

# ENVIRONMENTAL SCIENCE (BS)

Solving the world's most pressing environmental problems requires understanding the scientific aspects of sustainability. Our program in environmental science prepares students to develop innovative solutions to challenges such as climate change, air and water pollution, and biodiversity loss.

This program has optional concentrations in **Conservation & Restoration Ecology** or **Climate & Energy**.

## Related Programs

No results found.

## Curriculum

Environmental Science students complete coursework that includes both a heavy dose of basic science requirements and courses spanning a variety of disciplines pertinent to understanding the context in which environmental challenges reside.

Students may take the program without a concentration [66 credit hours] or choose a concentration in Conservation and Restoration Ecology [68 credit hours]; or Climate & Energy [70 credit hours].

Code	Title	Hours
<b>Foundational Curriculum</b>		
BIOL 101	General Biology I	3
BIOL 111	General Biology I Lab	1
CHEM 160	Chemical Structure and Properties	3
CHEM 161	Chemical Structure and Properties Laboratory	1
ENVS 137	Foundations of Environmental Science I	3
ENVS 200	Environmental Careers and Professional Skills	1
ENVS 203	Environmental Statistics	3
ENVS 274	Chemistry of the Natural Environment	3
ENVS 275	Chemistry of the Environment Lab	1
ENVS 276	Chemistry of Environmental Pollution	3
ENVS 280	Principles of Ecology	3
ENVS 286	Principles of Ecology Lab	1
PLSC 392	Environmental Politics	3
Students take one of the following sequences based on concentration:		4

BIOL 102 & BIOL 112	General Biology II and General Biology II Lab <sup>1</sup>
PHYS 111 & 111L	College Physics I Lec / Dis and College Physics Laboratory I <sup>2</sup>

### Justice and Ethics Choice

Select one of the following:		3
ENVS 284	Environmental Justice	
PHIL 287	Environmental Ethics	
THEO 204	Religious Ethics and the Ecological Crisis	

### Economics Choice

ENVS 335	Ecological Economics	3
or ECON 328	Environmental Economics	

### Engaged Learning Choice <sup>3,4</sup>

Select one of the following:		3
ENVS 226	Science & Conservation of Freshwater Ecosystems	
ENVS 267	Bird Conservation and Ecology	
ENVS 273	Energy and the Environment	
ENVS 281	Environmental Sustainability & Science in China	
ENVS 283	Environmental Sustainability	
ENVS 345	Conservation and Sustainability of Neotropical Ecosystems	
ENVS 350A	Solutions to Environmental Problems: Water	
ENVS 350C	Solutions to Environmental Problems: Climate Action	
ENVS 350F	Solutions to Environmental Problems: Food Systems	
ENVS 369	Field Ornithology	
ENVS 391	Environmental Research (with SES approval)	
ENVS 395	Environmental Internship (with SES approval)	

### Capstone Choice

Select one of the following:		3
ENVS 390	Integrative Seminar	
ENVS 391C	Independent Environmental Research (Capstone)	
ENVS 395C	Environmental Internship (Capstone)	

**Concentration Courses and Electives (p. 1)** **21-28**

**Total Hours** **66-70**

- Students with the Conservation and Restoration Ecology and without concentration must take BIOL 102 and BIOL 112.
- Students in the Climate and Energy Concentration must take PHYS 111 and PHYS 111L. Students in this concentration also take an additional PHYS course outlined in the Concentration requirements.
- Students in the Climate and Energy Concentration have limited options to satisfy the Engaged Learning requirement.
- Students in the Climate and Energy Concentration must take ENVS 273 for the Engaged Learning Requirement within the major. This requirement is outlined in the Concentration requirements.

