ENVIRONMENTAL SCIENCE

Description

A fundamental aspect of environmental science is the exploration of ecosystems and their connections to human activities and natural influences. This field emphasizes the importance of understanding the complex relationships of the soil-water-climate linkage, which serves as the foundation for fostering ecological health and resilience.

Students drawn to environmental science can specialize in various areas that reflect their interests and ambitions. They can choose from options that provide distinct perspectives on environmental challenges including :

- Climate Science Option: This path focuses on the complexities of the Earth's climate system, examining its effects on ecosystems and communities.
- Soil Science Option: Students delve into the critical role of soil in supporting life, studying its health, management practices, and its integral connection to broader ecological systems.
- Spatial Science Option: This option emphasizes the application of geographic information systems and spatial analysis, enabling students to address environmental issues through innovative technologies and methodologies.
- Water Science Option: Students in this option investigate the dynamics of water resources, exploring issues related to water quality, management, and the sustainability of aquatic ecosystems.

Each of these options allows students to engage deeply with the complexities of the environment, fostering a holistic understanding that is essential for addressing the pressing challenges facing the world.

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 environmental science will be able to:

1. Synthesize multidisciplinary knowledge in basic and applied sciences, and across temporal and spatial scales, to propose spatial science-oriented solutions to environmental issues related to soils, water quality and quantity, climate variability, and land use.

2. Communicate scientific and technical spatial science knowledge to diverse stakeholders using effective written and oral presentation skills.

3. Understand how to implement all steps of the scientific method within environmental science questions, including hypothesis development, experimental design, data collection and analysis, result interpretation and conclusion development, to critically evaluate scientific studies within and across multiple disciplines to conduct occupational functions and work in interdisciplinary environmental science settings.

Major Requirements

College Core Requirements

Natural Resources Core

SCIL 101	Science and Decision-Making for a Complex World (ACE 8)	3
NRES 115	Introduction to Environmental Science	4
NRES 208	Climate Literacy in Natural Resources	3
NRES 218	Introduction to Geospatial Technologies	3

NRES 220	Principles of Ecology	3
NRES 281	Introduction to Water Science	3
or GEOL 372	Water & Earth Connections	
SOIL 153 / PLAS 153	Soil Resources	4
Credit Hours Subtotal:		23
Natural Sciences (ACE 4)		
Select one CASNR approved Life Sciences sequence from the following:		4
BIOS 101 & 101L	General Biology and General Biology Laboratory	
LIFE 120 & 120L	Fundamentals of Biology I and Fundamentals of Biology I laboratory	
PLAS 131 & PLAS 133	Plant Science and Horticultural Plant Science Laboratory	
or PLAS 131 & PLAS 134	Plant Science and Plant Sciences Laboratory	
Chemistry		**4**
CHEM 109A & CHEM 109L	General Chemistry I and General Chemistry I Laboratory [1]	
Credit Hours Subtotal:		8
Mathematics and Statistics		
STAT 218	Introduction to Statistics (ACE 3)	3
Select one of the following:		3-5
MATH 102	Trigonometry	
MATH 103	College Algebra and Trigonometry	
MATH 104	Applied Calculus	
MATH 106	Calculus I [2]	
Credit Hours Subtotal:		6-8
Communications		
Select any approved ACE 1 Written Communication		3
Select any approved ACE 2 Oral Communication		3
Communication/Interpersonal Skills elective		3
Select one of the following:		
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	
JOMC 101	Principles of Mass Media	
MLSC 102 & MLSC 202	Basic Leadership and Leadership and Teamwork	
MLSC 301	Leadership and Problem Solving	
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
Total Credit Hours		**58-60**

[1] CHEM 110A *and* CHEM 110L *are required for Soil Science and Water Science Options.*

[2] MATH 106 *is required for students in the Climate Science Option*

Specific Major Requirements

Climate Science Option

This option is to provide a higher level of understanding in climatology in order to understand complex climate-based problems and their interrelationships with natural resources and ecosystem management issues that are pervasive today and will become even more important in the future. Issues such as natural hazard management, climate change, climate variability, changing frequency and severity of extreme climate events, environmental degradation, deforestation, and increased demand for water and other natural resources are at the root of this increased demand for applied climate professionals.

