Environmental and Conservation Sciences

Department Information

- **Program Director:**
  Craig Stockwell, Ph.D.
- **Department Location:**
  Biological Sciences, Stevens 119
- **Department Phone:**
  (701) 231-7717
- **Department Web Site:**
  www.ndsu.edu/ecs/ (http://www.ndsu.edu/ecs/)
- **Application Deadline:**
  International applications are due May 1 for fall semester and August 1 for spring semester. Domestic applicants should apply at least one month prior to the start of classes.
- **Credential Offered:**
  Ph.D., M.S.
- **English Proficiency Requirements:**
  TOEFL ibt 79; IELTS 6.5; Duolingo 105

The graduate program leading to an M.S. or a Ph.D. in Environmental and Conservation Sciences (ECS) rests on an integrative curriculum and a multidisciplinary team approach. The program emphasizes the common ground shared by all sciences, and seeks to bridge methodological and philosophical boundaries that might hinder interdisciplinary communication and cooperation. The program offers three tracks: Environmental Science, Conservation Biology and Environmental Social Sciences. The Environmental Science track focuses on abiotic environmental issues, such as water, air, and land pollution. The Conservation Biology track focuses on biotic issues, such as the preservation of biodiversity and ecosystem function. The Environmental Social Sciences track emphasizes environmental economics and policy.

The interdisciplinary nature of this program is reflected by the participation of faculty from across the campus, including the Colleges of Agriculture, Food Systems, and Natural Resources; Arts, Humanities, and Social Sciences; Engineering; and Science and Mathematics.

Environmental Science

Areas of Environmental Science, such as climate change, groundwater, hazardous waste, and water chemistry, require broad training across discipline lines for successful application. To better predict anthropogenic environmental impacts, the engineering, earth material, chemical, and biological data must be considered in an integrated manner.

Conservation Biology

Conservation Biology focuses on the loss of regional and global biodiversity, but considers the human element as well in its approach to resource issues. As an example, conservation genomics, community ecology, invasion ecology, endangered species management, and human-wildlife conflicts are themes for ECS Graduate Students.

Environmental Social Sciences

Environmental Social Sciences focuses on Natural Resources Economics; Environmental Economics as related to Environmental policy.

Admissions Requirements

To be admitted to the Environmental and Conservation Sciences program, the applicant must meet the Graduate School requirements. Further, applicants are **only considered after an ECS affiliated faculty member has agreed to to admit the student to her/his lab and make arrangements of stipend and research funding**. Thus, applicants should contact ECS faculty members who share their research interests. https://www.ndsu.edu/ecs/index.php/people/faculty (https://www.ndsu.edu/ecs/index.php/people/faculty/)

Financial Assistance

The applicant should contact a prospective mentor to identify sources of financial aid. Teaching and research assistantships may be available through funded research or participating departments. Applicants are considered on the basis of scholarship and potential to undertake advanced study and research. Contact the office of Financial Aid and Scholarships for information and applications regarding scholarships.

Program Administration

The graduate program is administered by the ECS Steering Committee. The committee is composed of ECS graduate faculty members representing the participating colleges: Agriculture, Food Systems, and Natural Resources; Engineering; and Science and Mathematics. The committee also includes a student member which is nominated annually by the ECS Graduate Student Association.

The ECS Program Director presides over ECS Steering Committee meetings. The duties of the ECS Steering Committee include:

1. review of requests to join the ECS faculty and
2. program review and administration.

Program Faculty

https://www.ndsu.edu/ecs/people/faculty/

By the end of the second semester, the student and academic adviser will arrange for the appointment of a Graduate Supervisory Committee. For Ph.D. study, the Graduate Supervisory Committee will consist of at least four members of the NDSU graduate faculty. The committee must include the student's adviser, two additional ECS faculty members, and a Graduate School representative. One committee member must be from outside the student's home college.

For M.S. study, the Graduate Supervisory Committee will consist of at least three members of the NDSU graduate faculty and will include the student's adviser, an ECS faculty member and a faculty from outside the student's home college. The plan of study will be prepared by the student, in consultation with the major adviser, by the end of the first year in residence.

Master of Science in Environmental and Conservation Sciences

The total credits will be not less than 30 graduate credits, with at least 16 credits of graduate courses numbered 601-689, 691; 700-789, 791 or 800-889, 891 plus the ECS graduate seminar for 1 credit, and research credits (798) not fewer than 6 nor more than 10 thesis credits. The didactic credits must include at least 1 ECS cross-disciplinary course; 1 ECS track course and UNIV 720 Scientific Integrity. All M.S. students must complete a thesis and pass a final examination as described in The Graduate School Policies section of the Graduate Bulletin. An overall GPA of 3.0 or better must be maintained.