## Concentration Requirements and Elective Course Options

### Environmental Science (Without Concentration)

Code	Title	Hours
<b>Electives</b>		
One (1) course in Society, Ethics, and Justice Electives		3
One (1) course in Policy, Economics, and Resource Management Electives		3
Five (5) courses in Environmental Science Electives, at least three (3) of which must be at 300-level		15
<b>Total Hours</b>		<b>21</b>

### Environmental Science: Conservation and Restoration Ecology Concentration

Code	Title	Hours
<b>Required Courses</b>		
ENVS 218	Biodiversity & Biogeography	3
ENVS 220	Conservation Genetics	3
ENVS 320	Conservation Biology	3

ENVS 321	Conservation Biology Lab	1
ENVS 330	Restoration Ecology	3
ENVS 331	Restoration Ecology Lab	1
ENVS 383	Human Dimensions of Conservation	3

**Electives**

One (1) course in Conservation and Society Electives	3
One (1) course in Environmental Science Choice Electives	3

<b>Total Hours</b>	<b>23</b>
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## Environmental Science: Climate and Energy Concentration

Code	Title	Hours
<b>Required Physics Core Course</b>		
PHYS 112	College Physics II Lec/Disc	3
PHYS 112L	College Physics Lab II	1
<b>Required Climate and Energy Courses</b>		
ENVS 224	Climate & Climate Change	3
ENVS 273	Energy and the Environment <sup>1</sup>	3
ENVS 313	Energy Law & Policy	3
ENVS 316	Energy and Power Systems	3
ENVS 324	Climate Science	3
<b>Electives</b>		
One (1) course in Business, Economics, & Management Electives	3	
One (1) course in Communication Electives	3	
One (1) course in Methods & Analysis Electives	3	
<b>Total Hours</b>	<b>28</b>	

<sup>1</sup> This course satisfies the Engaged Learning requirement.

**Electives****Society, Ethics, and Justice Electives (no concentration only)**

Code	Title	Hours
ANTH 104	The Human Ecological Footprint	3
COMM 101	Public Speaking & Critical Thinking	3
COMM 260	Environmental Journalism	3
COMM 306	Environmental Communication & Advocacy	3
COMM 379	Digital Sustainability	3
ENGL 288	Nature in Literature	3
ENVS 230	Feeding the Planet: Global Perspectives on Sustainability, Culture and Food	3
ENVS 279 / HIST 279E	Climate and History	3
ENVS 284	Environmental Justice	3
ENVS 285	Eco-spirituality	3
ENVS 297 / HIST 297E	North American Environmental History	3
ENVS 298	Special Topics (with SES approval)	3
ENVS 300	Introduction to Public Health	3
ENVS 391	Environmental Research (with SES approval)	1-3
ENVS 395	Environmental Internship (with SES approval)	3
ENVS 398	Special Topics (with SES approval)	3
GLST 305	Globalization and Environmental Sustainability	3
PHIL 287	Environmental Ethics	3

PSYC 277	Environmental Psychology	3
SOCL 272	Environmental Sociology	3
THEO 204	Religious Ethics and the Ecological Crisis	3
THEO 344	Theology and Ecology	3

**Policy, Economics, and Resource Management Electives (no concentration only)**

Code	Title	Hours
ECON 328	Environmental Economics	3
ENVS 298	Special Topics (with SES approval)	3
ENVS 310	Introduction to Environmental Law & Policy	3
ENVS 311	Natural Resources and Land Use Law & Policy	3
ENVS 312	Water Law & Policy	3
ENVS 313	Energy Law & Policy	3
ENVS 316	Energy and Power Systems	3
ENVS 333	Introduction to the Circular Economy	3
ENVS 335	Ecological Economics	3
ENVS 336	Design for Circular & Sustainable Business	3
ENVS 363	Sustainable Business Management	3
ENVS 384	Conservation Economics	3
ENVS 391	Environmental Research (with SES approval)	1-3
ENVS 395	Environmental Internship (with SES approval)	3
ENVS 398	Special Topics (with SES approval)	3
MGMT 201	Managing People and Organizations	3
PLSC 354	Global Environmental Politics	3

