FISHERIES & WILDLIFE

Description

Website: http://snr.unl.edu/undergrad/majors/fish_wild/

Fisheries and wildlife (F&W) professionals are responsible for the conservation, protection, regulation, and management of our nation's fish and wildlife resources. Their management strategies must provide for both consumptive (hunting, fishing) and non-consumptive uses (bird watching, non-game species enhancement, threatened and endangered species protection, conservation biology, zoo management, and others).

Students who successfully fulfill the requirements in the fisheries and wildlife degree program are prepared to enter postgraduate programs as well as competitively enter the workforce. The curriculum reflects the civil service requirements of the federal government for wildlife and fisheries biologists and incorporates course requirements for certification in professional societies. The breadth of the curriculum prepares graduates to address complex environmental issues and to interact professionally with a multitude of natural resources disciplines in order to develop solutions to problems. Typical careers for graduates of this degree program include fisheries biologist, wildlife biologist, law enforcement officer, ecologist, habitat manager, zookeeper, disease specialist, or research biologist with private consulting firms and zoos, or with governmental resource management agencies at the local, state, or federal level. Because this is a broad field, students should consult their advisor as they select one of the eight options.

College Requirements

College Admission

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

Admission Deficiencies/Removal of Deficiencies

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

Deficiencies in the required entrance subjects can be removed by the completion of specified courses in the University or by correspondence.

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

College Degree Requirements

Curriculum Requirements

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

World Languages/Language Requirement

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

Experiential Learning

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

Minimum Hours Required for Graduation

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

Grade Rules

Removal of C-, D, and F Grades

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

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

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

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

Pass/No Pass

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

GPA Requirements

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

Transfer Credit Rules

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

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

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

Joint Academic Transfer Programs

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

Dual Degree Programs

A to B Programs

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

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

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

Participating community colleges include:

- Central Community College
- Metropolitan Community College
- Mid-Plains Community College
- Nebraska College of Technical Agriculture
- Nebraska Indian Community College
- Northeast Community College
- Southeast Community College
- Western Nebraska Community College

3+2 Programs

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

Cooperative Degree Programs

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

UNL Degree-Granting Programs

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

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

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

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

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

Non University of Nebraska–Lincoln Degree-Granting Programs

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

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

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[1] (>299) including the appropriate ACE 10 degree requirement or an approved ACE 10

substitution offered through another Nebraska college and excluding independent study regardless of the number of hours transferred. Credit earned during education abroad may be used toward the residency requirement if students register through the University of Nebraska–Lincoln and participate in prior-approved education abroad programs. The University of Nebraska–Lincoln open enrollment and summer independent study courses count toward residence.

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

Online and Distance Education

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

For further information, contact:

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

Independent Study Rules

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

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

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

Other College Degree Requirements

Capstone Course Requirement

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

ACE Requirements

All students must fulfill the Achievement Centered Education (ACE) requirements. Information about the ACE program may be viewed at ace.unl.edu (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. Students transferring from a community college, but without admission to a Joint Academic Transfer Program, may be eligible to fulfill the requirements as stated in the catalog for an academic year in which they were enrolled at the community college prior to attending the University of Nebraska-Lincoln. This decision should be made in consultation with academic advisors, provided the student a) was enrolled in a community college during the catalog year they are utilizing, b) maintained continuous enrollment at the previous institution for 1 academic year or more, and c) continued enrollment at the University of Nebraska-Lincoln within 1 calendar year from their last term at the previous institution. In consultation with advisors, a student may choose to follow a subsequent catalog for any academic year in which they are admitted to and enrolled as a degree-seeking student at the University of Nebraska–Lincoln in the College of Agricultural Sciences and Natural Resources. Students must complete all degree requirements from a single catalog year. The catalog which a student follows for degree requirements may not be more than 10 years old at the time of graduation.

Learning Outcomes

Graduates of fisheries and wildlife will be able to:

1. Describe and explain the basic characteristics of natural resource systems, which include humans, climate, hydrology, geology and biology, and use standard mapping systems and technology to locate those resources in space.
2. Use appropriate resources to identify (with scientific names) flora and/or fauna in at least two specialized groups (grassland plants, woody plants, invertebrates, reptiles/amphibians, birds, mammals, fish, etc.).
3. Construct graphical and tabular summaries of quantitative data, conduct simple statistical analyses of those data, and use mathematical concepts to represent the dynamics of natural resource systems.
4. Recommend appropriate management actions to achieve a habitat management or wildlife population objective.
5. Know the basic pieces of federal legislation relevant to fish and wildlife management (e.g., Endangered Species Act, Migratory Bird Act, National Environmental Planning Act) and how to incorporate their requirements into a natural resources planning process.

Major Requirements

Core Requirements

The following basic courses are required for students in fisheries and wildlife. 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)		
SCIL 101	Science and Decision-Making for a Complex World	3
Credit Hours Subtotal:		3
Mathematics (ACE 3)		
Select one of the following:		3-5

MATH 104	Applied Calculus	
MATH 106	Calculus I	
Credit Hours Subtotal:		3-5
Statistics		
Select one of the following:		3
STAT 218	Introduction to Statistics	
STAT 380	Statistics and Applications [1]	
Credit Hours Subtotal:		3
Communications		
Written Communication (ACE 1)		
Select one course from ACE 1 (UNL approved list)		3
Oral Communication (ACE 2)		
Select one course from ACE 2 (UNL approved list)		3
Communication/Interpersonal Skills Elective		
Select one of the following:		3
Any additional UNL approved ACE 1 or ACE 2 course or from course list below:		
ALEC 136	Fundamentals of Agricultural and Environmental Sciences Communication	
ALEC 207 / ADPR 207	Communicating Science with Public Audiences	
ALEC 305	Presentation Strategies to Communicate Agricultural and Environmental Sciences	
ALEC 350	Agriculture, the Environment & Science in the Media	
JOMC 101	Principles of Mass Media	
MLSC 102 & MLSC 202	Basic Leadership and Leadership and Teamwork	
MLSC 301	Leadership and Problem Solving	
NRES 260	Introduction to Conservation Photography	
Credit Hours Subtotal:		9
Economics (ACE 6)		
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	
Credit Hours Subtotal:		3
ACE Requirement		
Select one course each from ACE outcomes 5, 7, and 9		9
Credit Hours Subtotal:		9
Basic Sciences		
Biological Sciences		
PLAS 215	Genetics	4
or BIOS 201	General Genetics	
LIFE 120 & 120L	Fundamentals of Biology I and Fundamentals of Biology I laboratory (ACE 4)	4
LIFE 121 & 121L	Fundamentals of Biology II and Fundamentals of Biology II Laboratory	4
Select one of the following:		4
BIOS 207	Ecology and Evolution	
NRES 220 & NRES 222	Principles of Ecology and Ecology Laboratory	
Earth Sciences		
Select one of the following:		3-4
GEOL 100	Introduction to Geology	
GEOL 101	Dynamic Earth	
GEOL 106	Environmental Geology	
GEOL 109	Oceanography	
GEOL 120	Geology of National Parks and Monuments	
GEOG 155	Elements of Physical Geography	
SOIL 153 / PLAS 153	Soil Resources [2]	
Physical Science		
Select one of the following:		8
CHEM 105A & CHEM 105L & CHEM 106A & CHEM 106L	Chemistry in Context I and Chemistry in Context I Laboratory and Chemistry in Context II and Chemistry in Context II Laboratory	
CHEM 109A & CHEM 109L & CHEM 110A & CHEM 110L	General Chemistry I and General Chemistry I Laboratory and General Chemistry II and General Chemistry II Laboratory	
Select one of the following:		3-5
AGST 109	Physical Principles in Agriculture and Life Sciences [3]	
PHYS 115	Descriptive Physics	
PHYS 141	Physics for Life Sciences I	
PHYS 151	Elements of Physics [3]	
PHYS 211	General Physics I	
Credit Hours Subtotal:		30-33
Total Credit Hours		**60-65**

1 *Course requires* MATH 107.