Climate Science Option Requirements

PHYS 211	General Physics I [1]	4
METR 100	Weather and Climate	4
METR 153	Introduction to Scientific Programming in Atmospheric Science	3
or CSCE 155A	Computer Science I	
or CSCE 155E	Computer Science I: Systems Engineering Focus	
or CSCE 155H	Honors: Computer Science I	
or CSCE 155N	Computer Science I: Engineering and Science Focus	
or CSCE 155T	Computer Science I: Informatics Focus	
METR 205	Introduction to Atmospheric Science	4
NRES 104	Climate in Crisis	3
NRES 370	Applied Climatology	3
NRES 408	Microclimate: The Biological Environment	3
NRES 452	Climate and Society	3
NRES 469	Bio-Atmospheric Instrumentation	3
NRES 478	Regional Climatology	3
NRES 479	Hydroclimatology	3
ACE 10		**3-4**
AGRI 485	Investigations in Applied Science	
BIOS 457	Ecosystem Ecology	
ENVR 489	Environmental Studies Senior Thesis I	
ENVR 489H	Honors: Environmental Studies Senior Thesis I	
ENVR 499	Environmental Studies Senior Thesis II	
ENVR 499H	Honors: Environmental Studies Senior Thesis II	
METR 442	Advanced Synoptic Meteorology-Climatology	
METR 470	The Climate System: Analysis and Prediction	
NRES 451	Soils, Water, and Environmental Chemistry	

NRES 459	Limnology
NRES 475 / PLAS 475 / SOIL 475	Water Quality Strategy
Credit Hours Subtotal:	39-40

Climate Science - ENVS Option Electives

Select a minimum of two courses from ENVS option electives (minimum 5 hours):	5-9
AECN 265	Resource and Environmental Economics I
BSEN 244	Thermodynamics of Living Systems
BSEN 321	Principles of Environmental Engineering
BSEN 355	Introduction to Ecological Engineering
CRPL 470	Environmental Planning and Policy
CRPL 471	Environmental Impact Assessment
CRPL 472	Hazard Mitigation Planning
CRPL 489	Urbanization of Rural Landscapes
ENSC 110	Energy in Perspective
ENSC 220	Energy Systems and Sustainability
ENSC 230	Energy and the Environment: Economics and Policy
ENVR 201	Science, Systems, Environment and Sustainability
ENVR 249	Individual and Cultural Perspectives on the Environment
ENVR 319	Environmental Engagement and the Community
ENVR 334	Psychology of Environmental Sustainability
GEOL 372	Water & Earth Connections
GEOL 410	Geochemistry
GEOL 424	Biogeochemical Cycles
GEOL 444	Earth and Environmental Microbiology
MATH 106	Calculus I
MATH 107	Calculus II
METR 100	Weather and Climate
METR 140	Severe and Unusual Weather
METR 180	Climate Change, Energy, and the Environment
METR 270	Global Warming: Science, Impacts, Solutions
METR 487	Earth's Climate: Past, Present, Future
NRES 104	Climate in Crisis
NRES 109	Water in Society
NRES 211	Introduction to Conservation Biology
NRES 245	Introduction to Grassland Ecology and Management
NRES 270	Biological Invaders
NRES 299	Special Topics
NRES 300	Toxins in the Environment
NRES 319	Fundamentals of Environmental Sampling
NRES 320	Fundamentals of Environmental Sampling Laboratory
NRES 323	Natural Resources Policy
NRES 330	Environmental Health
NRES 361	Soils, Environment and Water Quality
NRES 370	Applied Climatology
NRES 399	Independent Research
NRES 402	Aquatic Insects
NRES 408	Microclimate: The Biological Environment
NRES 413	Environmental Leadership
NRES 418	Introduction to Remote Sensing
NRES 419	Chemistry of Natural Waters
NRES 420	Applications of Remote Sensing in Agriculture and Natural Resources
NRES 421	Field Techniques in Remote Sensing
NRES 435	Agroecology
NRES 438	Grassland Conservation: Planning and Management
NRES 440	Great Plains Ecosystem
NRES 442	Wildland Plants
NRES 443	Global Change & Ecosystems
NRES 444	Ecosystem Monitoring and Assessment
NRES 451	Soils, Water, and Environmental Chemistry
NRES 452	Climate and Society
NRES 453	Hydrology
NRES 454	Ecological Interactions
NRES 455	Soil Chemistry and Mineralogy
NRES 459	Limnology
NRES 461	Soil Physics
NRES 467	Global Climate Change
NRES 468	Wetlands
NRES 470	Lake and Reservoir Restoration
NRES 475	Water Quality Strategy
NRES 477	Great Plains Field Pedology
NRES 478	Regional Climatology
NRES 479	Hydroclimatology
NRES 481K	Stream and River Ecology
NRES 484	Water Resources Seminar
NRES 487	Introduction to Landscape Ecology
NRES 488	Groundwater Geology
NRES 496	Independent Study
NRES 497	Career Experiences in Natural Resource Sciences
POLS 332	Climate Change: Policy and Politics
RNGE 340	Range Management and Improvement
SOCI 346	Environmental Sociology
SOIL 101	Soil and Society
SOIL 269	Principles of Soil Management
SOIL 279	Soil Evaluation
SOIL 354	Soil Conservation and Watershed Management
SOIL 379	Advanced Soil Evaluation
SOIL 453	Urban Soil Properties and Management
SOIL 460	Soil Microbial Ecology
SOIL 472	Applied Soil Physics
Credit Hours Subtotal:	5-9
Total Credit Hours	**44-49**