**Environmental Science Electives (no concentration only)**

Code	Title	Hours
<b>Environmental Science Electives</b>		
DSCI 101	Fundamentals of Modern Data Science with R	3
ENVS 207	Plants and Civilization	3
ENVS 215	Ornithology	3
ENVS 218	Biodiversity & Biogeography	3
ENVS 220	Conservation Genetics	3
ENVS 223	Soil Ecology	3
ENVS 224	Climate & Climate Change	3
ENVS 226	Science & Conservation of Freshwater Ecosystems	3
ENVS 267	Bird Conservation and Ecology	3
ENVS 273	Energy and the Environment	3
ENVS 281	Environmental Sustainability & Science in China	3
ENVS 283	Environmental Sustainability	3
ENVS 298	Special Topics (with SES approval)	3
ENVS 300	Introduction to Public Health	3
ENVS 301	Environmental Health	3
ENVS 303	Introduction to Epidemiology	3
ENVS 320	Conservation Biology	3
ENVS 322	Invasive Species	3
ENVS 323	Environmental Microbiology	3
ENVS 324	Climate Science	3
ENVS 325	Sustainable Agriculture	3
ENVS 326	Agroecosystems	3
ENVS 327	Food Systems Analysis	3
ENVS 330	Restoration Ecology	3

ENVS 338	Climate Change and Human Health	3
ENVS 345	Conservation and Sustainability of Neotropical Ecosystems	3
ENVS 350A	Solutions to Environmental Problems: Water	3
ENVS 350C	Solutions to Environmental Problems: Climate Action	3
ENVS 350F	Solutions to Environmental Problems: Food Systems	3
ENVS 367	Mammalogy	3
ENVS 369	Field Ornithology	3
ENVS 380	Introduction to Geographic Information Systems	3
ENVS 381	Advanced GIS Applications	3
ENVS 382	Remote Sensing	3
ENVS 383	Human Dimensions of Conservation	3
ENVS 386	Python Programming for GIS	3
ENVS 387	Principles of Ecotoxicology	3
ENVS 391	Environmental Research (with SES approval)	1-3
ENVS 395	Environmental Internship (with SES approval)	3
ENVS 398	Special Topics (with SES approval)	3
SOCL 206	Principles of Social Research	3
SOCL 302	Qualitative Research	3
STAT 303	SAS Programming and Applied Statistics	3
BIOL, CHEM, PHYS 300-level courses (with SES approval)		

**Business, Economics, & Management (Climate and Energy only)**

Code	Title	Hours
ENR 201	Essentials of Entrepreneurship	3
ENVS 336	Design for Circular & Sustainable Business	3
ENVS 363	Sustainable Business Management	3
MGMT 201	Managing People and Organizations	3
SCMG 232	Introduction to Supply Chain Management	3

**Communication (Climate and Energy only)**

Code	Title	Hours
COMM 101	Public Speaking & Critical Thinking	3
COMM 103	Business & Professional Speaking	3
COMM 236	Persuasive Presentations	3
COMM 237	Small Group Communication	3
COMM 260	Environmental Journalism	3
COMM 268	Persuasion	3
COMM 277	Organizational Communication	3
COMM 306	Environmental Communication & Advocacy	3
ENVS 350C	Solutions to Environmental Problems: Climate Action	3

**Methods & Analysis (Climate and Energy only)**

Code	Title	Hours
DSCI 101	Fundamentals of Modern Data Science with R	3
ENVS 380	Introduction to Geographic Information Systems	3
ENVS 382	Remote Sensing	3
ENVS 386	Python Programming for GIS	3
SOCL 206	Principles of Social Research	3
SOCL 302	Qualitative Research	3
STAT 303	SAS Programming and Applied Statistics	3