2 SOIL 153 *is strongly recommended for students in the Habitat Management, Wildlife Conservation and Management, Fisheries Conservation and Management options, and students pursuing a Water Science minor.*

3 AGST 109 *or* PHYS 151 *are recommended for students only taking one semester of physics.*

Specific Major Requirements

NRES 101	Natural Resources Orientation [1]	1
NRES 311	Wildlife Ecology and Management	3
NRES 315	Human Dimensions of Fish and Wildlife Management	3
NRES 386 / BIOS 386	Vertebrate Zoology	4
Select one Natural Resource Policy course from the following:		3
AECN 345	Policy Issues in Agriculture and Natural Resources	
AECN 357 / NREE 357	Natural Resource and Environmental Law	
CRPL 470	Environmental Planning and Policy	

NRES 323	Natural Resources Policy	
Total Credit Hours		**14**

[1] *This course may be waived for students entering the major with more than 15 credit hours.*

Fisheries Conservation and Management Option

This option is designed for students considering careers in fisheries biology, biological research, and fisheries management. Completion of this program also provides excellent preparation for graduate study.

Students completing the Fisheries Conservation and Management Option qualify for professional certification in the American Fisheries Society (AFS). Students are encouraged to consult with their advisor and the AFS website for further information. AFS requires a minimum grade of a C to receive credit for courses that apply toward professional certification.

Requirements

NRES 211	Introduction to Conservation Biology	3
NRES 450	Biology of Wildlife Populations	4
NRES 459 / BIOS 459	Limnology	4
or NRES 481K / BIOS 481	Stream and River Ecology	
NRES 463 & 463L	Fisheries Science and Fisheries Science Lab (Capstone experience, ACE 10)	4
Animal Course		
NRES 489 / BIOS 489	Ichthyology	4
Plant Course		
Select one of the following:		3-4
NRES 201 / LARC 201 / PLAS 201	Dendrology: Study and Identification of Trees and Shrubs	
NRES 245 / PLAS 245	Introduction to Grassland Ecology and Management	
NRES 270 / PLAS 270 / PLPT 270	Biological Invaders	
NRES 302 / PLAS 302	Tree Biology	
NRES 310	Introduction to Forest Management	
NRES 321	Arboriculture: Maintenance & Selection of Landscape Trees	
NRES 417	Agroforestry Systems in Sustainable Agriculture	
NRES 424	Forest Ecology	
NRES 426 / PLAS 426	Invasive Plants	
NRES 440 / PLAS 440 / GRAS 440 / RNGE 440	Great Plains Ecosystem	
PLAS 442 / GRAS 442 / NRES 442 / RNGE 442	Wildland Plants	
NRES 444	Ecosystem Monitoring and Assessment	
NRES 457 / PLAS 457	Green Space and Urban Forestry Management	
Water Resource Course		
Select one of the following:		3-4
METR 100	Weather and Climate	
NRES 208	Climate Literacy in Natural Resources	
NRES 281 / GEOG 281	Introduction to Water Science	
Aquatic Ecology Course		
Select one of the following:		2-4
BIOS 457 / GEOL 457	Ecosystem Ecology	
NRES 402 / ENTO 402 / BIOS 485 & NRES 402L / ENTO 402L / BIOS 485L	Aquatic Insects and Identification of Aquatic Insects	
NRES 431	Waterfowl Ecology and Management	
NRES 453	Hydrology	
NRES 459 / BIOS 459	Limnology	
NRES 468 / BIOS 458 / BSEN 468	Wetlands	
NRES 481K / BIOS 481	Stream and River Ecology	
SOIL 354 / AGST 354	Soil Conservation and Watershed Management	
Geographic Information Science (GIS) Courses		
Select one of the following:		2-4
GEOG 217	Introduction to Geographic Information Systems (GIS)	
NRES 218	Introduction to Geospatial Technologies	
NRES 415	GIS for Agriculture and Natural Resources	
NRES 418 / GEOG 418	Introduction to Remote Sensing	
NRES 420 / GEOG 419 / GEOL 419 / PLAS 419	Applications of Remote Sensing in Agriculture and Natural Resources	
NRES 427 / GEOG 427	Introduction to the Global Positioning System (GPS)	
Select one of the following:		0-3
NRES 399	Independent Research	
NRES 496	Independent Study	
NRES 497	Career Experiences in Natural Resource Sciences	
NRES 499	Thesis Research	
NRES 499H	Honors Thesis	
Free Electives		**21-22**
Credit Hours Subtotal:		50-60
Total Credit Hours		**50-60**

Habitat Management Option

This option is designed for students considering careers in habitat management, private lands management, or public lands (e.g., National Wildlife Refuge) management. Completion of this program also provides excellent preparation for graduate study.

Requirements

NRES 233	Wildlife Field Techniques	1
or NRES 463L	Fisheries Science Lab	
ACE 10 - Capstone experience		
Select one of the following:		3
NRES 433	Wildlife Management Techniques	
NRES 438	Grassland Conservation: Planning and Management	
NRES 457 / PLAS 457	Green Space and Urban Forestry Management	
NRES 463	Fisheries Science	
Animal Course		
Select one of the following:		3-4
BIOS 475	Avian Biology	
NRES 374	Field Herpetology	
NRES 431	Waterfowl Ecology and Management	
NRES 474 / BIOS 474	Herpetology	
NRES 476 / BIOS 476	Mammalogy	
NRES 489 / BIOS 489	Ichthyology	
Plant ID Course		
Select one of the following:		3-4
NRES 201 / LARC 201 / PLAS 201	Dendrology: Study and Identification of Trees and Shrubs	
NRES 426 / PLAS 426	Invasive Plants	
PLAS 212 / LARC 212 / NRES 212	Woody Plants for Landscapes: Identification, Management, and Use	
PLAS 442 / GRAS 442 / NRES 442 / RNGE 442	Wildland Plants	
Geographic Information Science (GIS) Course		
Select one of the following:		2-4
GEOG 217	Introduction to Geographic Information Systems (GIS)	
NRES 218	Introduction to Geospatial Technologies	
NRES 415	GIS for Agriculture and Natural Resources	
NRES 418 / GEOG 418	Introduction to Remote Sensing	
NRES 420 / GEOG 419 / GEOL 419 / PLAS 419	Applications of Remote Sensing in Agriculture and Natural Resources	
NRES 427 / GEOG 427	Introduction to the Global Positioning System (GPS)	
Grassland Systems Course		
Select one of the following:		3-4
NRES 245 / PLAS 245	Introduction to Grassland Ecology and Management	
RNGE 440 / PLAS 440 / GRAS 440 / NRES 440	Great Plains Ecosystem	
RNGE 444 / PLAS 444 / GRAS 444 / NRES 444	Ecosystem Monitoring and Assessment	
Forest Systems Course		
Select one of the following:		3-4
NRES 302 / PLAS 302	Tree Biology	
NRES 310	Introduction to Forest Management	
NRES 417 / PLAS 418	Agroforestry Systems in Sustainable Agriculture	
NRES 424	Forest Ecology	
Aquatic Systems Course		
Select one of the following:		3-4
AGST 354 / SOIL 354	Soil Conservation and Watershed Management	
BIOS 457 / GEOL 457	Ecosystem Ecology	
NRES 281 / GEOG 281	Introduction to Water Science	
NRES 453	Hydrology	
NRES 459 / BIOS 459	Limnology	
NRES 463 & 463L	Fisheries Science and Fisheries Science Lab	
NRES 468 / BIOS 458 / BSEN 468	Wetlands	
NRES 481K / BIOS 481	Stream and River Ecology	
Soil Science Course		
Select one of the following:		3-4
AGST 354 / SOIL 354	Soil Conservation and Watershed Management	
NRES 361 / GEOL 361 / PLAS 361 / SOIL 361	Soils, Environment and Water Quality	
PLAS 269 / SOIL 269	Principles of Soil Management	
PLAS 477 / GEOG 467 / NRES 477 / SOIL 477	Great Plains Field Pedology	
SOIL 255 / PLAS 255 / NRES 255	Soil Health and Environment	
Production Systems Course		

Select one of the following:		3
PLAS 204	Resource-Efficient Crop Management	
PLAS 435 / NRES 435	Agroecology	
NRES 321 / PLAS 321	Arboriculture: Maintenance & Selection of Landscape Trees	
RNGE 240 / PLAS 240 / GRAS 240	Forage Crop and Pasture Management	
RNGE 340 / PLAS 340 / GRAS 340	Range Management and Improvement	
Wildlife Focus Courses		
Select one of the following:		3-4
NRES 211	Introduction to Conservation Biology	
NRES 270 / PLAS 270 / PLPT 270	Biological Invaders	
NRES 348	Wildlife Damage Management	
NRES 431	Waterfowl Ecology and Management	
NRES 374	Field Herpetology	
NRES 433	Wildlife Management Techniques	
NRES 441	Zoo Keeping and Management	
NRES 450 / BIOS 450	Biology of Wildlife Populations	
NRES 462	Conservation Biology	
NRES 463	Fisheries Science	
NRES 474 / BIOS 474	Herpetology	
NRES 476 / BIOS 476	Mammalogy	
NRES 489 / BIOS 489	Ichthyology	
Select one of the following:		0-3
NRES 399	Independent Research	
NRES 496	Independent Study	
NRES 497	Career Experiences in Natural Resource Sciences	
NRES 499	Thesis Research	
NRES 499H	Honors Thesis	
Credit Hours Subtotal:		30-42
Free Electives		
Total Credit Hours		**30-42**

Law Enforcement Option

This option is designed for students considering careers in wildlife law enforcement. Completion of this program also provides excellent preparation for entry into law enforcement academies.