[1] PHYS 211 *is required for Climate Science Option*

Soil Science Option

This option provides students with an understanding of soil as a natural resource and component of all terrestrial ecosystems. The student will learn how soils influence ecological processes that take place above and below ground. Understanding these processes will enable the student to deal with environmental management problems such as groundwater protection, natural resource management, urban and rural development issues, waste management, and pollution abatement. Careers focus on environmental assessment, soil conservation, and remediation of soil contamination. Students interested in preparing for graduate work in soils can aim toward various special areas including soil microbiology, chemistry, physics, mineralogy, and morphology.

Soil Science Option Requirements

CHEM 110A & CHEM 110L	General Chemistry II and General Chemistry II Laboratory	4
Select one Physics course from the following:		
AGST 109	Physical Principles in Agriculture and Life Sciences	4-5
or PHYS 141	Physics for Life Sciences I	
or PHYS 151	Elements of Physics	
or PHYS 211	General Physics I	
Select one Geology course from the following:		3-4
GEOL 100	Introduction to Geology	
or GEOL 101	Dynamic Earth	
or GEOL 106	Environmental Geology	
or GEOL 109	Oceanography	
or GEOL 120	Geology of National Parks and Monuments	
or GEOG 155	Elements of Physical Geography	
AECN 357 / NREE 357	Natural Resource and Environmental Law	3
or NRES 323	Natural Resources Policy	
NRES 255	Soil Health and Environment	3
NRES 279 / PLAS 279 / SOIL 279	Soil Evaluation	2
NRES 300 / BIOS 300 / ENTO 300	Toxins in the Environment	3
or NRES 330	Environmental Health	
NRES 319 & NRES 320	Fundamentals of Environmental Sampling and Fundamentals of Environmental Sampling Laboratory	3
NRES 453	Hydrology	3
or NRES 488	Groundwater Geology	
NRES 361 / GEOL 361 / PLAS 361 / SOIL 361	Soils, Environment and Water Quality	3
NRES 477 / GEOG 467 / PLAS 477 / SOIL 477	Great Plains Field Pedology	4
SOIL 354 / AGST 354	Soil Conservation and Watershed Management	3
ACE 10		*3-4*
NRES 451	Soils, Water, and Environmental Chemistry	
SOIL 475 / NRES 475 / PLAS 475	Water Quality Strategy	
Credit Hours Subtotal:		41-44
ENVS Option Electives		
Select a minimum of two courses from ENVS option electives. Courses may not apply to both major and option. (minimum 5 hours)		5-9
AECN 265	Resource and Environmental Economics I	
BSEN 244	Thermodynamics of Living Systems	
BSEN 321	Principles of Environmental Engineering	
BSEN 355	Introduction to Ecological Engineering	
CRPL 470	Environmental Planning and Policy	
CRPL 471	Environmental Impact Assessment	
CRPL 472	Hazard Mitigation Planning	
CRPL 489	Urbanization of Rural Landscapes	
ENSC 110	Energy in Perspective	
ENSC 220	Energy Systems and Sustainability	
ENSC 230	Energy and the Environment: Economics and Policy	
ENVR 201	Science, Systems, Environment and Sustainability	
ENVR 249	Individual and Cultural Perspectives on the Environment	
ENVR 319	Environmental Engagement and the Community	
ENVR 334	Psychology of Environmental Sustainability	
GEOL 372	Water & Earth Connections	
GEOL 410	Geochemistry	
GEOL 424	Biogeochemical Cycles	
GEOL 444	Earth and Environmental Microbiology	
MATH 106	Calculus I	
MATH 107	Calculus II	
METR 100	Weather and Climate	
METR 140	Severe and Unusual Weather	
METR 180	Climate Change, Energy, and the Environment	
METR 270	Global Warming: Science, Impacts, Solutions	
METR 487	Earth's Climate: Past, Present, Future	
NRES 104	Climate in Crisis	
NRES 109	Water in Society	
NRES 211	Introduction to Conservation Biology	
NRES 245	Introduction to Grassland Ecology and Management	
NRES 270	Biological Invaders	

