved in sexual and asexual propagation of herbaceous and woody plants. Laboratory work includes actual practice to gain skill and experience on the different methods of propagating plants.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING
Prerequisite for: HORT 362; HORT 395

HORT 227 Introductory Turfgrass Management
Crosslisted with: AGRO 227, TLMT 227
Prerequisites: AGRO/HORT 131 or AGRO/HORT 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 326, HORT 326, TLMT 326; AGRO 327, HORT 327, TLMT 327; TLMT 295; 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 management and landscape design. Principles and practices.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL
Prerequisite for: AGRO 326, HORT 326, TLMT 326; TLMT 327; TLMT 295; TLMT 395T

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 of floral design and retail florist shop management, while offering practical experience in all aspects of flower arranging. Includes identification, care and handling, marketing and critiquing of floral designs.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: HORT 262
ACE: ACE 7 Arts

HORT 262 Floral Design II
Prerequisites: HORT 261 or permission.
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

HORT 265 Visual Communication for Landscape Design
Prerequisites: HORT 200.
Description: Graphic and oral presentation techniques for landscape design; sketching; introduction to use of various media and computers for visual communication and landscape analysis.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: HORT 267

HORT 267 Introduction to Landscape Design Studio
Prerequisites: HORT 200, HORT 265 or permission
Notes: Requires individual and team projects, studio critiques, presentations, and may require off-campus site visits outside of scheduled class time.
Description: Introduction to the process and elements of landscape design.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
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 and 101L or LIFE 120 and LIFE 120L or AGRO/HORT 131 and AGRO 132 or HORT 133.  
**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  
**Offered:** SPRING  
**Prerequisite for:** AGRO 227, HORT 227, TLMT 227; AGRO 228, HORT 228, TLMT 228; HORT 221

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  
**Notes:** Offered Spring Semester of odd years and alternate with HORT 301. Requires field trips to landscape installation sites.  
**Description:** Materials, systems, and methods for constructing landscapes.  
**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 operation and use of greenhouses and other controlled 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 325 Landscape Solutions
Crosslisted with: AGRO 326, TLMT 326
Prerequisites: TLMT/AGRO/HORT 227 or 228
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
Prerequisite for: AGRO 470, HORT 470, TLMT 470

HORT 327 Turfgrass Science and Management
Crosslisted with: AGRO 327, TLMT 327
Prerequisites: AGRO/HORT/SOIL 153; CHEM 105 or 109; 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: Principles underlying the management and production of floricultural, fruit and vegetable 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 suggested.
Description: Vegetable crop production principles and practices, both locally and from a global perspective. Experience with seedling, 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

HORT 354 Fruit Production Laboratory
Prerequisites: AGRO/HORT 131
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

HORT 355 Perennial, Pot and Bedding Plant Production Laboratory
Prerequisites: AGRO/HORT 131 and HORT 133
Notes: 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

HORT 356 Nursery Crop Production
Prerequisites: AGRO/HORT 131; HORT 221
Notes: Offered spring semester of even-numbered calendar years. Requires a culminating group project creating one of four types of nursery landscape businesses.
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
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

HORT 407 Bio-Atmospheric Instrumentation
Crosslisted with: AGRO 469, GEGG 469, METR 469, MSYM 469, NRES 469, AGRO 869, GEGG 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
Groups: Physical Geography
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
Groups: Physical Geography

HORT 409A Case studies in plant breeding: Breeding for Disease Resistance
Crosslisted with: AGRO 409A, AGRO 809A, HORT 809A
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

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

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

HORT 429A Food Security: A Global Perspective
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

ACE: ACE 10 Integrated Product
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. Manipulation and 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

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/SPRING

HORT 467 Planting Design
Crosslisted with: ARCH 467, ARCH 567, ARCH 867, LARC 467
Prerequisites: HORT/LARC/NRES 212; ARCH 210 or HORT/LARC 266.
Description: Design processes, principles, and elements as applied to the use of native and ornamental plant materials. Aesthetic, functional, and micro-climatic arrangements of plant material in parks, on commercial property, on home grounds, along roadways, and in urban open spaces. Develop a palette of plants and graphics for designs.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded
HORT 469 Senior Landscape Design
Crosslisted with: ARCH 469
Prerequisites: HORT 341 and/or permission.
Description: Capstone course for the landscape option. Students work individually on real-world projects with actual clients. They select the project location and scope in consultation with the instructor prior to the semester this course is taken. The project must reflect evidence of a design process, design articulation and communication understandable to the client and provide in depth drawings, details needed to carry out the implementation of the design.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
ACE: ACE 10 Integrated Product

HORT 470 Critical Thinking in Landscape Management
Crosslisted with: AGRO 470, TLMT 470
Prerequisites: AGRO/HORT/PGMP/TLMT 326.
Description: Using processes and strategies to identify and compare issues, make recommendations, demonstrate proficiency in field application as skills and techniques, and prepare cost estimates in the development of landscape management plans.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
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
ACE: ACE 10 Integrated Product

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 Rootzones
Crosslisted with: AGRO 480, TLMT 480, TLMT 880, AGRO 880, HORT 880
Notes: Offered as a five-week course.
Description: Modified rootzones 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

HORT 488 Entrepreneurship and Enterprise Development
Crosslisted with: HORT 888, EAEP 488, AGRO 888, ENTR 888, 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

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.

Regional and Community Forestry - Arboriculture
Regional and Community Forestry - Urban Forestry Management