Requirements		
CRIM 101	Survey of Criminal Justice	3
CRIM 203	Police and Society	3
CRIM 211	The Criminal Court System	3
FORS 120	Introduction to Forensic Science	2
NRES 211	Introduction to Conservation Biology	3
Select one ACE 10 (capstone) from the following:		3-4
CRIM 496	Issues in Crime and Justice	
NRES 433	Wildlife Management Techniques	
NRES 463	Fisheries Science	
Select one from the following:		1
NRES 233	Wildlife Field Techniques	
NRES 463L	Fisheries Science Lab	
Select two of any 300- or 400-level CRIM courses		6
Animal Course		
Select one of the following:		3-4
BIOS 475	Avian Biology	
NRES 374	Field Herpetology	
NRES 431	Waterfowl Ecology and Management	
NRES 474 / BIOS 474	Herpetology	
NRES 476 / BIOS 476	Mammalogy	
NRES 489 / BIOS 489	Ichthyology	
Plant Course		
Select one of the following:		3-4
NRES 201 / LARC 201 / PLAS 201	Dendrology: Study and Identification of Trees and Shrubs	
NRES 245 / PLAS 245	Introduction to Grassland Ecology and Management	
NRES 270 / PLAS 270 / PLPT 270	Biological Invaders	
NRES 302 / PLAS 302	Tree Biology	
NRES 321 / PLAS 321	Arboriculture: Maintenance & Selection of Landscape Trees	
PLAS 212 / LARC 212 / NRES 212	Woody Plants for Landscapes: Identification, Management, and Use	
PLAS 214 / NRES 214	Herbaceous Landscape Plants	
PLAS 440 / GRAS 440 / NRES 440 / RNGE 440	Great Plains Ecosystem	
PLAS 442 / GRAS 442 / NRES 442 / RNGE 442	Wildland Plants	
NRES 310	Introduction to Forest Management	
NRES 417 / PLAS 418	Agroforestry Systems in Sustainable Agriculture	
NRES 424	Forest Ecology	
NRES 426 / PLAS 426	Invasive Plants	
NRES 435 / PLAS 435	Agroecology	
NRES 457 / PLAS 457	Green Space and Urban Forestry Management	

Geographic Information Science (GIS) Courses		
Select one of the following:		2-4
GEOG 217	Introduction to Geographic Information Systems (GIS)	
NRES 218	Introduction to Geospatial Technologies	
NRES 415	GIS for Agriculture and Natural Resources	
NRES 418 / GEOG 418	Introduction to Remote Sensing	
NRES 427 / GEOG 427	Introduction to the Global Positioning System (GPS)	
NRES 420 / GEOG 419 / GEOL 419 / PLAS 419	Applications of Remote Sensing in Agriculture and Natural Resources	
Select one of the following:		0-3
NRES 399	Independent Research	
NRES 496	Independent Study	
NRES 497	Career Experiences in Natural Resource Sciences	
NRES 499	Thesis Research	
NRES 499H	Honors Thesis	
Free Electives		**13-14**
Credit Hours Subtotal:		45-54
Total Credit Hours		**45-54**

Wildlife Conservation and Management Option

This option is designed for students considering careers in wildlife biology, wildlife ecology, wildlife research, or wildlife management. Completion of this program also provides excellent preparation for graduate study.

This option was designed to meet the certification requirements of The Wildlife Society as an associate wildlife biologist. Students should refer to The Wildlife Society's guidelines for certification during their academic career to keep current with any changes in these requirements. See www.wildlife.org (http://www.wildlife.org) for more details.

Requirements

NRES 208	Climate Literacy in Natural Resources	3-4
or METR 100	Weather and Climate	
or METR 140	Severe and Unusual Weather	
or NRES 104	Climate in Crisis	
or GEOG 281 / NRES 281	Introduction to Water Science	
NRES 211	Introduction to Conservation Biology	3
NRES 433 & NRES 233	Wildlife Management Techniques and Wildlife Field Techniques (Capstone experience, ACE 10)	4
NRES 450 / BIOS 450	Biology of Wildlife Populations	4
Terrestrial Vertebrate Animal Courses		
Select two of the following:		7-8
BIOS 475	Avian Biology	
NRES 374	Field Herpetology	
NRES 431	Waterfowl Ecology and Management	
NRES 474 / BIOS 474	Herpetology	
NRES 476 / BIOS 476	Mammalogy	
Plant Course		
Select one of the following:		3-4
NRES 201 / LARC 201 / PLAS 201	Dendrology: Study and Identification of Trees and Shrubs	
NRES 245 / PLAS 245	Introduction to Grassland Ecology and Management	
NRES 302 / PLAS 302	Tree Biology	
NRES 310	Introduction to Forest Management	
NRES 321 / PLAS 321	Arboriculture: Maintenance & Selection of Landscape Trees	
NRES 417 / PLAS 418	Agroforestry Systems in Sustainable Agriculture	
NRES 424	Forest Ecology	
NRES 426 / PLAS 426	Invasive Plants	
NRES 435 / PLAS 435	Agroecology	
NRES 444 / PLAS 444 / GRAS 444 / RNGE 444	Ecosystem Monitoring and Assessment	
PLAS 440 / GRAS 440 / NRES 440 / RNGE 440	Great Plains Ecosystem	
PLAS 442 / GRAS 442 / NRES 442 / RNGE 442	Wildland Plants	
Plant ID or Taxonomy Course		
Select one of the following:		3-4
NRES 201 / LARC 201 / PLAS 201	Dendrology: Study and Identification of Trees and Shrubs	
NRES 426 / PLAS 426	Invasive Plants	
PLAS 442 / GRAS 442 / NRES 442 / RNGE 442	Wildland Plants	
PLAS 444 / GRAS 444 / NRES 444 / RNGE 444	Ecosystem Monitoring and Assessment	
Geographic Information Science (GIS) Course		
Select one of the following:		2-4
GEOG 217	Introduction to Geographic Information Systems (GIS)	
NRES 218	Introduction to Geospatial Technologies	
NRES 415	GIS for Agriculture and Natural Resources	
NRES 418 / GEOG 418	Introduction to Remote Sensing	

NRES 420 / GEOG 419 / GEOL 419 / PLAS 419	Applications of Remote Sensing in Agriculture and Natural Resources	
NRES 427 / GEOG 427	Introduction to the Global Positioning System (GPS)	
Additional Written Communication Course		
Choose any ACE 1 course		3
Select one of the following:		0-3
NRES 399	Independent Research	
NRES 496	Independent Study	
NRES 497	Career Experiences in Natural Resource Sciences	
NRES 499	Thesis Research	
NRES 499H	Honors Thesis	
Free Electives		**12-13**
Credit Hours Subtotal:		44-54
Total Credit Hours		**44-54**

Zoo Animal Care Option

This option is designed for students considering careers in zookeeping, zoo animal care, environmental education, animal rehabilitation, and animal training. Completion of this program also provides excellent preparation for graduate study.