NRES 299	Special Topics
NRES 300	Toxins in the Environment
NRES 319	Fundamentals of Environmental Sampling
NRES 320	Fundamentals of Environmental Sampling Laboratory
NRES 323	Natural Resources Policy
NRES 330	Environmental Health
NRES 361	Soils, Environment and Water Quality
NRES 370	Applied Climatology
NRES 402	Aquatic Insects
NRES 408	Microclimate: The Biological Environment
NRES 413	Environmental Leadership
NRES 415	GIS for Agriculture and Natural Resources
NRES 418	Introduction to Remote Sensing
NRES 419	Chemistry of Natural Waters
NRES 420	Applications of Remote Sensing in Agriculture and Natural Resources
NRES 421	Field Techniques in Remote Sensing
NRES 435	Agroecology
NRES 438	Grassland Conservation: Planning and Management
NRES 440	Great Plains Ecosystem
NRES 442	Wildland Plants
NRES 443	Global Change & Ecosystems
NRES 444	Ecosystem Monitoring and Assessment
NRES 451	Soils, Water, and Environmental Chemistry
NRES 452	Climate and Society
NRES 453	Hydrology
NRES 454	Ecological Interactions
NRES 455	Soil Chemistry and Mineralogy
NRES 459 / BIOS 459	Limnology
NRES 461	Soil Physics
NRES 467	Global Climate Change
NRES 468	Wetlands
NRES 470	Lake and Reservoir Restoration
NRES 475	Water Quality Strategy
NRES 477	Great Plains Field Pedology
NRES 478	Regional Climatology
NRES 479	Hydroclimatology
NRES 481K / BIOS 481	Stream and River Ecology
NRES 484	Water Resources Seminar
NRES 487	Introduction to Landscape Ecology
NRES 488	Groundwater Geology
NRES 497	Career Experiences in Natural Resource Sciences
NRES 399	Independent Research
NRES 496	Independent Study
NRES 499	Thesis Research
POLS 332	Climate Change: Policy and Politics
RNGE 340	Range Management and Improvement
SOCI 346	Environmental Sociology
SOIL 101	Soil and Society
SOIL 269	Principles of Soil Management
SOIL 279	Soil Evaluation
SOIL 354	Soil Conservation and Watershed Management
SOIL 379	Advanced Soil Evaluation
SOIL 453	Urban Soil Properties and Management
SOIL 460	Soil Microbial Ecology
SOIL 472	Applied Soil Physics
Free Electives	**7-16**
Credit Hours Subtotal:	12-25
Requirements	
Total Credit Hours	**53-69**

Spatial Science Option

This option provides students with an understanding of soil as a natural resource and component of all terrestrial ecosystems. The student will learn how soils influence ecological processes that take place above and below ground. Understanding these processes will enable the student to deal with environmental management problems such as groundwater protection, natural resource management, urban and rural development issues, waste management, and pollution abatement. Careers focus on environmental assessment, soil conservation, and remediation of soil contamination. Students interested in preparing for graduate work in soils can aim toward various special areas including soil microbiology, chemistry, physics, mineralogy, and morphology.