**Conservation & Society (Conservation and Restoration only)**

Code	Title	Hours
COMM 260	Environmental Journalism	3
COMM 306	Environmental Communication & Advocacy	3
COMM 379	Digital Sustainability	3
ENGL 288	Nature in Literature	3
ENVS 279	Climate and History	3
ENVS 284	Environmental Justice	3
ENVS 285	Eco-spirituality	3
ENVS 297	North American Environmental History	3
ENVS 298	Special Topics (with SES approval)	3
ENVS 310	Introduction to Environmental Law & Policy	3
ENVS 311	Natural Resources and Land Use Law & Policy	3
ENVS 312	Water Law & Policy	3
ENVS 313	Energy Law & Policy	3
ENVS 316	Energy and Power Systems	3
ENVS 338	Climate Change and Human Health	3
ENVS 350A	Solutions to Environmental Problems: Water	3
ENVS 350C	Solutions to Environmental Problems: Climate Action	3
ENVS 350F	Solutions to Environmental Problems: Food Systems	3
ENVS 384	Conservation Economics	3
ENVS 391	Environmental Research (with SES approval)	3
ENVS 395	Environmental Internship (with SES approval)	3
ENVS 398	Special Topics (with SES approval)	3
PHIL 287	Environmental Ethics	3
THEO 204	Religious Ethics and the Ecological Crisis	3

**Environmental Science Choice (Conservation and Restoration only)**

Code	Title	Hours
ENVS 207	Plants and Civilization	3
ENVS 215	Ornithology	3
ENVS 223	Soil Ecology	3
ENVS 224	Climate & Climate Change	3
ENVS 226	Science & Conservation of Freshwater Ecosystems	3
ENVS 267	Bird Conservation and Ecology	3
ENVS 298	Special Topics (with SES approval)	3
ENVS 322	Invasive Species	3
ENVS 323	Environmental Microbiology	3
ENVS 326	Agroecosystems	3
ENVS 327	Food Systems Analysis	3
ENVS 345	Conservation and Sustainability of Neotropical Ecosystems	3
ENVS 350A	Solutions to Environmental Problems: Water	3
ENVS 350C	Solutions to Environmental Problems: Climate Action	3
ENVS 350F	Solutions to Environmental Problems: Food Systems	3
ENVS 367	Mammalogy	3
ENVS 369	Field Ornithology	3
ENVS 380	Introduction to Geographic Information Systems	3
ENVS 381	Advanced GIS Applications	3
ENVS 382	Remote Sensing	3

ENVS 386	Python Programming for GIS	3
ENVS 387	Principles of Ecotoxicology	3
ENVS 391	Environmental Research (with SES approval)	1-3
ENVS 395	Environmental Internship (with SES approval)	3
ENVS 398	Special Topics (with SES approval)	3

## Suggested Sequence of Courses

The below sequence of courses is meant to be used as a suggested path for completing coursework. An individual student's completion of requirements depends on course offerings in a given term as well as the start term for a major or graduate study. Students should consult their advisor for assistance with course selection.

### Environmental Science (Without Concentration)

Course	Title	Hours
<b>Year One</b>		
<b>Fall</b>		
BIOL 101	General Biology I	3
BIOL 111	General Biology I Lab	1
CHEM 160	Chemical Structure and Properties	3
CHEM 161	Chemical Structure and Properties Laboratory	1
ENVS 137	Foundations of Environmental Science I	3
<b>Hours</b>		<b>11</b>
<b>Spring</b>		
BIOL 102	General Biology II	3
BIOL 112	General Biology II Lab	1
ENVS 203	Environmental Statistics	3
Environmental Science Elective		3
<b>Hours</b>		<b>10</b>
<b>Year Two</b>		
<b>Fall</b>		
ENVS 200	Environmental Careers and Professional Skills	1
ENVS 280	Principles of Ecology	3
ENVS 286	Principles of Ecology Lab	1
Environmental Science Elective		3
<b>Hours</b>		<b>8</b>
<b>Spring</b>		
ENVS 274	Chemistry of the Natural Environment	3
Justice & Ethics Choice		3
Society, Ethics, & Justice Elective		3
<b>Hours</b>		<b>9</b>
<b>Year Three</b>		
<b>Fall</b>		
ENVS 275	Chemistry of the Environment Lab	1
ENVS 276	Chemistry of Environmental Pollution	3
PLSC 392	Environmental Politics	3
Environmental Science 300 Level Elective		3
<b>Hours</b>		<b>10</b>
<b>Spring</b>		
ENVS 335 or ECON 328	Ecological Economics or Environmental Economics	3

