

# ENVIRONMENTAL SCIENCES, B.S. (CALS)

The Environmental Sciences major satisfies the growing demand among entry-level students for a rigorous, science-based program that promotes critical thinking and emphasizes environmental problem solving in service to society. The program is designed to prepare graduates who will be highly competitive for entry-level positions in nonprofit and private sectors, and for master's programs and doctoral research programs in environmental fields. Possible career paths include environmental monitoring, consulting, education, research, and planning, as well as natural resource management, ecology restoration, remediation, water and air quality assessment, sustainability practices, and more. Undergraduates in Environmental Sciences prepare for a variety of career and graduate school opportunities that require a strong background in the natural sciences. Foundational course work in the major includes calculus, biology, chemistry, and physics. Core and elective course work is fulfilled through diverse offerings from both the College of Agricultural and Life Sciences and the College of Letters & Science.

The Environmental Sciences major can be earned in either the College of Agricultural and Life Sciences (CALS) or the College of Letters & Science (L&S) under the bachelor of science (B.S.) or bachelor of arts (B.A.) degree program. An undergraduate B.S. degree is offered through both colleges. A B.A. option is offered through L&S only. Students are encouraged to review the degree requirements for both L&S and CALS and choose the college from which they would prefer to earn their degree; students may choose only one degree "home."

- In CALS, the major is housed in the Department of Soil Science.
- In L&S, the major is housed in the Department of Atmospheric and Oceanic Sciences.

The major can be taken as a stand-alone or as a double major with a variety of other majors on campus including Life Sciences Communication, Biology, Community & Environmental Sociology, Soil Science, foreign language/culture, and a number of other disciplines.

## HOW TO GET IN

Students wishing to declare the Environmental Sciences major should meet with an academic advisor. Contact information for advisors can be found here (<http://envirosci.wisc.edu/advising/>).

## REQUIREMENTS

### UNIVERSITY GENERAL EDUCATION REQUIREMENTS

All undergraduate students at the University of Wisconsin–Madison are required to fulfill a minimum set of common university general education requirements to ensure that every graduate acquires the essential core of an undergraduate education. This core establishes a foundation for living a productive life, being a citizen of the world, appreciating aesthetic values, and engaging in lifelong learning in a continually changing world. Various schools and colleges will have requirements in addition to the requirements listed below. Consult your advisor for assistance, as needed. For additional information, see the university Undergraduate

General Education Requirements (<http://guide.wisc.edu/undergraduate/#requirementsforundergraduatetext>) section of the *Guide*.

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|-------------------|--|
| General Education | <ul style="list-style-type: none"> <li>• Breadth—Humanities/Literature/Arts: 6 credits</li> <li>• Breadth—Natural Science: 4 to 6 credits, consisting of one 4- or 5-credit course with a laboratory component; or two courses providing a total of 6 credits</li> <li>• Breadth—Social Studies: 3 credits</li> <li>• Communication Part A &amp; Part B *</li> <li>• Ethnic Studies *</li> <li>• Quantitative Reasoning Part A &amp; Part B *</li> </ul> |
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\* The mortarboard symbol appears before the title of any course that fulfills one of the Communication Part A or Part B, Ethnic Studies, or Quantitative Reasoning Part A or Part B requirements.

## COLLEGE OF AGRICULTURAL AND LIFE SCIENCES REQUIREMENTS

In addition to the University General Education Requirements, all undergraduate students in CALS must satisfy a set of college and major requirements. Courses may not double count within university requirements (General Education and Breadth) or within college requirements (First-Year Seminar, International Studies, Science, and Capstone), but courses counted toward university requirements may also be used to satisfy a college and/or a major requirement; similarly, courses counted toward college requirements may also be used to satisfy a university and/or a major requirement.

### COLLEGE REQUIREMENTS FOR ALL CALS B.S. DEGREE PROGRAMS

Code	Title	Credits
Quality of Work: Students must maintain a minimum cumulative grade point average of 2.000 to remain in good standing and be eligible for graduation.		
Residency: Students must complete 30 degree credits in residence at UW–Madison after earning 86 credits toward their undergraduate degree.		
First Year Seminar ( <a href="http://guide.wisc.edu/undergraduate/agricultural-life-sciences/#CALSThirdYearSeminarCourses">http://guide.wisc.edu/undergraduate/agricultural-life-sciences/#CALSThirdYearSeminarCourses</a> )		1
International Studies ( <a href="http://guide.wisc.edu/undergraduate/agricultural-life-sciences/#CALSThirdYearSeminarCourses">http://guide.wisc.edu/undergraduate/agricultural-life-sciences/#CALSThirdYearSeminarCourses</a> )		3
Physical Science Fundamentals		4-5
CHEM 103 or CHEM 108 or CHEM 109	General Chemistry I Chemistry in Our World Advanced General Chemistry	
Biological Science		5
Additional Science (Biological, Physical, or Natural)		3
Science Breadth (Biological, Physical, Natural, or Social)		3
CALS Capstone Learning Experience: included in the requirements for each CALS major (see "Major Requirements") ( <a href="http://guide.wisc.edu/undergraduate/agricultural-life-sciences/#CALSCapstoneRequirement">http://guide.wisc.edu/undergraduate/agricultural-life-sciences/#CALSCapstoneRequirement</a> )		