Spatial Science Option Requirements

AGST 109	Physical Principles in Agriculture and Life Sciences	4-5
or PHYS 141	Physics for Life Sciences I	
or PHYS 151	Elements of Physics	
or PHYS 211	General Physics I	
NRES 415	GIS for Agriculture and Natural Resources	4
NRES 418	Introduction to Remote Sensing	4
NRES 420	Applications of Remote Sensing in Agriculture and Natural Resources	4
CSCE 155A	Computer Science I	3
or CSCE 155E	Computer Science I: Systems Engineering Focus	
or CSCE 155H	Honors: Computer Science I	
or CSCE 155N	Computer Science I: Engineering and Science Focus	
or CSCE 155T	Computer Science I: Informatics Focus	
ACE 10		*3-4*
AGRI 485	Investigations in Applied Science	
or BIOS 454	Ecological Interactions	
or BIOS 457	Ecosystem Ecology	
or ENVR 489	Environmental Studies Senior Thesis I	
or ENVR 489	Honors: Environmental Studies Senior Thesis I	
or ENVR 499	Environmental Studies Senior Thesis II	
or ENVR 499	Honors: Environmental Studies Senior Thesis II	
or NRES 435	Agroecology	
or NRES 451	Soils, Water, and Environmental Chemistry	
or NRES 459	Limnology	
or NRES 475	Water Quality Strategy	
Select a minimum of 2 of the following courses:		5-8

CRPL 400	Introduction to Planning	
CRPL 430	Planning with GIS	
CRPL 432	Advanced Spatial Analysis with GIS	
CRPL 433	GIS in Environmental Design and Planning	
CRPL 463	Land Use and Transportation Planning	
CRPL 464	Urban Design	
CRPL 470	Environmental Planning and Policy	
CRPL 471	Environmental Impact Assessment	
GEOG 217	Principles of GIS	
GEOG 317	Cartography I: Introduction to Cartography	
GEOG 422	Advanced Techniques in Geographic Information Systems	
GEOG 432	Programming, Scripting, and Automation for GIS	
NRES 421	Field Techniques in Remote Sensing	
NRES 427	Introduction to the Global Positioning System (GPS)	
STAT 432	Introduction to Spatial Statistics	
Credit Hours Subtotal:		27-32
Spatial Science Option Electives		
Select a minimum of two courses from Spatial Science option electives. Courses may not apply to both major and option.		6-9
BIOS 458	Wetlands	
BIOS 459	Limnology	
GEOL 101	Dynamic Earth	
GEOL 106	Environmental Geology	
GEOL 488	Groundwater Geology	
GEOG 155	Elements of Physical Geography	
METR 100	Weather and Climate	
METR 270	Global Warming: Science, Impacts, Solutions	
METR 479	Hydroclimatology	
METR 483	Global Climate Change	
NRES 104	Climate in Crisis	
NRES 214	Herbaceous Landscape Plants	
NRES 220	Principles of Ecology	
NRES 222	Ecology Laboratory	
NRES 245	Introduction to Grassland Ecology and Management	
NRES 281	Introduction to Water Science	
NRES 302	Tree Biology	
NRES 319	Fundamentals of Environmental Sampling	
NRES 320	Fundamentals of Environmental Sampling Laboratory	
NRES 323	Natural Resources Policy	
NRES 370	Applied Climatology	
NRES 398R	Research Experiences in Grasslands	
NRES 408	Microclimate: The Biological Environment	
NRES 417	Agroforestry Systems in Sustainable Agriculture	
NRES 435	Agroecology	
NRES 424	Forest Ecology	
NRES 438	Grassland Conservation: Planning and Management	
NRES 440	Great Plains Ecosystem	
NRES 442	Wildland Plants	
NRES 443	Global Change & Ecosystems	
NRES 444	Ecosystem Monitoring and Assessment	
NRES 451	Soils, Water, and Environmental Chemistry	
NRES 453	Hydrology	
NRES 455	Soil Chemistry and Mineralogy	
NRES 477	Great Plains Field Pedology	
NRES 478	Regional Climatology	
NRES 481K / BIOS 481	Stream and River Ecology	
NRES 487	Introduction to Landscape Ecology	
SOIL 153	Soil Resources	
SOIL 269	Principles of Soil Management	
SOIL 460	Soil Microbial Ecology	
Free Electives		**7-16**
Credit Hours Subtotal:		13-25
Requirements		
Total Credit Hours		**40-57**

