

# Environmental and Sustainability Sciences, BS

Our Bachelor of Science in Environmental and Sustainability Sciences is designed to provide students comprehensive and transdisciplinary skills needed to tackle the pressing environmental problems we face. Our core curriculum is grounded in a solid foundation in Earth systems, ecology, sustainable development, and required skills courses in data management and geographic information systems. Students then diverge into one of four concentrations. For students interested in the interface of social and ecological systems and who want to view environmental problem solving through a social science lens, we have a concentration in environment and society. For students interested in the nexus of food, water, and energy, our concentration in sustainable development and planning might be most appropriate. Is the conservation of organisms and their ecosystems the area you are most interested in? Our concentration in conservation, restoration, and management may be the best choice. Lastly, for students interested in understanding environmental problem solving from an Earth systems perspective, courses in our Earth, oceans, and environmental change concentration will satisfy your curiosity. In the final semester, our students build teams that bring the skills developed across the varied concentrations back together to learn from each other and to work with our partners to solve specific environmental challenges presented by our stakeholders. Combined, this degree seeks to prepare students to work across a wide array of disciplines to help solve the environmental challenges of the future.

There are a number of interdisciplinary opportunities involving Environmental and Sustainability Sciences. Due to curricular overlap, combinations of any Environmental and Sustainability Sciences major, including combined majors, cannot occur with majors or minors in Ecology and Evolutionary Biology or Environmental Studies, or with the minor in Geoscience.

## Program Requirements

Complete all courses listed below unless otherwise indicated. Also complete any corequisite labs, recitations, clinicals, or tools courses where specified and complete any additional courses needed beyond specific college and major requirements to satisfy graduation credit requirements.

## Universitywide Requirements

All undergraduate students are required to complete the Universitywide Requirements (<http://catalog.northeastern.edu/undergraduate/university-academics/university-wide-requirements/>).

## NUpath Requirements

All undergraduate students are required to complete the NUpath Requirements (<http://catalog.northeastern.edu/undergraduate/university-academics/nupath/>).

## Environmental and Sustainability Sciences Major Requirements

Code	Title	Hours
<b>Introduction to College</b>		
ENVR 1000 or INSC 1000	Marine and Environmental Sciences at Northeastern Science at Northeastern	1
<b>Core Curriculum</b>		
EEMB 2302 and EEMB 2303	Ecology and Lab for EEMB 2302	5
ENVR 1200 and ENVR 1201 or ENVR 2200	Dynamic Earth and Lab for ENVR 1200 Earth's Changing Cycles	4
ENVR 1400 and ENVR 1401	Foundations in Environmental and Sustainability Sciences and Lab for ENVR 1400	5
ENVR 1500 and ENVR 1501	Introduction to Environmental, Social, and Biological Data and Lab for ENVR 1500	5
ENVR 2515	Sustainable Development	4
ENVR 3300 and ENVR 3301	Geographic Information Systems and Lab for ENVR 3300	5
ENVR 4000	Science Communication and Professional Development	4
ENVR 4050 or ENVR 4971 or ENVR 4997	Solving Emerging Environmental Challenges through Capstone Junior/Senior Honors Project 2 Senior Thesis	4
<b>Mathematics Requirements</b>		
ENVR 2500 and ENVR 2501 or ECON 2350 or POLS 2400	Biostatistics and Lab for ENVR 2500 Statistics Quantitative Techniques	4

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or SOCL 2321	Research Methods in Sociology	
MATH 1241	Calculus 1	4
or MATH 1251	Calculus and Differential Equations for Biology 1	
or MATH 1341	Calculus 1 for Science and Engineering	

**ENVIRONMENTAL AND SUSTAINABILITY SCIENCES CONCENTRATIONS**

Complete one of the following concentrations:

**CONCENTRATION IN ENVIRONMENT AND SOCIETY**

Code	Title	Hours
<b>Required Environment and Society Courses</b>		
ENVR 5450	Applied Social-Ecological Systems Modeling	4
ENVR 5800	Climate Adaptation and Nature-Based Solutions	4
PPUA 5260	Ecological Economics	4
SOCL 1246	Environment and Society	4
SOCL 2485	Environment, Technology, and Society	4
or POLS 2395	Environmental Politics and Policy	

**Environment and Society Electives**

Complete five of the following: 20-24

CIVE 5275	Life Cycle Assessment of Materials, Products, and Infrastructure	
EEMB 3460	Conservation Biology	
EEMB 4000 and ENVR 3151	Applied Conservation Biology and Food Sustainability in the Mediterranean - Abroad	
ENVR 3150	Food Security and Sustainability	
ENVR 3201 and ENVR 3202	Coastal Sustainability: Ecology and Coupled Human-Natural Systems in Southeast Asia and Coastal Sustainability: The Blue Economy of the Gulf of Maine	
ENVR 5220	Ecosystem-Based Management	
ENVR 5210	Environmental Planning	
ENVR 5350	Sustainable Energy and Climate Solutions	
ENVR 5600	Coastal Processes, Adaptation, and Resilience	
ENVR 5750	Urban Ecology	
INTL 2464	Natural Resources and Sustainable Development	
INTL 5100	Climate and Development	
PPUA 5264	Energy Democracy and Climate Resilience: Technology, Policy, and Social Change	
PPUA 5268	International Environmental Policy	