Requirements

NRES 211	Introduction to Conservation Biology	3
NRES 233	Wildlife Field Techniques	1
or NRES 463L	Fisheries Science Lab	
NRES 441	Zoo Keeping and Management (Capstone experience, ACE 10)	3
Animal Courses		
Select two of the following:		7-8
BIOS 475	Avian Biology	
ENTO 402 / BIOS 485 / NRES 402 & ENTO 402L / BIOS 485L / NRES 402L	Aquatic Insects and Identification of Aquatic Insects	
ENTO 406 / BIOS 406	Insect Ecology	
NRES 374	Field Herpetology	
NRES 431	Waterfowl Ecology and Management	
NRES 474 / BIOS 474	Herpetology	
NRES 476 / BIOS 476	Mammalogy	
NRES 489 / BIOS 489	Ichthyology	
Plant Course		
Select one of the following:		3-4
PLAS 440 / GRAS 440 / NRES 440 / RNGE 440	Great Plains Ecosystem	
PLAS 442 / GRAS 442 / NRES 442 / RNGE 442	Wildland Plants	
NRES 201 / LARC 201 / PLAS 201	Dendrology: Study and Identification of Trees and Shrubs	
NRES 212 / PLAS 212 / LARC 212	Woody Plants for Landscapes: Identification, Management, and Use	
NRES 213 / LARC 213 / PLAS 213	Cultivars and Varieties of Woody Plants for Landscapes	
NRES 214 / PLAS 214	Herbaceous Landscape Plants	
NRES 245 / PLAS 245	Introduction to Grassland Ecology and Management	
NRES 270 / PLAS 270 / PLPT 270	Biological Invaders	
NRES 302 / PLAS 302	Tree Biology	
NRES 310	Introduction to Forest Management	
NRES 321 / PLAS 321	Arboriculture: Maintenance & Selection of Landscape Trees	
NRES 417 / PLAS 418	Agroforestry Systems in Sustainable Agriculture	
NRES 424	Forest Ecology	
NRES 426 / PLAS 426	Invasive Plants	
NRES 435 / PLAS 435	Agroecology	
Animal Behavior Course		
Select one of the following:		3-4
ASCI 271	Companion Animal Behavior	
BIOS 462	Animal Behavior	
Education Course		
Select one of the following:		3
NRES 322	Environmental Education Curricula	
NRES 434 / ENVR 434	Environmental Education and Interpretation	
Anatomy and Physiology Course		
Select one of the following:		4
ASCI 240	Physiology of Domestic Animals	
ASCI 340	Animal Physiological Systems	
BIOS 213 & 213L	Human Physiology and Human Physiology Laboratory	
BIOS 214	Human Anatomy	
Nutrition Course		
ASCI 320	Animal Nutrition	3
or ASCI 321	Companion Animal Nutrition	
NRES 425	Wildlife Health	3
Select one of the following:		0-3
NRES 399	Independent Research	
NRES 496	Independent Study	

NRES 497	Career Experiences in Natural Resource Sciences	
NRES 499	Thesis Research	
NRES 499H	Honors Thesis	
Free Electives		**16-17**
Credit Hours Subtotal:		49-56
Total Credit Hours		**49-56**

Nature-based Entrepreneurship Option

This option is designed for students considering careers in industry or self-employment as land or resource managers, ecotourism operators, hunting guides, or nature-based artists. Completion of this program provides a 12-hour minor in the Engler Entrepreneurship program in CASNR and prepares students to run their own nature-based business. With a careful selection of courses, students may also be able to obtain a minor in hospitality, restaurant and tourism management or grassland ecology and management.

Requirements

EAEP 395	Agribusiness Entrepreneurship Internship	3
EAEP 488 / ABUS 488 / ENTR 488 / PLAS 488	Entrepreneurship and Enterprise Development (ACE 10, Capstone)	3
Select one of the following:		1
NRES 233	Wildlife Field Techniques	
NRES 463L	Fisheries Science Lab	
Animal Course		
Select one of the following:		3-4
BIOS 475	Avian Biology	
NRES 374	Field Herpetology	
NRES 431	Waterfowl Ecology and Management	
NRES 474 / BIOS 474	Herpetology	
NRES 476 / BIOS 476	Mammalogy	
NRES 489 / BIOS 489	Ichthyology	
Plant Course		
Select one of the following:		3-4
PLAS 440 / GRAS 440 / NRES 440 / RNGE 440	Great Plains Ecosystem	
PLAS 442 / GRAS 442 / NRES 442 / RNGE 442	Wildland Plants	
NRES 201 / LARC 201 / PLAS 201	Dendrology: Study and Identification of Trees and Shrubs	
NRES 245 / PLAS 245	Introduction to Grassland Ecology and Management	
NRES 270 / PLAS 270 / PLPT 270	Biological Invaders	
NRES 302 / PLAS 302	Tree Biology	
NRES 310	Introduction to Forest Management	
NRES 321 / PLAS 321	Arboriculture: Maintenance & Selection of Landscape Trees	
NRES 417 / PLAS 418	Agroforestry Systems in Sustainable Agriculture	
NRES 424	Forest Ecology	
NRES 426 / PLAS 426	Invasive Plants	
NRES 435 / PLAS 435	Agroecology	
Fisheries and Wildlife Courses		
Select two of the following:		6-8
NRES 211	Introduction to Conservation Biology	
NRES 322	Environmental Education Curricula	
NRES 374	Field Herpetology	
NRES 425	Wildlife Health	
NRES 431	Waterfowl Ecology and Management	
NRES 433 & NRES 233	Wildlife Management Techniques and Wildlife Field Techniques	
NRES 434 / ENVR 434	Environmental Education and Interpretation	
NRES 441	Zoo Keeping and Management	
NRES 450 / BIOS 450	Biology of Wildlife Populations	
NRES 462	Conservation Biology	
NRES 463 & 463L	Fisheries Science and Fisheries Science Lab	
NRES 492	International Study Tours in Natural Resource Management	
Entrepreneurship Courses		
Select two of the following:		6
AECN 471 & AECN 472	Agricultural Marketing and Product Development I and Agricultural Marketing and Product Development II	
AGRI 310 or NRES 492	Study Tours in International Agriculture International Study Tours in Natural Resource Management	
EAEP 388 / ABUS 388 / PLAS 388 / ENTR 388	Business Systems in Entrepreneurship	
ENTR 321	Foundations of Entrepreneurship	
ENTR 322	Family Business	
ENTR 421	Identifying and Exploring Entrepreneurial Opportunities	
ENTR 422	Managing Rapid Growth and Change in Organizations	
ENTR 423	Entrepreneurial Decision Making and Venture Development	
Career Focus Courses		
Select 9 hours from the following: [1]		9
AECN 256	Legal Aspects in Agriculture	

AECN 357 / NREE 357	Natural Resource and Environmental Law
PLAS 204	Resource-Efficient Crop Management
PLAS 440 / GRAS 440 / NRES 440 / RNGE 440	Great Plains Ecosystem
PLAS 442 / GRAS 442 / NRES 442 / RNGE 442	Wildland Plants
ALEC 393 / NRES 393	Digital Imaging and Storytelling in Agriculture and Natural Resources
PLAS 200 / GEOG 200 / LARC 200	Landscape and Environmental Appreciation
PLAS 261	Floral Design I
PLAS 471 / HRTM 471 / NUTR 471	Vines, Wines and You
HRTM 171	Introduction to Hospitality Management
HRTM 172	Field Experience in Hospitality Management I
HRTM 274	Introduction to Food and Beverage in the Hospitality Industry
HRTM 280	Introduction to Tourism
HRTM 285	Introduction to the Lodging Industry
HRTM 289	Introduction to the Event Industry
HRTM 360	Hospitality and Tourism Marketing
HRTM 374	Guest Services Management
HRTM 481	Legal Environment in Hospitality Management
HRTM 483	Hospitality Financial Management
JGEN 184	
NREE 456 / AECN 456	
NREE 457 / AECN 457	
NRES 201 / LARC 201 / PLAS 201	Dendrology: Study and Identification of Trees and Shrubs
NRES 260	Introduction to Conservation Photography
NRES 245 / PLAS 245	Introduction to Grassland Ecology and Management
NRES 302 / PLAS 302	Tree Biology
NRES 310	Introduction to Forest Management
NRES 321 / PLAS 321	Arboriculture: Maintenance & Selection of Landscape Trees
NRES 348	Wildlife Damage Management
NRES 417 / PLAS 418	Agroforestry Systems in Sustainable Agriculture
NRES 424	Forest Ecology
NRES 426 / PLAS 426	Invasive Plants
NRES 435 / PLAS 435	Agroecology
NRES 434 / ENVR 434	Environmental Education and Interpretation
PHOT 161	Photography for Non-Majors
RNGE 240 / PLAS 240 / GRAS 240	Forage Crop and Pasture Management
RNGE 340 / PLAS 340 / GRAS 340	Range Management and Improvement
TMFD 121	Visual Communication with Animation
Free Electives	**8**
Credit Hours Subtotal:	42-46
Total Credit Hours	**42-46**

[1] *Work with your advisor to select 9 hours that will enhance professional competencies and complement career goals in land or resource management, ecotourism/guiding, or nature-based art.*

Additional Major Requirements

Prerequisite Requirements/Rules

Students are required to complete the Basic Core before their junior year.