Water Science Option

This option is designed for the student will learn the important biotic, physical, and chemical processes that occur within lakes and streams and be prepared to environmentally manage problems related to water quality. Students will also be prepared to implement pollution abatement procedures or management practices associated with lake and stream restoration. Careers focus on environmental assessment, water conservation, and freshwater remediation. Completion of this program also provides excellent preparation for graduate study.

Water Science Option Requirements

CHEM 110A & CHEM 110L	General Chemistry II and General Chemistry II Laboratory	4
Select one Physics course from the following:		4-5
AGST 109	Physical Principles in Agriculture and Life Sciences	
PHYS 141	Physics for Life Sciences I	
PHYS 151	Elements of Physics	
PHYS 211	General Physics I	
Select one from:		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	
NREE 357 / AECN 357	Natural Resource and Environmental Law	3
or NRES 323	Natural Resources Policy	
NRES 319 & NRES 320	Fundamentals of Environmental Sampling and Fundamentals of Environmental Sampling Laboratory	3
NRES 361 / GEOL 361 / PLAS 361 / SOIL 361	Soils, Environment and Water Quality	3

NRES 453	Hydrology	3
NRES 459 / BIOS 459	Limnology	4
NRES 468 / BIOS 458	Wetlands	4
NRES 481K	Stream and River Ecology	4
NRES 484	Water Resources Seminar	1
SOIL 354 / AGST 354	Soil Conservation and Watershed Management	3
ACE 10		**3-4**
BIOS 457	Ecosystem Ecology	4
NRES 451	Soils, Water, and Environmental Chemistry	4
SOIL 475 / NRES 475 / PLAS 475	Water Quality Strategy	3
Water Science ENVS option electives:		
Select a minimum of two courses for Water Science ENVS option electives:		5-9
AECN 265	Resource and Environmental Economics I	
AECN 457	Water Law	
or NREE 457	Water Law	
AECN 465	Resource and Environmental Economics II	
or NREE 465	Resource and Environmental Economics II	
AGST 452	Irrigation Systems Management	
or PLAS 452	Irrigation Systems Management	
BSEN 244	Thermodynamics of Living Systems	
BSEN 321	Principles of Environmental Engineering	
BSEN 355	Introduction to Ecological Engineering	
CRPL 470	Environmental Planning and Policy	
CRPL 471	Environmental Impact Assessment	
CRPL 472	Hazard Mitigation Planning	
CRPL 489	Urbanization of Rural Landscapes	
ENSC 110	Energy in Perspective	
ENSC 220	Energy Systems and Sustainability	
ENSC 230	Energy and the Environment: Economics and Policy	
ENVR 201	Science, Systems, Environment and Sustainability	
ENVR 249	Individual and Cultural Perspectives on the Environment	
ENVR 319	Environmental Engagement and the Community	
ENVR 334	Psychology of Environmental Sustainability	
GEOL 372	Water & Earth Connections	
GEOL 410	Geochemistry	
GEOL 418 / NRES 419	Chemistry of Natural Waters	
GEOL 424	Biogeochemical Cycles	
GEOL 444	Earth and Environmental Microbiology	
MATH 106	Calculus I	
MATH 107	Calculus II	
METR 100	Weather and Climate	
METR 140	Severe and Unusual Weather	
METR 180	Climate Change, Energy, and the Environment	
METR 270	Global Warming: Science, Impacts, Solutions	
METR 487	Earth's Climate: Past, Present, Future	
NRES 104	Climate in Crisis	
NRES 109	Water in Society	
NRES 211	Introduction to Conservation Biology	
NRES 245	Introduction to Grassland Ecology and Management	
NRES 270	Biological Invaders	
NRES 299	Special Topics	
NRES 300	Toxins in the Environment	
NRES 319	Fundamentals of Environmental Sampling	
NRES 320	Fundamentals of Environmental Sampling Laboratory	
NRES 323	Natural Resources Policy	
NRES 330	Environmental Health	
NRES 361	Soils, Environment and Water Quality	
NRES 370	Applied Climatology	
NRES 399	Independent Research	
NRES 402	Aquatic Insects	
NRES 408	Microclimate: The Biological Environment	
NRES 413	Environmental Leadership	
NRES 415	GIS for Agriculture and Natural Resources	
NRES 418	Introduction to Remote Sensing	
NRES 419	Chemistry of Natural Waters	
NRES 420	Applications of Remote Sensing in Agriculture and Natural Resources	
NRES 421	Field Techniques in Remote Sensing	
NRES 435	Agroecology	
NRES 438	Grassland Conservation: Planning and Management	
NRES 440	Great Plains Ecosystem	
NRES 442	Wildland Plants	
NRES 443	Global Change & Ecosystems	
NRES 444	Ecosystem Monitoring and Assessment	
NRES 451	Soils, Water, and Environmental Chemistry	
NRES 452	Climate and Society	
NRES 453	Hydrology	
NRES 454	Ecological Interactions	
NRES 455	Soil Chemistry and Mineralogy	
NRES 459	Limnology	
NRES 461	Soil Physics	
NRES 467	Global Climate Change	
NRES 468	Wetlands	
NRES 470	Lake and Reservoir Restoration	
NRES 475	Water Quality Strategy	
NRES 477	Great Plains Field Pedology	
NRES 478	Regional Climatology	
NRES 479	Hydroclimatology	
or METR 479	Hydroclimatology	
or BSEN 479	Hydroclimatology	