Doctor of Philosophy in Environmental and Conservation Sciences

Each Ph.D. student will complete at least 27 credits of didactic courses plus the ECS graduate seminar for 1 credit. The didactic courses will include: 3 core courses (9 credits), UNIV 720 Scientific Integrity, a minimum of 14-15 credits from a chosen track, and 2-3 credits of electives from another track or other NDSU courses numbered 601-689, 691; 700-789, 791 or 800-889, 891. The 15 track credits must be from at least 2 course categories. Two of the three courses must come from outside of the student's chosen track. Of the 27 didactic course credits, a total of 15 must be at the 700-800 level. A total of 90 credits are required.

For students entering the program with a Master's Degree or previous graduate coursework, up to 12 credits of previous graduate work can transfer and be counted toward the 27 credits. Such transferred credits must be approved by the student's supervisory committee, the program director and the Graduate Dean. The student must earn no fewer than 60 graduate credits at NDSU. Of these, no fewer than 15 credits must be at the 700 or 800 level (700-789, 791; 800-889 and 891).

Program Requirements

Code	Title	Credits
Environmental Social Sciences Track		
ECON 681	Natural Resource Economics	3
ECS 770	Environmental Law and Policy	3
HIST 634	Environmental History	3
or HIST 710	Research Seminar in North American History	
or HIST 780	Readings in World History	
NRM 631	National Environmental Policy Act & Environental Impact Assessment	3
NRM 702	Natural Resources Management Planning	3
SOC 631	Environmental Sociology	3
Environmental Sciences Track		
CE 770	Hazardous Waste Site Remediation	3
GEOL 614	Hydrogeology	3
MICR 652	Microbial Ecology	3
PH 720	Environmental Health	3

Conservation Biology Track	
BOT 862	3
BOT 864	3
ZOO 675	3
ZOO 850	

CONSERVATIVE BIOLOGY TRACK - TOTAL 18 CREDITS

Code	Title	Credits
Biodiversity		
Select 3-9 credits of the following:		
BIOL 681	Wetland Science	
BOT 717		
ENT 750	Systematic Entomology	
RNG 716	Agrostology	
ZOO 650		
ZOO 652		
ZOO 654		
ZOO 658		
Ecology and Evolution		
Select 3-9 credits of the following:		
BIOL 850	Advanced Ecology	
BIOL 859	Evolution	
BOT 660		
BOT 862		
BOT 864		
ENT 765		
ENT 770	Writing a Scientific Literature Review	
GEOL 640		
MICR 652	Microbial Ecology	
PLSC 631	Intermediate Genetics	
PLSC 751	Advanced Plant Genetics	
PLSC 781		
RNG 765	Analysis Of Ecosystems	
SOIL 610	Soils and Land Use	
SOIL 647	Microclimatology	
ZOO 662		
ZOO 670		
ZOO 850		
ZOO 860		
ZOO 870		
Human Dimensions and Management		
Select 3-9 credits of the following:		
ANTH 662	Anthropology and the Environment	
COMM 783	Advanced Organizational Communication I	
CE 678	Water Quality Management	
ECON 682	Environmental Economics	
POLS 642	Global Policy Issues	
POLS 650	Politics of the Developing Countries	
RNG 656	Ecological Restoration	
ZOO 675		
ZOO 676		
ZOO 677		

ZOO 850	
Research Tools	
Select 3-9 credits of the following:	
CE 677	Applied Hydrology
GEOG 655	Introduction to Geographic Information Systems
GEOG 656	Advanced Geographic Information Systems
GEOL 660	Biogeochemistry
GEOL 760	Advanced Biogeochemistry
PLSC 724	Field Design I
PSYC 640	Experimental Methods
RNG 650	Range Plants
SOC 701	Quantitative Methods
SOIL 784	
STAT 661	Applied Regression Models
STAT 662	Introduction to Experimental Design
STAT 663	Nonparametric Statistics
STAT 665	Meta-Analysis Methods
STAT 670	Statistical SAS Programming
STAT 730	Biostatistics
STAT 761	Advanced Regression
STAT 770	Survival Analysis

ENVIRONMENTAL SCIENCES TRACK-TOTAL 17 CREDITS

Code	Title	Credits
Water Sciences		
Select 3-9 credits of the following:		
ABEN 664	Resource Conservation and Irrigation Engineering	
ABEN 765	Small Watershed Hydrology and Modeling	
CE 610	Water & Wastewater Engineering	
CE 677	Applied Hydrology	
CE 676	Watershed Modeling	
CE 678	Water Quality Management	
CE 679	Advanced Water and Wastewater Treatment	
CE 776	Ground Water and Seepage	
CE 779	Watershed Water Quality Modeling	
CE 796	Special Topics	
GEOL 640		
ZOO 670		
Soil and Solid Waste		
Select 3-9 credits of the following:		
ABEN 696	Special Topics	
CE 672	Solid and Hazardous Waste Management	
CE 770	Hazardous Waste Site Remediation	
SOIL 610	Soils and Land Use	
SOIL 633	Soil Ecohydrology and Physics	
SOIL 733	Advanced Soil Nutrient Cycling	
Environmental Management		
Select 3-9 credits of the following:		
CE 672	Solid and Hazardous Waste Management	
CE 678	Water Quality Management	
COMM 783	Advanced Organizational Communication I	
RNG 656	Ecological Restoration	