Basic Core

SCIL 101	Science and Decision-Making for a Complex World	3
NRES 101	Natural Resources Orientation	1
LIFE 120 & 120L	Fundamentals of Biology I and Fundamentals of Biology I laboratory	4
LIFE 121 & 121L	Fundamentals of Biology II and Fundamentals of Biology II Laboratory	4
Select one of the following:		4
NRES 220 & NRES 222	Principles of Ecology and Ecology Laboratory	
BIOS 207	Ecology and Evolution	
CHEM 105A & CHEM 105L	Chemistry in Context I and Chemistry in Context I Laboratory	4
or		
CHEM 109A & CHEM 109L	General Chemistry I and General Chemistry I Laboratory	
Select one of the following:		3-5
PHYS 115	Descriptive Physics	
PHYS 141	Physics for Life Sciences I	
PHYS 151	Elements of Physics	
AGST 109	Physical Principles in Agriculture and Life Sciences	
PHYS 211	General Physics I	
MATH 104	Applied Calculus	3-5
or MATH 106	Calculus I	
STAT 218	Introduction to Statistics	3
or STAT 380	Statistics and Applications	

Written Communication Requirement

Select any ACE 1 course	3
Total Credit Hours	**32-36**

Grade Rules

Pass/No Pass

Fisheries and wildlife majors must take all NRES courses as graded, with the exception of NRES 497.

GPA Requirements

Students must maintain a 2.5 cumulative GPA to graduate in the fisheries and wildlife major.

Requirements for Minor Offered by Department

A minor in fisheries and wildlife consists of eighteen (18) hours of coursework. An advisor for the minor will be assigned by the fisheries and wildlife major coordinator.

Requirements		
NRES 220	Principles of Ecology	3-4
or BIOS 207	Ecology and Evolution	
NRES 233	Wildlife Field Techniques	1
or NRES 463L	Fisheries Science Lab	
NRES 311	Wildlife Ecology and Management	3
Select one of the following:		3
NRES 433	Wildlife Management Techniques	
NRES 438	Grassland Conservation: Planning and Management	
NRES 441	Zoo Keeping and Management	
NRES 457	Green Space and Urban Forestry Management	
NRES 463	Fisheries Science	
Credit Hours Subtotal:		11
Elective Courses		
Select 7-9 hours of the following to reach a total of 18 hours for the minor:		7-9
AECN 357	Natural Resource and Environmental Law	
BIOS 475	Avian Biology	
NRES 211	Introduction to Conservation Biology	
NRES 218	Introduction to Geospatial Technologies	
NRES 222	Ecology Laboratory	
NRES 245 / PLAS 245	Introduction to Grassland Ecology and Management	
NRES 260	Introduction to Conservation Photography	
NRES 270 / PLAS 270 / PLPT 270	Biological Invaders	
NRES 299	Special Topics	
NRES 310	Introduction to Forest Management	
NRES 315	Human Dimensions of Fish and Wildlife Management	
NRES 322	Environmental Education Curricula	
NRES 323	Natural Resources Policy	
NRES 348	Wildlife Damage Management	
NRES 374	Field Herpetology	
NRES 386	Vertebrate Zoology	
NRES 399	Independent Research	
NRES 417 / PLAS 418	Agroforestry Systems in Sustainable Agriculture	
NRES 424	Forest Ecology	
NRES 425	Wildlife Health	
NRES 431	Waterfowl Ecology and Management	
NRES 433	Wildlife Management Techniques	
NRES 434 / ENVR 434	Environmental Education and Interpretation	
NRES 438	Grassland Conservation: Planning and Management	
NRES 450 / BIOS 450	Biology of Wildlife Populations	
NRES 457 / PLAS 457	Green Space and Urban Forestry Management	
NRES 459 / BIOS 459	Limnology	
NRES 462	Conservation Biology	
NRES 463	Fisheries Science	
NRES 468 / BIOS 458 / BSEN 468	Wetlands	
NRES 474 / BIOS 474	Herpetology	
NRES 476 / BIOS 476	Mammalogy	
NRES 481K / BIOS 481	Stream and River Ecology	
NRES 489 / BIOS 489	Ichthyology	
NRES 492	International Study Tours in Natural Resource Management	
NRES 496	Independent Study	
NRES 497	Career Experiences in Natural Resource Sciences	
NRES 498	Special Topics in Natural Resources	
NRES 499	Thesis Research	
NRES 499H	Honors Thesis	
Credit Hours Subtotal:		8
Total Credit Hours		**19**

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
Prerequisite for: ASCI 202
Course and Laboratory Fee: $50

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: PLAS 107
Notes: Online only
Description: The flora of the earth is constantly being re-distributed by natural and human forces. As plant species change locations, they affect ecosystems, but how? In this course, students will learn how invasive plants establish and spread in ecosystems and develop an understanding of their impacts on ecosystems from local to global scales.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: FALL/SPR
ACE: ACE 9 Global/Diversity

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
ACE: ACE 4 Science ACE 8 Civic/Ethics/Stewardship

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

NRES 115 Introduction to Environmental Science
Notes: High school earth sciences, chemistry and mathematics courses recommended.
Description: Emphasizes understanding the natural world and improving science literacy by learning the scientific method. Contemporary environmental problems are presented along with relevant questions. The scientific method along with fundamental concepts of chemistry, physics and biology are used to present possible solutions to environmental issues.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded
Offered: FALL
ACE: ACE 4 Science
Course and Laboratory Fee: $70

NRES 125 Introduction to Zoo and Aquarium Science
Description: Become familiar with the concepts and challenges associated with biological, ethical, welfare, and administrative aspects of zoo science and captive animal care. Conduct an ethology study using the scientific method.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
ACE: ACE 4 Science
Course and Laboratory Fee: $70

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
ACE: ACE 5 Humanities
Experiential Learning: Case/Project-Based Learning

NRES 163 Oh My Cod: Exploring Aquatic Ecology Careers
Prerequisites: Limited to Freshman or Sophomore classification only
Description: Introduction to fisheries and aquatic ecology. Familiarize with current research and critical review of literature. Guidance on careers in aquatic ecology. Initial field sampling experience.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded with Option

NRES 201 Dendrology: Study and Identification of Trees and Shrubs
Crosslisted with: PLAS 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
Course and Laboratory Fee: $10

NRES 208 Climate Literacy in Natural Resources
Description: Develop an understanding of the science of the climate system and the climate's influence on our environment. Learn about climate interactions, impacts of changing climate conditions, and actions to reduce these impacts, particularly on natural resources. Develop competency in assessing scientific information about the global climate and learn that such information is essential in making informed decisions about natural resource management.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL

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
Course and Laboratory Fee: $65

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 Woody Plants for Landscapes: Identification, Management, and Use
Crosslisted with: PLAS 212, LARC 212
Description: Identification, basic management and design uses of trees and shrubs for sustainable landscapes, with an emphasis on native plants and plants adapted to the Plains states. Emphasis is on live specimens in outdoor environments, supported by online resources.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL

NRES 213 Cultivars and Varieties of Woody Plants for Landscapes
Crosslisted with: PLAS 213, LARC 213
Description: Characteristics of commercially available trees and shrubs used in urban landscapes. Compares differences among cultivars, design uses, and management issues using a combination of live specimens in outdoor environments and online resources.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING

NRES 214 Herbaceous Landscape Plants
Crosslisted with: PLAS 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

NRES 218 Introduction to Geospatial Technologies
Notes: Recommended to have basic computer skills
Description: Theory and applications of geospatial information technology (GIT) with emphasis on real-world applications to natural resources. Overview of GIT, focusing on introduction of remote sensing, the global positioning system (GPS), and geographic information systems (GIS). Introduction to data collection, spatial data representation, georeferencing, spatial data analysis, and remote sensing image analysis.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL/SPR
Course and Laboratory Fee: $50

NRES 220 Principles of Ecology
Prerequisites: LIFE 120 or BIOS 101 or PLAS 131; 3 hours MATH.
Notes: Not open to students who have completed BIOS 207. Will not count toward a major in BIOS. MATH 100A is not sufficient preparation.
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: LARC 487, NRES 487; NRES 222; NRES 311; NRES 374; NRES 862, NRES 462