NRES 481K	Stream and River Ecology
NRES 484	Water Resources Seminar
NRES 487	Introduction to Landscape Ecology
NRES 488	Groundwater Geology
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
POLS 332	Climate Change: Policy and Politics
RNGE 340	Range Management and Improvement
SOCI 346	Environmental Sociology
SOIL 101	Soil and Society
SOIL 269	Principles of Soil Management
SOIL 279	Soil Evaluation
SOIL 354	Soil Conservation and Watershed Management
SOIL 379	Advanced Soil Evaluation
SOIL 453	Urban Soil Properties and Management
SOIL 460	Soil Microbial Ecology
SOIL 472	Applied Soil Physics
Credit Hours Subtotal:	58-65

Requirements for Minor Offered by Department

Environmental Science Minor

Category 1 – Required Courses		
NRES 281 / GEOG 281	Introduction to Water Science	3
SOIL 153 / PLAS 153	Soil Resources	4
SOIL 361 / GEOL 361 / NRES 361 / PLAS 361	Soils, Environment and Water Quality	3
SOIL 477 / GEOG 467 / NRES 477 / PLAS 477	Great Plains Field Pedology	4
or NRES 468 / BIOS 458 / BSEN 468	Wetlands	
or NRES 481K / BIOS 481	Stream and River Ecology	
Credit Hours Subtotal:		14
Category 2 – Advanced Courses		
Select 6 hours from the following:		6
NRES 319	Fundamentals of Environmental Sampling	
NRES 320	Fundamentals of Environmental Sampling Laboratory	
NRES 451	Soils, Water, and Environmental Chemistry	
NRES 477 / GEOG 467 / PLAS 477 / SOIL 477	Great Plains Field Pedology (if not taken in Category 1)	
SOIL 354 / AGST 354	Soil Conservation and Watershed Management	
SOIL 453 / PLAS 453 / LARC 453	Urban Soil Properties and Management	
SOIL 455 / NRES 455 / PLAS 455	Soil Chemistry and Mineralogy	
SOIL 460 / BIOS 460 / NRES 460 / PLAS 460	Soil Microbial Ecology	
SOIL 461 / NRES 461 / PLAS 461	Soil Physics	
NRES 475 / AGST 475 / CIVE 475 / CRPL 475 / GEOL 475 / PLAS 475 / POLS 475 / SOIL 475	Water Quality Strategy	
Credit Hours Subtotal:		6
Category 3 – Related Courses		
Select one of the following:		3-4
BSEN 355	Introduction to Ecological Engineering	
CIVE 321 / BSEN 321	Principles of Environmental Engineering	
GEOG 217	Principles of GIS	
NRES 218	Introduction to Geospatial Technologies	
NRES 453	Hydrology	
NRES 459 / BIOS 459	Limnology	
NRES 468 / BIOS 458 / BSEN 468	Wetlands (if not taken in Category 1)	
NRES 481K	Stream and River Ecology	
Credit Hours Subtotal:		3-4
Total Credit Hours		**23-24**