## REQUIREMENTS FOR THE MAJOR

Courses may not double count within the major (unless specifically noted otherwise), but courses counted toward the major requirements may also be used to satisfy a university requirement and/or a college requirement. A minimum of **15 credits** must be completed in the major that are not used elsewhere.

### MATHEMATICS AND STATISTICS

This major requires calculus. Prerequisites may need to be taken before enrollment in calculus. Refer to the Course Guide for information about calculus prerequisites.

Code	Title	Credits
Complete one of the following:		5-10
MATH 221	Calculus and Analytic Geometry I (Recommended)	
MATH 171 & MATH 217	Calculus with Algebra and Trigonometry I and Calculus with Algebra and Trigonometry II	
MATH 211	Calculus	
Complete one of the following:		3
STAT 240	Data Science Modeling I	
STAT 302	Accelerated Introduction to Statistical Methods	
STAT 371	Introductory Applied Statistics for the Life Sciences	
<b>Total Credits</b>		<b>8-13</b>

### CHEMISTRY

Code	Title	Credits
CHEM 103 & CHEM 104 or CHEM 109	General Chemistry I and General Chemistry II Advanced General Chemistry	5-9
Complete one of the following:		3
CHEM 341	Elementary Organic Chemistry	
CHEM 343	Organic Chemistry I	
<b>Total Credits</b>		<b>8-12</b>

### BIOLOGY

Code	Title	Credits
Complete one of the following:		10
BIOLOGY/ BOTANY/ ZOOLOGY 151 & BIOLOGY/ BOTANY/ ZOOLOGY 152	Introductory Biology and Introductory Biology	
BOTANY/ BIOLOGY 130 & ZOOLOGY/ BIOLOGY 101 & ZOOLOGY/ BIOLOGY 102	General Botany and Animal Biology and Animal Biology Laboratory	

BIOCORE 381 & BIOCORE 382 & BIOCORE 383 & BIOCORE 384	Evolution, Ecology, and Genetics and Evolution, Ecology, and Genetics Laboratory and Cellular Biology and Cellular Biology Laboratory	
<b>Total Credits</b>		<b>10</b>

### PHYSICS

Code	Title	Credits
Complete one of the following:		4-5
PHYSICS 207	General Physics (Recommended)	
PHYSICS 103	General Physics	
PHYSICS 201	General Physics	
<b>Total Credits</b>		<b>4-5</b>

### MAJOR FOUNDATION

Code	Title	Credits
Complete one of the following:		3-4
ENVIR ST/ILS 126	Principles of Environmental Science	
GEOG/ ENVIR ST 120	Introduction to the Earth System	
GEOSCI/ ENVIR ST 106	Environmental Geology	
SOIL SCI/ ENVIR ST/ GEOG 230	Soil: Ecosystem and Resource	
SOIL SCI 250	Introduction to Environmental Science	
<b>Total Credits</b>		<b>3-4</b>

### MAJOR CORE

Complete at least one course and 3 credits from each of these following areas:

#### Ecology

Code	Title	Credits
AGRONOMY 300	Cropping Systems	3
AGRONOMY/ BOTANY/ SOIL SCI 370	Grassland Ecology	3
AGRONOMY/ DY SCI 471	Food Production Systems and Sustainability	3
BOTANY/ F&W ECOL 455	The Vegetation of Wisconsin	4
BOTANY/ F&W ECOL/ ZOOLOGY 460	General Ecology (Recommended)	4
ENTOM 450	Basic and Applied Insect Ecology	3
ENTOM 451	Basic and Applied Insect Ecology Laboratory	1
ENTOM/BOTANY/ ZOOLOGY 473	Plant-Insect Interactions	3
ENVIR ST 400	Special Topics in the Environment: Biological Aspects of Envir St (Stream Ecology)	3