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
Course and Laboratory Fee: $25

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
Course and Laboratory Fee: $220
Experiential Learning: Fieldwork

NRES 235 Independent Fisheries and Wildlife Field Techniques
Prerequisites: Permission
Notes: Credit hours calculated (similar to NRES 233 and NRES 463L) as a laboratory with 2-3 contact hours per credit hours because of field work and independent study.
Description: Introduction to field and laboratory skills used for fisheries and wildlife management emphasizing animal and habitat surveys, capture methods, radio-telemetry, sexing and aging methods, and habitat assessment using independent experiential learning.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded
Offered: FALL

NRES 245 Introduction to Grassland Ecology and Management
Crosslisted with: PLAS 245
Description: Grassland ecology and management is relevant to students with education and career goals in managing natural resources in Nebraska and the Great Plains. About 50% of the land area in Nebraska is classified as grassland (or rangeland) and is the land type with the most opportunity for enhancing biodiversity and wildlife habitat. Applying ecological principles and social values to managing rangeland resources, students will develop a knowledge and appreciation for the various grassland management uses and techniques available to resource managers.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: PLAS 340, RNGE 340, GRAS 340

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 255 Soil Health and Environment
Crosslisted with: PLAS 255, SOIL 255
Prerequisites: SOIL 153
Description: Develop a life-long interest in observing and studying soil health and ecosystems. Provide the necessary academic skills to incorporate soil health principles into real-world applications, including natural resource conservation, evaluation of regenerative practices, and promotion of environmental sustainability. Prepare professionals and advocates of soil ecosystems.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: FALL
Course and Laboratory Fee: $50

NRES 260 Introduction to Conservation Photography
Description: An introduction to photography in natural resources and conservation. Provides a solid photography foundation for applications in research projects, science communication efforts, and the field of conservation.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: FALL/SPR
Course and Laboratory Fee: $60
Experiential Learning: Case/Project-Based Learning

NRES 270 Biological Invaders
Crosslisted with: PLAS 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: PLAS 279, SOIL 279
Notes: PLAS/SOIL 153 recommended, but not required. This course includes an inter-collegiate Soil Judging contest that takes place in the North Central region of the United States during the course of the class, or a course-based undergraduate research experience.
Description: Apply fundamental knowledge to the description of soils in the field. Application of techniques employed in writing descriptions of soil morphology and in classifying and interpreting soils.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Graded with Option
Offered: FALL
Prerequisite for: NRES 379, PLAS 379, SOIL 379
Course and Laboratory Fee: $100
Experiential Learning: Fieldwork

NRES 281 Introduction to Water Science
Crosslisted with: GEOG 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; PLAS 361, GEOL 361, NRES 361, SOIL 361

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
ACE: ACE 6 Social Science ACE 5 Humanities

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

NRES 302 Tree Biology
Crosslisted with: PLAS 302
Prerequisites: BIOS 101 or LIFE 120 or PLAS 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

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

NRES 310 Introduction to Forest Management
Prerequisites: BIOS 101, PLAS 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
Course and Laboratory Fee: $45

NRES 311 Wildlife Ecology and Management
Prerequisites: NRES 220 or BIOS 207, or concurrent.
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 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 319 Fundamentals of Environmental Sampling
Prerequisites: SOIL 153, NRES 281, CHEM 105A and 105L or CHEM 109A and 109L.
Notes: 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
Course and Laboratory Fee: $30

NRES 321 Arboriculture: Maintenance & Selection of Landscape Trees
Crosslisted with: PLAS 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
Course and Laboratory Fee: $65

NRES 322 Environmental Education Curricula
Description: National curricula are available to formal and non-formal environmental 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
Course and Laboratory Fee: $55
Experiential Learning: Community Engagement

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: PLAS 361, GEOL 361, SOIL 361
Prerequisites: SOIL 153; MATH 102 or above; two semesters chemistry (CHEM 105, 106 or CHEM 109, 110) and GEOG/NRES 281.
Description: Chemical and physical processes that influence the fate and transport of contaminants (inorganic, organic, microbial) in soil-water environments. Extent, fate, mitigation and impact of various sources of pollution. Remedial technologies used for environmental restoration of contaminated environments.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: PLAS 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 374 Field Herpetology
Prerequisites: BIOS 207 OR NRES 220
Description: Become proficient in valuable skills regarding methods, techniques and standards for obtaining field data regarding Herpetofauna for various applications. Gain knowledge of the principles for conservation and management of Herpetofauna such as occupancy, population demographics, regional status, threat analysis, infectious disease occurrences and more. Ability to utilize critical thinking to propose solutions in regard to herpetological conservation and management situations/scenarios. Recognize and identify Nebraska Herpetofauna.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded
Offered: SUMMER
Course and Laboratory Fee: $50
Experiential Learning: Fieldwork

NRES 379 Advanced Soil Evaluation
Crosslisted with: PLAS 379, SOIL 379
Prerequisites: PLAS/NRES/SOIL 279
Notes: This course includes a national- or regional-level inter-collegiate Soil Judging contest that takes place during the course of the class.
Description: Apply fundamental knowledge and improve field techniques to the description and interpretation of soils in the field. Application of techniques employed in writing descriptions of soil morphology and in classifying and interpreting soils.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 7
Grading Option: Graded with Option
Offered: FALL/SPR
Course and Laboratory Fee: $150
Experiential Learning: Fieldwork

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

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
Offered: SPRING
Course and Laboratory Fee: $35

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
Course and Laboratory Fee: $50
Experiential Learning: Case/Project-Based Learning

NRES 398R Research Experiences in Grasslands
Crosslisted with: GRAS 398R, PLAS 398R
Description: Scientific and research training and necessary soft skills for researchers, using grasslands as a study system. Provides individualized opportunities for engagement with scientific methods, which include experiential learning, acquisition and refinement of skills that enhance higher-learning opportunities, and increased marketability for future employment or postgraduate degrees.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 5
Grading Option: Graded
Offered: FALL
Experiential Learning: Research

NRES 399 Independent Research
Prerequisites: Permission of instructor
Notes: To be supervised and evaluated by a NRES faculty member.
Description: Research, literature review, or extension of course work.
Credit Hours: 0-6
Min credits per semester:
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Graded with Option
Experiential Learning: Research

NRES 399A Global Independent Research
Prerequisites: Permission of instructor
Notes: International travel required. Choice of subject matter and coordination of off-campus study is at the discretion of the instructor.
Description: Independent, mentored research experience illustrating the diversity of approaches to research in natural resources found around the world.
Credit Hours: 0-6
Min credits per semester:
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Graded with Option
Offered: SUMMER
Experiential Learning: Research

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
Course and Laboratory Fee: $25

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, PLAS 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: PLAS 408, GEOG 408, METR 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: BSEN 954, NRES 954

NRES 409 Human Dimensions of Natural Resources
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 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
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
Course and Laboratory Fee: $50

NRES 416 Artificial Intelligence, Computer Vision, and Data Analytics for Agriculture and Natural Resources
Crosslisted with: BSEN 461, BSEN 861, NRES 816
Description: Covers recent advances in computer vision, data analytics, and artificial intelligence techniques, which can be applied in numerous research fields related to agricultural science and natural resources. Examines image analysis techniques for different camera modalities, machine learning programming in Python, and an in-depth discussion of Tableau, Rattle, and Gretl with hands-on experiences. Studies generative AI techniques and other AI tools.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL/SPR

NRES 417 Agroforestry Systems in Sustainable Agriculture
Crosslisted with: PLAS 418, HORT 818, NRES 817
Prerequisites: NRES 220, BIOS 207, or equivalent introductory course in ecology.
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: Junior Standing
Description: Remote sensing of the earth from aerial and satellite platforms. Aerial photography, multispectral scanning, thermal imaging, microwave remote sensing techniques. Data acquisition and image analysis. Physical foundations of remote sensing using electromagnetic energy and energy-matter interactions. 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
Offered: FALL
Prerequisite for: GEOG 421, GEOG 821, NRES 421, NRES 821
Course and Laboratory Fee: $115

NRES 419 Chemistry of Natural Waters
Crosslisted with: GEOL 418, GEOL 818, NRES 819
Prerequisites: CHEM 109A/CHEM 109L and CHEM 110A/CHEM 110L, CHEM 113A/CHEM 113L and CHEM 114.
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
Course and Laboratory Fee: $25