**CONCENTRATION IN SUSTAINABLE PLANNING AND DEVELOPMENT**

Code	Title	Hours
<b>Required Sustainable Planning and Development Courses</b>		
ENVR 3150	Food Security and Sustainability	4
ENVR 3200	Water Resources	4
ENVR 5210	Environmental Planning	4
ENVR 5350 or ENVR 5800	Sustainable Energy and Climate Solutions Climate Adaptation and Nature-Based Solutions	4
PPUA 5268	International Environmental Policy	4

**Sustainable Planning and Development Electives**

Complete five of the following: 20-28

CIVE 5275	Life Cycle Assessment of Materials, Products, and Infrastructure	
EEMB 3460	Conservation Biology	
EEMB 4000 and ENVR 3151	Applied Conservation Biology and Food Sustainability in the Mediterranean - Abroad	
EEMB 4001	Landscape and Restoration Ecology	
ENVR 3201 and ENVR 3202	Coastal Sustainability: Ecology and Coupled Human-Natural Systems in Southeast Asia and Coastal Sustainability: The Blue Economy of the Gulf of Maine	

ENVR 3701	Energy in the Desert Ecosystem
ENVR 4500 and ENVR 4501	Applied Hydrogeology and Lab for ENVR 4500
ENVR 4505	Wetlands
ENVR 5190	Soil Science
ENVR 5220	Ecosystem-Based Management
ENVR 5350	Sustainable Energy and Climate Solutions
ENVR 5450	Applied Social-Ecological Systems Modeling
ENVR 5563	Advanced Spatial Analysis
ENVR 5800	Climate Adaptation and Nature-Based Solutions
INTL 2464	Natural Resources and Sustainable Development
PPUA 5260	Ecological Economics

### CONCENTRATION IN CONSERVATION, RESTORATION, AND MANAGEMENT

Code	Title	Hours
<b>Required Conservation, Restoration, and Management Courses</b>		
EEMB 2400	Introduction to Evolution	4
EEMB 3455 or CIVE 3430	Ecosystems Ecology Engineering Microbiology and Ecology	4
EEMB 3460	Conservation Biology	4
EEMB 4001	Landscape and Restoration Ecology	4
ENVR 5220	Ecosystem-Based Management	4

#### Conservation, Restoration, and Management Electives

Complete five of the following:		20-25
EEMB 3465	Ecological and Conservation Genomics	
EEMB 3475	Wildlife Ecology	
EEMB 3466	Disease Ecology	
EEMB 3700	Desert Ecology	
EEMB 4000 and ENVR 3151	Applied Conservation Biology and Food Sustainability in the Mediterranean - Abroad	
ENVR 3150	Food Security and Sustainability	
ENVR 3200	Water Resources	
ENVR 3701	Energy in the Desert Ecosystem	
ENVR 4500 and ENVR 4501	Applied Hydrogeology and Lab for ENVR 4500	
ENVR 4505	Wetlands	
ENVR 5190	Soil Science	
ENVR 5350	Sustainable Energy and Climate Solutions	
ENVR 5450	Applied Social-Ecological Systems Modeling	
ENVR 5563	Advanced Spatial Analysis	
ENVR 5700	Streams and Watershed Ecology	
ENVR 5750	Urban Ecology	

### CONCENTRATION IN EARTH, OCEANS, AND ENVIRONMENTAL CHANGE

Code	Title	Hours
<b>Earth Systems</b>		
Complete one of the following:		4-5
ENVR 1200 and ENVR 1201	Dynamic Earth and Lab for ENVR 1200	
ENVR 2200	Earth's Changing Cycles	
<b>Earth Materials and Landforms</b>		
Complete one of the following:		5
ENVR 2340 and ENVR 2341	Earth Landforms and Processes and Lab for ENVR 2340	
ENVR 2310 and ENVR 2311	Earth Materials and Lab for ENVR 2310	

**Freshwater**

Complete one of the following: 4-5

ENVR 3200	Water Resources
ENVR 4500 and ENVR 4501	Applied Hydrogeology and Lab for ENVR 4500
ENVR 4505	Wetlands
ENVR 5700	Streams and Watershed Ecology

**Oceans**

Complete one of the following: 4

ENVR 3600	Oceanography
ENVR 3125	Global Oceanic Change

**Environmental Change**

Complete one of the following: 4

ENVR 3125	Global Oceanic Change
ENVR 5150	Climate and Atmospheric Change

**Chemistry**

Complete one of the following: 5

CHEM 1151 and CHEM 1153	General Chemistry for Engineers and Recitation for CHEM 1151
CHEM 1161 and CHEM 1162 and CHEM 1163	General Chemistry for Science Majors and Lab for CHEM 1161 and Recitation for CHEM 1161
CHEM 1211 and CHEM 1212 and CHEM 1213	General Chemistry 1 and Lab for CHEM 1211 and Recitation for CHEM 1211