ENVIR ST/ ZOOLOGY 510	Ecology of Fishes	3
ENVIR ST/ ZOOLOGY 511	Ecology of Fishes Lab	2
F&W ECOL/ ENVIR ST/ ZOOLOGY 360	Extinction of Species	3
F&W ECOL 410	Principles of Silviculture	3
F&W ECOL/AN SCI/ ZOOLOGY 520	Ornithology	3
F&W ECOL/AN SCI/ ZOOLOGY 521	Birds of Southern Wisconsin	3
F&W ECOL 550	Forest Ecology	3
F&W ECOL 551	Forest Ecology Lab	1
F&W ECOL/ LAND ARC/ ZOOLOGY 565	Principles of Landscape Ecology	2
HORT 334	Greenhouse Cultivation	2
HORT 335	Greenhouse Cultivation Lab	1
LAND ARC/ ENVIR ST 361	Wetlands Ecology	3
LAND ARC/ ENVIR ST 581	Prescribed Fire: Ecology and Implementation	3
SOIL SCI/ PL PATH 323	Soil Biology	3
ZOOLOGY 304	Marine Biology	2
ZOOLOGY/ ENVIR ST 315	Limnology-Conservation of Aquatic Resources	2
ZOOLOGY 316	Laboratory for Limnology-Conservation of Aquatic Resources	2-3

## Physical Environment

Code	Title	Credits
ATM OCN 310	Dynamics of the Atmosphere and Ocean I	3
ATM OCN/ ENVIR ST/ GEOG 322	Polar Regions and Their Importance in the Global Environment	3
ATM OCN/ GEOG 323	Science of Climate Change	3
ATM OCN/ ENVIR ST/GEOG/ GEOSCI 335	Climatic Environments of the Past	3
ATM OCN/ ENVIR ST 355	Introduction to Air Quality	3
ATM OCN/ ENVIR ST 520	Bioclimatology	3
ATM OCN/ ENVIR ST 535	Atmospheric Dispersion and Air Pollution	3
BSE 365	Measurements and Instrumentation for Biological Systems	3
BSE/ENVIR ST 367	Renewable Energy Systems	3
BSE 460	Biorefining: Energy and Products from Renewable Resources	3
CIV ENGR 320	Environmental Engineering	3
CIV ENGR 423	Air Pollution Effects, Measurement and Control	3

CIV ENGR 424		
ENVIR ST/ POP HLTH 502	Air Pollution and Human Health	3
GEOG/GEOSCI 320	Geomorphology	3
GEOG 329	Landforms and Landscapes of North America	3
GEOG/ATM OCN/ ENVIR ST 332	Global Warming: Science and Impacts	3
GEOG/BOTANY 338	Environmental Biogeography	3
GEOG/GEOSCI 420	Glacial and Pleistocene Geology	3
GEOSCI 304	Geobiology	3
GEOSCI 551	Paleoceanography	3
GEOSCI/G L E 627	Hydrogeology	3-4
GEOSCI/G L E 629	Contaminant Hydrogeology	3
POP HLTH/ ENVIR ST 471	Introduction to Environmental Health	3
SOIL SCI 301	General Soil Science	3
SOIL SCI 302	Meet Your Soil: Soil Analysis and Interpretation Laboratory	1
SOIL SCI 321	Soils and Environmental Chemistry	3
SOIL SCI 322	Physical Principles of Soil and Water Management	3
SOIL SCI/ ENVIR ST 324	Soils and Environmental Quality	3
SOIL SCI 327	Environmental Monitoring and Soil Characterization for Earth's Critical Zone	4
SOIL SCI 430	Environmental Soil Contamination	3
SOIL SCI/ F&W ECOL 451	Environmental Biogeochemistry	3
SOIL SCI/ AGRONOMY/ ATM OCN 532	Environmental Biophysics	3
SOIL SCI/ CIV ENGR/ M&ENVTOX 631	Toxicants in the Environment: Sources, Distribution, Fate, & Effects	3

## Geospatial Sciences

Code	Title	Credits
COMP SCI 220	Data Science Programming I	4
ENVIR ST/ CIV ENGR/ LAND ARC 556	Remote Sensing Digital Image Processing	3
GEOG 360	Quantitative Methods in Geographical Analysis	4
GEOG 370	Introduction to Cartography	4
GEOG/ENVIR ST/ F&W ECOL/ G L E/GEOSCI/ LAND ARC 371	Introduction to Environmental Remote Sensing	3
GEOG/CIV ENGR/ ENVIR ST 377	An Introduction to Geographic Information Systems	4
GEOSCI/CIV ENGR/ ENVIR ST/G L E 444	Practical Applications of GPS Surveying	2
LAND ARC 311	Introduction to Design Frameworks and Spatial Technologies	2

LAND ARC 511	Geodesign Methods and Applications	3
SOIL SCI 585	Using R for Soil and Environmental Sciences	3
SOIL SCI/ENVIR ST/ LAND ARC 695	Applications of Geographic Information Systems in Natural Resources	3