NRES 420 Applications of Remote Sensing in Agriculture and Natural Resources
Crosslisted with: PLAS 419, GEOG 419, GEOL 419, AGRO 819, GEOG 819, GEOL 819, NRES 820
Prerequisites: Junior standing
Description: Introduction to the basic methods and practical applications of remote sensing to map, monitor and assess agricultural and natural resources and other environmental changes
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Graded with Option
Course and Laboratory Fee: $35

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
Course and Laboratory Fee: $65

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 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 425 Wildlife Health
Crosslisted with: VBMS 425
Prerequisites: LIFE 120 and LIFE 121; Junior standing and above
Description: Introduction to ecological, social, and institutional issues. Engage in discussions of important zoonotic diseases, diseases of conservation concern, non-infectious threats, and strategies for assessing and managing wildlife health.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: SPRING

NRES 426 Invasive Plants
Crosslisted with: PLAS 426, AGRO 826, HORT 826, NRES 826
Prerequisites: PLAS/SOIL 153; PLAS 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
Course and Laboratory Fee: $65

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
Experiential Learning: Case/Project-Based Learning

NRES 429A Food Security: A Global Perspective
Crosslisted with: PLAS 429A, AGRO 829A, HORT 829A, NRES 829A, NUTR 429A, NUTR 829A
Prerequisites: Junior standing
Description: Overview of the technical and sociocultural dimensions of global food insecurity.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

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 432 Programming, Scripting, and Automation for GIS
Crosslisted with: GEOG 432, GEOG 832
Prerequisites: GEOG 217
Notes: Practical experience or other formal preparation in GIS may be substituted for prerequisite by permission.
Description: GIS-focused programming, scripting, and spatial analysis using the Python and R programming languages. Topics include: the ArcPy library, algorithm development, open source geospatial libraries, and the manipulation and analysis of geospatial data.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING
Course and Laboratory Fee: $50

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
Course and Laboratory Fee: $10

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
Course and Laboratory Fee: $40
Experiential Learning: Community Engagement

NRES 435 Agroecology
Crosslisted with: PLAS 435, AGRO 835, NRES 835
Prerequisites: For PLAS/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 Cenozoic Mammal Evolution
Crosslisted with: GEOL 436, GEOL 836, NRES 836
Prerequisites: Junior or Senior Standing
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 fossil specimens.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING

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
Course and Laboratory Fee: $30

NRES 439 Environmental Laboratory Instrumentation and Methods
Crosslisted with: NRES 839
Prerequisites: CHEM 106A & CHEM 106L or CHEM 110A and CHEM 110L
Description: Exposure to technologies such as spectroscopy, discrete automated colorimetry, chromatography and mass spectrometry used for environmental testing. Hands-on training in calibration, operation and sample analysis, proper use of analytical balance, volumetric glassware and micropipettes, creating and maintaining a laboratory notebook, and development and understanding standard operational procedures. Advanced in-lab training in analytical laboratory techniques and operation of advanced instrumentation used in commercial and research environmental laboratories.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded
Offered: FALL/SPR

NRES 440 Great Plains Ecosystem
Crosslisted with: PLAS 440, AGRO 840, NRES 840, RNGE 440, GRAS 440
Prerequisites: Junior standing.
Description: Characteristics of Great Plains ecosystems, interrelationships of ecological factors and processes, and their application in the management of grasslands. Interactions of fire, vegetation, grazing animals and wildlife.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING

NRES 441 Zoo Keeping and Management
Description: Examine and build on the knowledge, skills and abilities needed to work in a zoo in various capactities including animal keeping, guest services and curation. Acquire knowledge in all aspects needed to manage zoos including individual species care, collections, guest services, species conservation, and AZA accreditation. Become familiar with the concepts and challenges associated with the biological, educational, ethical, and administrative aspects of zoo science through partnerships and interactions with local zoos.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: FALL/SPR
ACE: ACE 10 Integrated Product
Course and Laboratory Fee: $100

NRES 442 Wildland Plants
Crosslisted with: PLAS 442, AGRO 842, NRES 842, RNGE 442, GRAS 442
Prerequisites: Junior standing.
Notes: PLAS 131 or LIFE 121 and 121L or equivalent recommended
Description: Wildland plants that are important to grassland and shrubland ecosystem management and production. Distribution, utilization, classification, identification (including identification by vegetative parts), uses by Native Americans, and recognition of grasses, forbs, shrubs, exotic and wetland plants.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL

NRES 443 Global Change & Ecosystems
Crosslisted with: NRES 843
Prerequisites: Junior standing and above
Notes: Background in ecology and NRES 418 recommended.
Description: Examines global change from a biological perspective, focusing on global change impacts on terrestrial and aquatic ecosystems. Considers the scientific literature on biological aspects of global change, and explores the methods used for studying global change, and involves presentation of brief, comprehensible oral and written summaries of this literature. Social, and economic aspects will also be considered.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

NRES 443H Honors: Global Change & Ecosystems
Prerequisites: Good standing in the University Honors Program or by invitation and Junior standing and above.
Notes: Previous coursework in Ecology, Climate, and Spatial Sciences is recommended.
Description: Examines global change from a biological perspective, focusing on global change impacts on terrestrial and aquatic ecosystems. Considers the scientific literature on biological aspects of global change, and explores the methods used for studying global change, and involves presentation of brief, comprehensible oral and written summaries of this literature. Social, and economic aspects will also be considered.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded

NRES 444 Ecosystem Monitoring and Assessment
Crosslisted with: PLAS 444, AGRO 844, NRES 844, RNGE 444, GRAS 444
Prerequisites: Junior standing.
Notes: NRES 220 or equivalent, recommended.
Description: Measurement and monitoring of the important vegetation and environmental factors used to develop management guidelines in grasslands, savannas, woodlands, and wetlands. Emphasis on using ecosystem monitoring protocols for assessment of wildlife habitat, fuels management for wild-land fire, livestock production, and watershed function. Requires field sampling and travel to local field sites.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL

NRES 446 Pollen Analysis for Behavioral, Biological and Forensic Science
Crosslisted with: FORS 446, FORS 846, NRES 846
Prerequisites: 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 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/SOIL/PLAS/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: PLAS 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

NRES 453 Hydrology
Crosslisted with: NRES 853
Prerequisites: MATH 102 or above
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
Offered: SPRING
Prerequisite for: AGEN 957, BSEN 957, CIVE 957, GEOL 957

NRES 454 Ecological Interactions
Crosslisted with: BIOS 454, BIOS 854, NRES 854
Prerequisites: LIFE 121; LIFE 121L; BIOS 207 or NRES 220
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

NRES 455 Soil Chemistry and Mineralogy
Crosslisted with: PLAS 455, AGRO 855, NRES 855, SOIL 455
Prerequisites: PLAS/SOIL 153 or GEOL 101; CHEM 109A/CHEM 109L and CHEM 110A/CHEM 110L; CHEM 221A & CHEM 221L or 251.
Description: Chemical and mineralogical properties of soil components. Inorganic colloidal fraction. Structures of soil minerals as a means of understanding properties, such as ion exchange and equilibria; release and supply of nutrient and toxic materials; and soil acidity and alkalinity. Forms and functions of organic matter in soil.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING

NRES 456 Mathematical Models in Biology
Crosslisted with: BIOS 456, BIOS 856, NRES 856
Prerequisites: LIFE 120; LIFE 120L; LIFE 121; LIFE 121L; MATH 107
Description: 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.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NRES 457 Green Space and Urban Forestry Management
Crosslisted with: NRES 857, PLAS 457
Prerequisites: Junior or senior standing, Graduate student or permission
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

NRES 458 Soil Physical Determinations
Crosslisted with: PLAS 458, AGRO 858, NRES 858, SOIL 458
Prerequisites: SOIL/PLAS/GEOL/NRES 361; PHYS 141 or equivalent; MATH 102 or 103.
Description: Survey of measurement techniques and principles used in characterizing the physical properties of soils. Includes analysis of experimental design and sources of experimental error. Techniques include: particle size analysis, soil water content, pore size analysis, field sampling techniques, soil strength, and saturated hydraulic conductivity.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Graded with Option

NRES 459 Limnology
Crosslisted with: BIOS 459, BIOS 859, NRES 859
Prerequisites: BIOS 207 or NRES 220; CHEM 106A & CHEM 106L or CHEM 110A & CHEM 110L
Description: 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; eutroplication and its effects.
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
Course and Laboratory Fee: $85