Water Science Minor

Required Courses		
AGST 354 / SOIL 354	Soil Conservation and Watershed Management	3
NRES 281 / GEOG 281	Introduction to Water Science	3
Credit Hours Subtotal:		6
Advanced Courses		
Law, Policy and Management		
Select at least one of the following:		3-6

AECN 265 / NREE 265	Resource and Environmental Economics I
AECN 357 / NREE 357	Natural Resource and Environmental Law
AECN 457 / NREE 457	Water Law
AECN 465 / NREE 465	Resource and Environmental Economics II
CRPL 470	Environmental Planning and Policy
NRES 323	Natural Resources Policy
NRES 475 / AGST 475 / CIVE 475 / CRPL 475 / GEOL 475 / PLAS 475 / POLS 475 / SOIL 475	Water Quality Strategy
NRES 484 / GEOG 484 / GEOL 484 / PLAS 484	Water Resources Seminar
Science and Technology	
Select at least two of the following:	6-9
AGST 452 / PLAS 452	Irrigation Systems Management
GEOL 418 / NRES 419	Chemistry of Natural Waters
NRES 319	Fundamentals of Environmental Sampling
NRES 320	Fundamentals of Environmental Sampling Laboratory
NRES 361 / GEOL 361 / PLAS 361 / SOIL 361	Soils, Environment and Water Quality
NRES 408 / GEOG 408 / METR 408 / PLAS 408	Microclimate: The Biological Environment
NRES 451	Soils, Water, and Environmental Chemistry
NRES 453	Hydrology
NRES 459 / BIOS 459	Limnology
or BIOS 458 , BSEN 468 / NRES 468	Wetlands
NRES 463 & 463L	Fisheries Science and Fisheries Science Lab
NRES 481K / BIOS 481	Stream and River Ecology
NRES 484 / GEOG 484 / GEOL 484 / PLAS 484	Water Resources Seminar
NRES 488 / GEOL 488	Groundwater Geology
Credit Hours Subtotal:	12
Total Credit Hours	**18**

Applied Climate Science Minor

Required Courses

NRES 104	Climate in Crisis	3
or METR 100	Weather and Climate	
or METR 180	Climate Change, Energy, and the Environment	
NRES 208	Climate Literacy in Natural Resources	3
NRES 370 / METR 370	Applied Climatology	3
Select 6 hours from the following:		6
ENSC 110	Energy in Perspective	
ENSC 220	Energy Systems and Sustainability	
ENSC 230	Energy and the Environment: Economics and Policy	
GEOL 125	Frontiers in Antarctic Geosciences	
METR 180	Climate Change, Energy, and the Environment	
POLS 332	Climate Change: Policy and Politics	
Select one of the following:		3
METR 479 / BSEN 479 / NRES 479	Hydroclimatology	
NRES 452 / GEOG 450 / METR 450 / PLAS 450	Climate and Society	
NRES 478 / METR 478	Regional Climatology	
Credit Hours Subtotal:		18
Total Credit Hours		**18**

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

- Technical Sales, LI-COR Biosciences - Lincoln, NE
- Soil Scientist, USDA-NRCS - Powell, WY
- Integrated Water Management Planner, Nebraska Department of Natural Resources - Lincoln, NE
- Soil Conservationist, Natural Resource Conservation Service - Central City, NE
- Ecologist, Forest Preserve District - Springfield, IL
- Young for Preventative Maintenance Associate, University of Nebraska-Lincoln - Lincoln, NE