### Environmental Policy & Social Perspectives

Code	Title	Credits
A A E/ENVIR ST 244	The Environment and the Global Economy	4
A A E 246	Climate Change Economics and Policy	3
A A E/ECON/ ENVIR ST 343	Environmental Economics	3-4
AMER IND/ ENVIR ST 306	Indigenous Peoples and the Environment	3
AMER IND/ ENVIR ST/ GEOG 345	Managing Nature in Native North America	3
C&E SOC/ F&W ECOL/ SOC 248	Environment, Natural Resources, and Society	3
C&E SOC/CURRIC/ ENVIR ST 405	Education for Sustainable Communities	3
C&E SOC/ENVIR ST/ GEOG 434	People, Wildlife and Landscapes	3
C&E SOC/ENVIR ST/ SOC 540	Sociology of International Development, Environment, and Sustainability	3
C&E SOC/SOC 541	Environmental Stewardship and Social Justice	3
ENVIR ST 349	Climate Change Governance	3
ENVIR ST/ GEOG 439	US Environmental Policy and Regulation	3-4
ENVIR ST/ PHILOS 441	Environmental Ethics	3-4
GEOG/ ENVIR ST 339	Environmental Conservation	4
GEOG/ URB R PL 305	Introduction to the City	3-4
GEOG/ENVIR ST/ HISTORY 460	American Environmental History	4
GEOG/ ENVIR ST 537	Culture and Environment	4
GEOSCI/ ENVIR ST 411	Energy Resources	3
HISTORY/ENVIR ST/ GEOG 469	The Making of the American Landscape	4
POLI SCI 510		3-4
URB R PL/ ECON/ENVIR ST/ POLI SCI 449	Government and Natural Resources	3-4

## MAJOR ELECTIVES

There are two ways to complete this requirement, either by distributing 12 credits across at least three categories, or by focusing those credits in a single category.<sup>1</sup>

## DISTRIBUTED ELECTIVES

Students choosing the Distributed Electives path must complete a total of **12 credits** of Environmental Sciences Electives from the categories below, including **at least one course** from **each** category.

### Ecology

Code	Title	Credits
AGRONOMY 300	Cropping Systems	3
AGRONOMY/ BOTANY/ SOIL SCI 370	Grassland Ecology	3
AGRONOMY/ DY SCI 471	Food Production Systems and Sustainability	3
BOTANY/ F&W ECOL 455	The Vegetation of Wisconsin	4
BOTANY/ F&W ECOL/ ZOOLOGY 460	General Ecology	4
ENTOM/BOTANY/ ZOOLOGY 473	Plant-Insect Interactions	3
ENTOM 450	Basic and Applied Insect Ecology	3
ENTOM 451	Basic and Applied Insect Ecology Laboratory	1
ENVIR ST 400	Special Topics in the Environment: Biological Aspects of Envir St (Stream Ecology)	3
ENVIR ST/ ZOOLOGY 510	Ecology of Fishes	3
ENVIR ST/ ZOOLOGY 511	Ecology of Fishes Lab	2
F&W ECOL/ ENVIR ST/ ZOOLOGY 360	Extinction of Species	3
F&W ECOL 410	Principles of Silviculture	3
F&W ECOL/AN SCI/ ZOOLOGY 520	Ornithology	3
F&W ECOL/AN SCI/ ZOOLOGY 521	Birds of Southern Wisconsin	3
F&W ECOL 550	Forest Ecology	3
F&W ECOL 551	Forest Ecology Lab	1
F&W ECOL/ LAND ARC/ ZOOLOGY 565	Principles of Landscape Ecology	2
F&W ECOL/ ZOOLOGY 660	Climate Change Ecology	3
HORT 334	Greenhouse Cultivation	2
HORT 335	Greenhouse Cultivation Lab	1
LAND ARC/ ENVIR ST 361	Wetlands Ecology	3
LAND ARC/ ENVIR ST 581	Prescribed Fire: Ecology and Implementation	3

SOIL SCI/ PL PATH 323	Soil Biology	3
ZOOLOGY 304	Marine Biology	2
ZOOLOGY/ ENVIR ST 315	Limnology-Conservation of Aquatic Resources	2
ZOOLOGY 316	Laboratory for Limnology- Conservation of Aquatic Resources	2-3