ZOO 675	
ZOO 676	
ZOO 677	
Research Tools	
Select 3-9 credits of the following:	
ABEN 682	Instrumentation & Measurements
ABEN 696	Special Topics
CE 677	Applied Hydrology
GEOG 655	Introduction to Geographic Information Systems
GEOG 656	Advanced Geographic Information Systems
GEOL 660	Biogeochemistry
GEOL 760	Advanced Biogeochemistry
IME 660	Evaluation of Engineering Data
RNG 650	Range Plants
STAT 662	Introduction to Experimental Design
STAT 725	Applied Statistics
STAT 761	Advanced Regression

ENVIRONMENTAL AND SOCIAL SCIENCES TRACK-TOTAL 17 CREDITS

Code	Title	Credits
Social Science Theory		
Select 3-9 credits of the following:		
AGEC 741	Advanced Microeconomics	
ANTH 680	Development of Anthropological Theory	
COMM 711	Communication Theory	
ECON 640	Game Theory and Strategy	
POLS 720		
SOC 622	Development Of Social Theory	
SOC 723	Social Theory	
Cultural and Behavioral Aspects		
Select 3-9 credits of the following:		
AGEC 711	Applied Risk Analysis I	
ANTH 662	Anthropology and the Environment	
ANTH 664	Disaster and Culture	
ECON 656		
ECON 681	Natural Resource Economics	
ECON 682	Environmental Economics	
HIST 634	Environmental History	
POLS 642	Global Policy Issues	
POLS 653	Environmental Policy and Politics	
SOC 631	Environmental Sociology	
SOC 639	Social Change	
SOC 643		
Management Techniques		
Select 3-9 credits of the following:		
COMM 783	Advanced Organizational Communication I	
GEOL 660	Biogeochemistry	
NRM 631	National Environmental Policy Act & Environental Impact Assessment	
NRM 632		
NRM 653	Rangeland Resources Watershed Management	
NRM 701	Terrestrial Resources Management	
NRM 702	Natural Resources Management Planning	

RNG 654	Wetland Resources Management
RNG 656	Ecological Restoration
SOC 604	Community Assessment
TL 755	City Logistics
ZOO 675	
ZOO 676	
ZOO 850	
Research Tools	
Select 3-9 credits of the following:	
AGEC 701	Research Methods
AGEC 739	Analytical Methods for Applied Economics
BIOL 850	Advanced Ecology
COMM 700	Research Methods in Communication
COMM 701	Advanced Research Methods in Communication I
COMM 704	Qualitative Research Methods in Communication
COMM 707	Quantitative Research Methods in Communication
ECON 610	Econometrics
ECON 710	Advanced Econometrics
EMGT 614	
ENGL 656	Literacy, Culture and Identity
ENGL 758	Topics in Rhetoric, Writing, and Culture
GEOG 655	Introduction to Geographic Information Systems
GEOG 656	Advanced Geographic Information Systems
PSYC 640	Experimental Methods
RNG 652	Managing Natural and Rangeland Resources using GIS
RNG 765	Analysis Of Ecosystems
SOC 700	Qualitative Methods
SOC 701	Quantitative Methods
STAT 660	Applied Survey Sampling
STAT 661	Applied Regression Models
STAT 662	Introduction to Experimental Design
STAT 663	Nonparametric Statistics
STAT 665	Meta-Analysis Methods
STAT 670	Statistical SAS Programming
STAT 725	Applied Statistics
STAT 726	Applied Regression and Analysis of Variance
STAT 730	Biostatistics
STAT 761	Advanced Regression
STAT 770	Survival Analysis

Preliminary Examinations for Doctoral Students

The written preliminary examination will cover the core areas for ECS and each of the core topic areas for the appropriate track. The preliminary examination will typically be taken in the middle of the third year. The written exam must be passed before the comprehensive oral examination can be scheduled.

The comprehensive oral examination will be taken no later than the end of the third year in residence. The examination will cover the topic areas for the appropriate track.

Dissertation Research

A proposal describing research suitable for preparation of a dissertation in Environmental and Conservation Sciences will be prepared in the format of a NSF Dissertation Improvement Grant. Alternative formats must be agreed to by the Graduate Supervisory Committee. The proposal will be submitted

to the student's Graduate Supervisory Committee for review and approval. The dissertation must show originality and demonstrate the student's capacity for independent research.