NRES 460 Soil Microbial Ecology
Crosslisted with: PLAS 460, BIOS 460, SOIL 460, AGRO 860, BIOS 860, NRES 860
Prerequisites: Senior standing.
Notes: Recommend having a strong science background, including courses from the agronomic, environmental, microbiology, engineering or medicine disciplines.
Description: Soil from a microbe's perspective-growth, activity and survival strategies; principles governing methods to study microorganisms and biochemical processes in soil; mechanisms controlling organic matter cycling and stabilization with reference to C, N, S, and P; microbial interactions with plants and animals; and agronomic and environmental applications of soil microorganisms.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING

NRES 461 Soil Physics
Crosslisted with: PLAS 461, SOIL 461, AGRO 861, NRES 861
Prerequisites: PLAS/SOIL 153; PHYS 141 or equivalent, one semester of calculus.
Description: Principles of soil physics. Movement of water, air, heat, and solutes in soils. Water retention and movement, including infiltration and field water regime. Movement of chemicals in soils.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NRES 462 Conservation Biology
Crosslisted with: NRES 862
Prerequisites: 12 hours of biological sciences, including NRES 220 and NRES 222 or equivalent.
Description: Current issues in conservation biology. Theoretical principles from the areas of ecology and genetics to effectively preserve and manage biological diversity and small populations.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NRES 463 Fisheries Science
Crosslisted with: NRES 863
Notes: May be offered at Cedar Point Biological Station.
Description: Fisheries biology emphasizing the determination and evaluation of vital statistics for the management of fish populations. Basis of specific management techniques.
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
Notes: May be offered at Cedar Point Biological Station.
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.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded with Option
Offered: FALL
Course and Laboratory Fee: $150
Experiential Learning: Fieldwork

NRES 467 Global Climate Change
Crosslisted with: METR 483, METR 883, NRES 867
Prerequisites: Junior standing
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, BSEN 468, BSEN 868
Prerequisites: CHEM 109A and 109L and CHEM 110A and 110L, or CHEM 105A and 105L and CHEM 106A and 106L; 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
Course and Laboratory Fee: $40

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

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 471 Avian Biology
Crosslisted with: BIOS 475, BIOS 875, NRES 871
Prerequisites: LIFE 121 & LIFE 121L
Notes: May also be offered at Cedar Point Biological Station.
Description: Biology of birds emphasizing the behavior and ecology of this group. Topics include avian diversity, systematics & evolutionary history, flight, foraging, migration, communication, reproductive biology, population ecology and conservation biology.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Experiential Learning: Fieldwork

NRES 472 Applied Soil Physics
Crosslisted with: PLAS 472, AGRO 872, NRES 872, SOIL 472
Prerequisites: PLAS/SOIL 153; MATH 102 or MATH 104 or MATH 106.
Description: Emphasis on applied soil physics. Discussion of theoretical principles followed by field and laboratory exercises and applications. Fluxes of water, solutes, air, and heat through the soil. Emphasis on water infiltration, water retention, other soil hydraulic properties. Components of soil water balance. Management of soil water.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL

NRES 474 Herpetology
Crosslisted with: BIOS 474, BIOS 874, NRES 874
Prerequisites: NRES/BIOS 386
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
Offered: FALL
Course and Laboratory Fee: $50

NRES 475 Water Quality Strategy
Crosslisted with: NRES 875, SOIL 475, PLAS 475, AGRO 875, CIVE 475, CIVE 875, CRPL 475, CRPL 875, GEOL 475, GEOL 875, AGST 475, AGST 875
Prerequisites: Senior undergraduate or graduate student status.
Notes: Capstone course.
Description: Introduces methods to identify, analyze, strategize, justify and develop planning approaches to protect water quality from nonpoint source contamination. Focuses on identifying present water quality issues and situations, investigating adverse impacts on whole systems and subsystems over time, developing effective planning strategies, and assessing strategy effectiveness.
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

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
Course and Laboratory Fee: $25

NRES 477 Great Plains Field Pedology
Crosslisted with: PLAS 477, GEOG 467, SOIL 477, GEOG 867, NRES 877
Prerequisites: PLAS/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
Course and Laboratory Fee: $80

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, 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.
Description: Interaction between earth's climate and the hydrologic cycle. Energy and water fluxes at the land-atmosphere interface. Atmospheric moisture transport, precipitation, evaporation, snowmelt, and runoff. Impacts of climate variability and change on the hydrologic cycle.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

NRES 481K Stream and River Ecology
Crosslisted with: WATS 881K, BIOS 481, NRES 881K
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
Course and Laboratory Fee: $20
Experiential Learning: Fieldwork

NRES 482 Ecophysiology of Wildlife
Crosslisted with: NRES 882
Prerequisites: NRES 220 or BIOS 207; PLAS 215/BIOS 201; 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 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: PLAS 484, GEOG 484, GEOL 484, NRES 884, AGRO 884, GEOG 884, GEOL 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 485 Natural Resources Seminar
Crosslisted with: NRES 885
Description: Active listening and critical thinking activities related to seminars on current natural resources research and issues in Nebraska, the Great Plains, and throughout the world.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded
Offered: FALL

NRES 486A Professional Certifications: Certified Interpretive Guide
Crosslisted with: NRES 886A
Description: Professional certification from the National Association of Interpretation. Practical skills for developing quality interpretive programs for museum, nature center, zoo and park visitors. Theoretical foundations of interpretation.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Graded

NRES 486B Professional Certifications: Certified Interpretive Host
Crosslisted with: NRES 886B
Description: Receive professional certification from the National Association of Interpretation. Practical skills for staff and volunteers of museums, nature centers, zoos and parks to provide quality customer service.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded

NRES 487 Introduction to Landscape Ecology
Crosslisted with: LARC 487
Prerequisites: PLAS/SOIL 153 and NRES 220.
Notes: PLAS/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: Occurence, 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: GEOL 986; NRES 918
Course and Laboratory Fee: $10

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
Course and Laboratory Fee: $20
Experiential Learning: Research

NRES 491 Special Topics in Geography
Crosslisted with: GEOG 491, GEOG 891
Description: Topics vary.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Graded with Option

NRES 492 International Study Tours in Natural Resource Management
Crosslisted with: 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
Experiential Learning: Education Abroad

NRES 493 Experiences in Natural Resources
Crosslisted with: NRES 893
Prerequisites: Permission of instructor
Description: Immersive learning experiences in natural resources.
Credit Hours: 0-3
Min credits per semester:
Max credits per semester: 3
Max credits per degree: 12
Grading Option: Graded with Option
Experiential Learning: Fieldwork

NRES 495 Grasslands Seminar
Crosslisted with: PLAS 495, ENTO 495, GRAS 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: Permission of instructor
Description: Individual or group projects in research or management.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 12
Grading Option: Graded with Option
Experiential Learning: Case/Project-Based Learning

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
Experiential Learning: Internship/Co-op

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: Permission of thesis adviser.
Notes: Requires conducting a scholarly research project and writing an undergraduate thesis.
Description: Independent engagement in the research process in natural resources to conduct a scholarly research project and write an undergraduate thesis.
Credit Hours: 0-6
Min credits per semester:
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Graded with Option
Experiential Learning: Research

NRES 499H Honors Thesis
Prerequisites: Admission to the University Honors Program and permission. Credit toward the degree cannot be earned in both NRES 499 and NRES 499H.
Description: Independent engagement in the research process in natural resources to conduct a scholarly research project and write an undergraduate thesis as a participant in the University Honors Program.
Credit Hours: 0-6
Min credits per semester:
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Graded
Experiential Learning: Research

Career Information

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

Jobs of Recent Graduates

- Fisheries Technician, University of Nebraska-Lincoln - Lincoln, NE
- Conservation technician, Nebraska Game and Parks - Battle Creek, NE
- Highway Environmental Biologist, Nebraska Department of Roads - Lincoln, NE
- Sea Turtle Protection Intern, Bald Head Island Conservancy - Bald Head Island, NC
- Forest Products Program Leader, Nebraska Forest Service - Lincoln, NE
- Environmental Scientist, EA Engineering Science and Technology - Lincoln, NE
- Environmental Technician, New Country Environment - Columbus, NE
- Biological Science Technician, U.S. Fish and Wildlife - Leadville, CO
- Big Cat Keeper, In-Sync Exotics - Wylie, TX