### Physical Environment

Code	Title	Credits
ATM OCN 310	Dynamics of the Atmosphere and Ocean I	3
ATM OCN/ ENVIR ST/ GEOG 322	Polar Regions and Their Importance in the Global Environment	3
ATM OCN/ GEOG 323	Science of Climate Change	3
ATM OCN/ ENVIR ST/GEOG/ GEOSCI 335	Climatic Environments of the Past	3
ATM OCN/ ENVIR ST 355	Introduction to Air Quality	3
ATM OCN/ ENVIR ST 520	Bioclimatology	3
ATM OCN/ ENVIR ST 535	Atmospheric Dispersion and Air Pollution	3
BSE 365	Measurements and Instrumentation for Biological Systems	3
BSE/ENVIR ST 367	Renewable Energy Systems	3
BSE 460	Biorefining: Energy and Products from Renewable Resources	3
CIV ENGR 320	Environmental Engineering	3
CIV ENGR 423	Air Pollution Effects, Measurement and Control	3
CIV ENGR 424		
ENVIR ST/ POP HLTH 502	Air Pollution and Human Health	3
GEOG/GEOSCI 320	Geomorphology	3
GEOG 329	Landforms and Landscapes of North America	3
GEOG/ATM OCN/ ENVIR ST 332	Global Warming: Science and Impacts	3
GEOG/BOTANY 338	Environmental Biogeography	3
GEOG/GEOSCI 420	Glacial and Pleistocene Geology	3
GEOSCI 304	Geobiology	3
GEOSCI 551	Paleoceanography	3
GEOSCI/G L E 627	Hydrogeology	3-4
GEOSCI/G L E 629	Contaminant Hydrogeology	3
POP HLTH/ ENVIR ST 471	Introduction to Environmental Health	3
SOIL SCI 301	General Soil Science	3
SOIL SCI 302	Meet Your Soil: Soil Analysis and Interpretation Laboratory	1
SOIL SCI 321	Soils and Environmental Chemistry	3
SOIL SCI 322	Physical Principles of Soil and Water Management	3

SOIL SCI/ ENVIR ST 324	Soils and Environmental Quality	3
SOIL SCI 327	Environmental Monitoring and Soil Characterization for Earth's Critical Zone	4
SOIL SCI 430	Environmental Soil Contamination	3
SOIL SCI/ F&W ECOL 451	Environmental Biogeochemistry	3
SOIL SCI/ AGRONOMY/ ATM OCN 532	Environmental Biophysics	3
SOIL SCI/ CIV ENGR/ M&ENVTOX 631	Toxicants in the Environment: Sources, Distribution, Fate, & Effects	3

### Geospatial Sciences

Code	Title	Credits
ENVIR ST/ CIV ENGR/ LAND ARC 556	Remote Sensing Digital Image Processing	3
GEOG 360	Quantitative Methods in Geographical Analysis	4
GEOG 370	Introduction to Cartography	4
GEOG/ENVIR ST/ F&W ECOL/ G L E/GEOSCI/ LAND ARC 372	Intermediate Environmental Remote Sensing	3
GEOG/CIV ENGR/ ENVIR ST 377	An Introduction to Geographic Information Systems	4
GEOG 378	Introduction to Geocomputing	4
GEOG 560	Advanced Quantitative Methods	3
GEOG 578	GIS Applications	4
GEOG 579	GIS and Spatial Analysis	4
GEOSCI/CIV ENGR/ ENVIR ST/G L E 444	Practical Applications of GPS Surveying	2
LAND ARC 311	Introduction to Design Frameworks and Spatial Technologies	2
LAND ARC 511	Geodesign Methods and Applications	3
SOIL SCI 585	Using R for Soil and Environmental Sciences	3
SOIL SCI/ENVIR ST/ LAND ARC 695	Applications of Geographic Information Systems in Natural Resources	3

### FOCUSED ELECTIVES

Students choosing the Focused Electives path must complete a total of **12 credits** of Environmental Sciences Electives from **one** of the following categories.<sup>1</sup>

### Ecology

Code	Title	Credits
AGRONOMY 300	Cropping Systems	3
AGRONOMY/ BOTANY/ SOIL SCI 370	Grassland Ecology	3
AGRONOMY/ DY SCI 471	Food Production Systems and Sustainability	3