Policy, Economics & Resource Management Elective	3
<b>Hours</b>	
<b>6</b>	
<b>Year Four</b>	
<b>Fall</b>	
Engaged Learning Choice	3
Environmental Science 300 Level Elective	3
<b>Hours</b>	
<b>6</b>	
<b>Spring</b>	
Capstone Choice	3
Environmental Science 300 Level Elective	3
<b>Hours</b>	
<b>6</b>	
<b>Total Hours</b>	
<b>66</b>	

### Environmental Science: Conservation and Restoration Ecology Concentration

Course	Title	Hours
<b>Year One</b>		
<b>Fall</b>		
BIOL 101	General Biology I	3
BIOL 111	General Biology I Lab	1
CHEM 160	Chemical Structure and Properties	3
CHEM 161	Chemical Structure and Properties Laboratory	1
ENVS 137	Foundations of Environmental Science I	3
<b>Hours</b>		<b>11</b>
<b>Spring</b>		
BIOL 102	General Biology II	3
BIOL 112	General Biology II Lab	1
ENVS 203	Environmental Statistics	3
Justice & Ethics Choice		3
<b>Hours</b>		<b>10</b>
<b>Year Two</b>		
<b>Fall</b>		
ENVS 200	Environmental Careers and Professional Skills	1
ENVS 218	Biodiversity & Biogeography	3
ENVS 280	Principles of Ecology	3
ENVS 286	Principles of Ecology Lab	1
<b>Hours</b>		<b>8</b>
<b>Spring</b>		
ENVS 220	Conservation Genetics	3
ENVS 274	Chemistry of the Natural Environment	3
ENVS 275	Chemistry of the Environment Lab	1
Conservation & Society Choice		3
<b>Hours</b>		<b>10</b>
<b>Year Three</b>		
<b>Fall</b>		
ENVS 276	Chemistry of Environmental Pollution	3
ENVS 335 or ECON 328	Ecological Economics or Environmental Economics	3
PLSC 392	Environmental Politics	3
<b>Hours</b>		<b>9</b>

<b>Spring</b>		
ENVS 320	Conservation Biology	3
ENVS 321	Conservation Biology Lab	1
ENVS 383	Human Dimensions of Conservation	3
<b>Hours</b>		<b>7</b>

**Year Four**

<b>Fall</b>		
ENVS 330	Restoration Ecology	3
ENVS 331	Restoration Ecology Lab	1
Engaged Learning Choice		3
<b>Hours</b>		<b>7</b>

<b>Spring</b>		
Capstone Choice		3
Environmental Science Choice Elective		3
<b>Hours</b>		<b>6</b>
<b>Total Hours</b>		<b>68</b>

## Environmental Science: Climate and Energy Concentration

Course	Title	Hours
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**Year One**

<b>Fall</b>		
ENVS 137	Foundations of Environmental Science I	3
PHYS 111	College Physics I Lec / Dis	3
PHYS 111L	College Physics Laboratory I	1
CHEM 160	Chemical Structure and Properties	3
CHEM 161	Chemical Structure and Properties Laboratory	1
<b>Hours</b>		<b>11</b>

<b>Spring</b>		
ENVS 203	Environmental Statistics	3
ENVS 224	Climate & Climate Change	3
PHYS 112	College Physics II Lec/Disc	3
PHYS 112L	College Physics Lab II	1
<b>Hours</b>		<b>10</b>

**Year Two**

<b>Fall</b>		
BIOL 101	General Biology I	3
BIOL 111	General Biology I Lab	1
ENVS 280	Principles of Ecology	3
ENVS 286	Principles of Ecology Lab	1
Justice & Ethics Choice		3
<b>Hours</b>		<b>11</b>

<b>Spring</b>		
ENVS 200	Environmental Careers and Professional Skills	1
ENVS 274	Chemistry of the Natural Environment	3
ENVS 273	Energy and the Environment	3
<b>Hours</b>		<b>7</b>