**Physics**

Complete one of the following: 5

PHYS 1145 and PHYS 1146	Physics for Life Sciences 1 and Lab for PHYS 1145
PHYS 1151 and PHYS 1152 and PHYS 1153	Physics for Engineering 1 and Lab for PHYS 1151 and Interactive Learning Seminar for PHYS 1151
PHYS 1161 and PHYS 1162 and PHYS 1163	Physics 1 and Lab for PHYS 1161 and Recitation for PHYS 1161

**Earth, Oceans, and Environmental Change Electives**

Complete three of the following: 12-15

CIVE 5280	Remote Sensing of the Environment
ENVR 2310 and ENVR 2311	Earth Materials and Lab for ENVR 2310
ENVR 2340 and ENVR 2341	Earth Landforms and Processes and Lab for ENVR 2340
ENVR 3125	Global Oceanic Change
ENVR 3200	Water Resources
ENVR 3415	Environmental Pollution: Fate and Transport
ENVR 3418	Geophysics
ENVR 3600	Oceanography
ENVR 4500 and ENVR 4501	Applied Hydrogeology and Lab for ENVR 4500
ENVR 4504	Environmental Pollution
ENVR 4505	Wetlands
ENVR 5190	Soil Science
ENVR 5201 and ENVR 5202	Geologic Field Seminar and Environmental Science Field Seminar Abroad
ENVR 5240 and ENVR 5241	Sedimentary Basin Analysis and Lab for ENVR 5240

ENVR 5242 and ENVR 5243	Ancient Marine Life and Lab for ENVR 5242
ENVR 5270 and ENVR 5271	Glacial and Quaternary History and Lab for ENVR 5270
ENVR 5670	Global Biogeochemistry
ENVR 5700	Streams and Watershed Ecology

## Environmental and Sustainability Sciences Major Credit Requirement

Complete 81 semester hours in the major.

### Program Requirement

136 total semester hours required

### Plan of Study

#### Four Years, One Co-op in Spring/Summer 1

Year 1								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
ENGV 1111		4 EEMB 2302 and EEMB 2303		5 Vacation		Elective		4
ENVR 1000		1 ENVR 1200 and ENVR 1201		5		Elective		4
ENVR 1400 and ENVR 1401		5 MATH 1241		4				
ENVR 1500 and ENVR 1501		5 ESS concentration core or elective 1		4				
Elective		4						
		19		18		0		8
Year 2								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
EESC 2000		1 Co-op		0 Co-op		0 Elective		4
ENVR 2500 and ENVR 2501		5				Elective		4
ENVR 2515		4						
ENVR 3300 and ENVR 3301		5						
ESS concentration core or elective 2		4						
		19		0		0		8
Year 3								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
ENGV 3307		4 ESS concentration core or elective 6		4 Vacation		Vacation		
ESS concentration core or elective 3		4 ESS concentration core or elective 7		4				
ESS concentration core or elective 4		4 ESS concentration core or elective 8		4				
ESS concentration core or elective 5		4 Elective		4				
		16		16		0		0
Year 4								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
ESS concentration core or elective 9		4 ENVR 4000		4				
ESS concentration core or elective 10		4 ENVR 4050		4				
Elective		4 Elective		4				

Elective	4	Elective	4
	16		16

Total Hours: 136

**Four Years, One Co-op in Summer 2/Fall****Year 1**

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
ENGW 1111		4 EEMB 2302 and EEMB 2303		5 Vacation		Elective	4
ENVR 1000		1 ENVR 1200 and ENVR 1201		5		Elective	4
ENVR 1400 and ENVR 1401		5 MATH 1241		4			
ENVR 1500 and ENVR 1501		5 ESS concentration core or elective 1		4			
Elective		4					
	19		18		0		8

**Year 2**

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
EESC 2000		1 ESS concentration core or elective 3		4 Elective		4 Co-op	0
ENVR 2500 and ENVR 2501		5 ESS concentration core or elective 4		4 Elective		4	
ENVR 2515		4 ESS concentration core or elective 5		4			
ENVR 3300 and ENVR 3301		5 Elective		4			
ESS concentration core or elective 2		4					
	19		16		8		0

**Year 3**

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op		0 ENGW 3307		4 Vacation		Vacation	
		ESS concentration core or elective 6		4			
		ESS concentration core or elective 7		4			
		ESS concentration core or elective 8		4			
	0		16		0		0

**Year 4**

Fall	Hours	Spring	Hours
ESS concentration core or elective 9		4 ENVR 4000	4
ESS concentration core or elective 10		4 ENVR 4050	4
Elective		4 Elective	4
Elective		4 Elective	4
	16		16

Total Hours: 136