BOTANY/ F&W ECOL 455	The Vegetation of Wisconsin	4	ATM OCN/ ENVIR ST/GEOG/ GEOSCI 335	Climatic Environments of the Past	3
BOTANY/ F&W ECOL/ ZOOLOGY 460	General Ecology	4	ATM OCN/ ENVIR ST 355	Introduction to Air Quality	3
ENTOM/BOTANY/ ZOOLOGY 473	Plant-Insect Interactions	3	ATM OCN/ ENVIR ST 520	Bioclimatology	3
ENTOM 450	Basic and Applied Insect Ecology	3	ATM OCN/ ENVIR ST 535	Atmospheric Dispersion and Air Pollution	3
ENTOM 451	Basic and Applied Insect Ecology Laboratory	1	BSE 365	Measurements and Instrumentation for Biological Systems	3
ENVIR ST 400	Special Topics in the Environment: Biological Aspects of Envir St (Stream Ecology)	3	BSE/ENVIR ST 367	Renewable Energy Systems	3
ENVIR ST/ ZOOLOGY 510	Ecology of Fishes	3	BSE 460	Biorefining: Energy and Products from Renewable Resources	3
ENVIR ST/ ZOOLOGY 511	Ecology of Fishes Lab	2	CIV ENGR 320	Environmental Engineering	3
F&W ECOL/ ENVIR ST/ ZOOLOGY 360	Extinction of Species	3	CIV ENGR 423	Air Pollution Effects, Measurement and Control	3
F&W ECOL 410	Principles of Silviculture	3	CIV ENGR 424		
F&W ECOL/AN SCI/ ZOOLOGY 520	Ornithology	3	ENVIR ST/ POP HLTH 502	Air Pollution and Human Health	3
F&W ECOL/AN SCI/ ZOOLOGY 521	Birds of Southern Wisconsin	3	GEOG/GEOSCI 320	Geomorphology	3
F&W ECOL 550	Forest Ecology	3	GEOG 329	Landforms and Landscapes of North America	3
F&W ECOL 551	Forest Ecology Lab	1	GEOG/ATM OCN/ ENVIR ST 332	Global Warming: Science and Impacts	3
F&W ECOL/ LAND ARC/ ZOOLOGY 565	Principles of Landscape Ecology	2	GEOG/BOTANY 338	Environmental Biogeography	3
F&W ECOL/ ZOOLOGY 660	Climate Change Ecology	3	GEOG/GEOSCI 420	Glacial and Pleistocene Geology	3
HORT 334	Greenhouse Cultivation	2	GEOSCI 304	Geobiology	3
HORT 335	Greenhouse Cultivation Lab	1	GEOSCI 551	Paleoceanography	3
LAND ARC/ ENVIR ST 361	Wetlands Ecology	3	GEOSCI/G L E 627	Hydrogeology	3-4
LAND ARC/ ENVIR ST 581	Prescribed Fire: Ecology and Implementation	3	GEOSCI/G L E 629	Contaminant Hydrogeology	3
SOIL SCI/ PL PATH 323	Soil Biology	3	POP HLTH/ ENVIR ST 471	Introduction to Environmental Health	3
ZOOLOGY 304	Marine Biology	2	SOIL SCI 301	General Soil Science	3
ZOOLOGY/ ENVIR ST 315	Limnology-Conservation of Aquatic Resources	2	SOIL SCI 302	Meet Your Soil: Soil Analysis and Interpretation Laboratory	1
ZOOLOGY 316	Laboratory for Limnology- Conservation of Aquatic Resources	2-3	SOIL SCI 321	Soils and Environmental Chemistry	3
<b>Physical Environment</b>			SOIL SCI 322	Physical Principles of Soil and Water Management	3
<b>Code</b>	<b>Title</b>	<b>Credits</b>	SOIL SCI/ ENVIR ST 324	Soils and Environmental Quality	3
ATM OCN 310	Dynamics of the Atmosphere and Ocean I	3	SOIL SCI 327	Environmental Monitoring and Soil Characterization for Earth's Critical Zone	4
ATM OCN/ ENVIR ST/ GEOG 322	Polar Regions and Their Importance in the Global Environment	3	SOIL SCI 430	Environmental Soil Contamination	3
ATM OCN/ GEOG 323	Science of Climate Change	3	SOIL SCI/ F&W ECOL 451	Environmental Biogeochemistry	3
			SOIL SCI/ AGRONOMY/ ATM OCN 532	Environmental Biophysics	3
			SOIL SCI/ CIV ENGR/ M&ENVTOX 631	Toxicants in the Environment: Sources, Distribution, Fate, & Effects	3



**Geospatial Sciences**

<b>Code</b>	<b>Title</b>	<b>Credits</b>
ENVIR ST/ CIV ENGR/ LAND ARC 556	Remote Sensing Digital Image Processing	3
GEOG 360	Quantitative Methods in Geographical Analysis	4
GEOG 370	Introduction to Cartography	4
GEOG/ENVIR ST/ F&W ECOL/ G L E/GEOSCI/ LAND ARC 372	Intermediate Environmental Remote Sensing	3
GEOG/CIV ENGR/ ENVIR ST 377	An Introduction to Geographic Information Systems	4
GEOG 378	Introduction to Geocomputing	4
GEOG 560	Advanced Quantitative Methods	3
GEOG 578	GIS Applications	4
GEOG 579	GIS and Spatial Analysis	4
GEOSCI/CIV ENGR/ ENVIR ST/G L E 444	Practical Applications of GPS Surveying	2
LAND ARC 311	Introduction to Design Frameworks and Spatial Technologies	2
LAND ARC 511	Geodesign Methods and Applications	3
SOIL SCI 585	Using R for Soil and Environmental Sciences	3
SOIL SCI/ENVIR ST/ LAND ARC 695	Applications of Geographic Information Systems in Natural Resources	3