**Year Three**

<b>Fall</b>		
ENVS 276	Chemistry of Environmental Pollution	3

ENVS 275	Chemistry of the Environment Lab	1
PLSC 392	Environmental Politics	3
ENVS 335 or ECON 328	Ecological Economics (Environmental Science Elective) or Environmental Economics	3
<b>Hours</b>		<b>10</b>

<b>Spring</b>		
ENVS 313	Energy Law & Policy	3
Communication Elective		3
Methods & Analysis Elective		3
<b>Hours</b>		<b>9</b>

<b>Year Four</b>		
<b>Fall</b>		
ENVS 324	Climate Science	3
Business & Economics Elective Choice		3
<b>Hours</b>		<b>6</b>

<b>Spring</b>		
Capstone Choice		3
ENVS 316	Energy and Power Systems	3
<b>Hours</b>		<b>6</b>
<b>Total Hours</b>		<b>70</b>

## School of Environmental Sustainability Graduation Requirements

All SES students are required to complete a foreign language requirement and a writing intensive requirement. The SES language requirement can be fulfilled by 1) earning college credit at the 102-level or above; or 2) demonstrating proficiency via the SES foreign language proficiency examination. The SES writing intensive requirement is fulfilled by successfully completing two Loyola WI courses (max of one per semester). Writing intensive courses have a "W" in the section number.

## Additional Undergraduate Graduation Requirements

All Undergraduate students are required to complete the University Core, at least one Engaged Learning course, and UNIV 101. SCPS students are not required to take UNIV 101. Nursing students in the Accelerated BSN program are not required to take core or UNIV 101. You can find more information in the University Requirements (<https://catalog.luc.edu/undergraduate/university-requirements/>) area.

## Learning Outcomes

- Examine the causes and consequences of environmental change at local to global scales. [no concentration]
- Apply scientific knowledge to evaluate policy, management, and other solutions that aim to enhance environmental sustainability. [no concentration]
- Create an action plan for leading a professional and personal life that promotes environmental sustainability. [no concentration]
- Articulate the foundational principles of natural and social sciences and humanities essential to solving environmental problems. [both no concentration and all concentrations]
- Critically evaluate the accuracy and credibility of information relating to environmental topics. [both no concentration and all concentrations]

- Employ knowledge and skills to design and implement solutions that contribute to a just and sustainable world. [both no concentration and all concentrations]
- Exemplify the values of environmental and social justice through actions to care for our common home and one another. [both no concentration and all concentrations]
- Explain fundamental connections among ecological processes that are the basis of unity and diversity of life. [Conservation and Restoration Ecology concentration]
- Analyze ecological and societal data to apply best management practices in conservation and restoration ecology. [Conservation and Restoration Ecology concentration]
- Synthesize the social, historical, economic, political, and biological causes, consequences, and solutions to our current biodiversity crisis. [Conservation and Restoration Ecology concentration]
- Develop and express a personal philosophy that values protecting and restoring our global biodiversity and vital ecosystems. [Conservation and Restoration Ecology concentration]
- Understand the fundamental concepts of climate science and the impacts of climate change on society and the natural environment. [Climate and Energy concentration]
- Assess the state of energy production, consumption, and the deployment of sustainable technologies as part of a just energy transition. [Climate and Energy concentration]
- Evaluate the role of governmental policy and regulation in solving climate and energy related problems. [Climate and Energy concentration]
- Apply techniques from both the natural and social sciences to design practical and innovative solutions to contemporary climate and energy issues. [Climate and Energy concentration]

## SES Shared Learning Outcomes

All SES majors share the following Program Learning Objectives, in addition to their unique major-specific Program Learning Objectives:

1. Articulate the foundational principles of natural and social sciences and humanities essential to solving environmental problems.
2. Critically evaluate the accuracy and credibility of information relating to environmental topics.
3. Employ knowledge and skills to design and implement solutions that contribute to a just and sustainable world.
4. Exemplify the values of environmental and social justice through actions to care for our common home and one another.