**Environmental Policy & Social Perspectives**

<b>Code</b>	<b>Title</b>	<b>Credits</b>
A A E/ENVIR ST 244	The Environment and the Global Economy	4
A A E 246	Climate Change Economics and Policy	3
A A E/ECON/ ENVIR ST 343	Environmental Economics	3-4
AMER IND/ ENVIR ST 306	Indigenous Peoples and the Environment	3
AMER IND/ ENVIR ST/ GEOG 345	Managing Nature in Native North America	3
C&E SOC/ F&W ECOL/ SOC 248	Environment, Natural Resources, and Society	3
C&E SOC/CURRIC/ ENVIR ST 405	Education for Sustainable Communities	3
C&E SOC/ENVIR ST/ GEOG 434	People, Wildlife and Landscapes	3
C&E SOC/ENVIR ST/ SOC 540	Sociology of International Development, Environment, and Sustainability	3
C&E SOC/SOC 541	Environmental Stewardship and Social Justice	3
ENVIR ST 349	Climate Change Governance	3

ENVIR ST/ GEOG 439	US Environmental Policy and Regulation	3-4
ENVIR ST/ PHILOS 441	Environmental Ethics	3-4
GEOG/ URB R PL 305	Introduction to the City	3-4
GEOG/ ENVIR ST 339	Environmental Conservation	4
GEOG/ENVIR ST/ HISTORY 460	American Environmental History	4
GEOG/ ENVIR ST 537	Culture and Environment	4
GEOSCI/ ENVIR ST 411	Energy Resources	3
HISTORY/ENVIR ST/ GEOG 469	The Making of the American Landscape	4
POLI SCI 510		
URB R PL/ ECON/ENVIR ST/ POLI SCI 449	Government and Natural Resources	3-4

**1**

Students may consult their environmental sciences advisor regarding alternate ways to complete the major electives requirement.

**CAPSTONE <sup>1</sup>**

<b>Code</b>	<b>Title</b>	<b>Credits</b>
AGRONOMY 500	Senior Capstone Experience	2
BOTANY/ENVIR ST/ F&W ECOL/ ZOOLOGY 651	Conservation Biology	3
CIV ENGR 515	Hydroclimatology for Water Resources Management	3
ENVIR ST/ SOIL SCI 575	Assessment of Environmental Impact	3
F&W ECOL/ A A E 652	Decision Methods for Natural Resource Managers	3
LAND ARC 668	Restoration Ecology	3
PL PATH 315	Plant Microbiomes	4
SOIL SCI 499	Soil Management	3

**1**

Students may speak with their environmental science advisor about alternatives (e.g., courses, directed study, senior thesis) to complete the capstone. To be approved, the alternative must be taken for a minimum of 3 credits, clearly focused on environmental science, and approved by the Environmental Sciences Administrative Committee. Students must consult with their environmental sciences advisor and fill out all necessary paperwork before registering.

UNIVERSITY DEGREE REQUIREMENTS

Total Degree	To receive a bachelor's degree from UW–Madison, students must earn a minimum of 120 degree credits. The requirements for some programs may exceed 120 degree credits. Students should consult with their college or department advisor for information on specific credit requirements.
Residency	Degree candidates are required to earn a minimum of 30 credits in residence at UW–Madison. "In residence" means on the UW–Madison campus with an undergraduate degree classification. "In residence" credit also includes UW–Madison courses offered in distance or online formats and credits earned in UW–Madison Study Abroad/Study Away programs.
Quality of Work	Undergraduate students must maintain the minimum grade point average specified by the school, college, or academic program to remain in good academic standing. Students whose academic performance drops below these minimum thresholds will be placed on academic probation.

LEARNING OUTCOMES

1. Demonstrate understanding of Environmental Science fundamentals in the context of biology, chemistry, mathematics, statistics, and physics.
2. Demonstrate a quantitative and qualitative understanding of the ecological relationships (material and energetic) between organisms, both as individuals and in groups, and their biotic and abiotic environment. This may include processes influencing the distribution and abundance of organisms.
3. Demonstrate a quantitative and qualitative understanding of the physical, largely abiotic, conditions (e.g. climate, water, soil, air, noise, greenspace, etc.) of the environment. The physical environment can include natural or managed settings such as urban environments.
4. Demonstrate a quantitative and qualitative understanding of geospatial processes and information as it relates to the environment including how to collect, interpret, and analyze geospatial information regarding the features of the Earth's surface. These technologies may include geographic information systems (GIS), the global positioning system (GPS), digital maps, and satellite based remote sensing.
5. Demonstrate a basic understanding of relationships that focus on the organization and implementation of laws, regulations, and other policy mechanisms concerning environmental issues and sustainability and their effect on society. This includes how human behaviors influences, and are also influenced by, the natural environment.
6. Apply skills in critical thinking, problem identification and resolution of a complex environmental issues that require interdisciplinary solutions and team-based work.
7. Articulate the role of environmental science in one or more focused areas of a specific environmental discipline (e.g. geology, soils, atmosphere, water, plants, animals).
8. Demonstrate expertise in organizing and presenting (written and oral) scientific information to both lay and professional audiences.

FOUR-YEAR PLAN

FOUR-YEAR PLAN  
SAMPLE ENVIRONMENTAL SCIENCES  
FOUR-YEAR PLAN

First Year			
Fall	Credits	Spring	Credits
CHEM 103 or 109		4-5 CHEM 104	5
MATH 114 or 171 <sup>1</sup>		5 MATH 221, 217, or 211 <sup>1</sup>	5
SOIL SCI 250		3 Ethnic Studies	3
CALS First Year Seminar		1 COMM A Course	3-4
13-14			16-17
Second Year			
Fall	Credits	Spring	Credits
BIOLOGY/BOTANY/ ZOOLOGY 151 (or BOLOGY/BOTANY 130)		5 BIOLOGY/BOTANY/ ZOOLOGY 152 (or BIOLOGY/ZOOLOGY 101 & BIOLOGY/ZOOLOGY 102) <sup>2</sup>	5
CHEM 341 or 343		3 STAT 371	3
CALS International Studies		3 Humanities Breadth	3-4
Social Sciences Breadth		3-4 Elective (or COMM B Course)	3
14-15			14-15
Third Year			
Fall	Credits	Spring	Credits
PHYSICS 207, 201, or 103		4-5 Major Core Courses	6
Major Core Courses		6 Humanities Breadth	3
Electives		5-7 Electives	6-7
15-18			15-16
Fourth Year			
Fall	Credits	Spring	Credits
Major Electives		6 Major Electives	6
Capstone		2-4 Electives	9
Electives		6	
14-16			15
Total Credits 116-126			

Students must complete at least 120 total credits to be eligible for graduation.

1  
Sequence of MATH 112/MATH 113 (or MATH 114) and MATH 221 is recommended.

2  
Completion of BIOLOGY/BOTANY/ZOOLOGY 152 fulfills the Communication Part B university requirement.



## ADVISING AND CAREERS

### ADVISING

Students wishing to declare the Environmental Sciences major should meet with an academic advisor. Contact information for advisors can be found here (<http://envirosci.wisc.edu/advising/>).

CALS undergraduate students interested in pursuing the Environmental Sciences major in the College of Agricultural and Life Sciences should contact Zach Wyman, [zwyman@ \(njbalster@wisc.edu\)wisc.edu](mailto:zwyman@njbalster.wisc.edu) ([zwyman@wisc.edu](mailto:zwyman@wisc.edu)) or 608-265-2925.

L&S undergraduate students interested in pursuing the Environmental Sciences major in the College of Letters & Science should contact the faculty advisor.

### CAREERS

A major in Environmental Sciences serves as excellent preparation for careers of great diversity, including environmental modeling, agricultural scientist, botanist, ecologist, park ranger, agricultural technician, air and water quality manager, environmental analyst, air pollution analyst, environmental consultant, environmental educator, GIS analyst, project manager, hazardous waste manager, hydrologist, environmental lawyer, soil conservation technician, and natural resource specialist. For more info about careers, please visit our website (<http://envirosci.wisc.edu/careers-internships/>).

## PEOPLE

### PROGRAM COMMITTEE

Nick Balster, Professor, Department of Soil Science (Co-Chair)  
 Ken Ferrier, Associate Professor, Department of Geoscience  
 Zac Freedman, Assistant Professor, Department of Soil Science  
 Hazel M. Holden, Professor, Department of Biochemistry  
 Erin Silva, Associate Professor, Department of Plant Pathology  
 Daniel J. Vimont, Professor, Department of Atmospheric and Oceanic Sciences (Co-Chair)

#### Staff Advisors

Zach Wyman, Academic Advising Manager (CALS)  
 Sabrina Manero, Academic Advising Manager (L&S)

## WISCONSIN EXPERIENCE

As an interdisciplinary cross-college major, students majoring in Environmental Sciences are involved in a wide array of opportunities across campus. Students are highly encouraged to complement their coursework with out-of-classroom experiences such as research (<https://research.wisc.edu/information-for-undergraduate-students/>), volunteering (<https://morgridge.wisc.edu/>), internships (<https://envirosci.wisc.edu/careers-internships/>), and study abroad (<https://www.studyabroad.wisc.edu/>).

Many students are also involved in environmental and sustainability organizations (<https://sustainability.wisc.edu/student-organizations/>).