

# BACHELOR OF SCIENCE (BS) DEGREE WITH A MAJOR IN ENVIRONMENTAL SCIENCE AND A MAJOR CONCENTRATION IN EARTH SCIENCE

## Program Learning Outcomes for the BS Degree with a Major in Environmental Science

Upon completing the BS degree with a major in Environmental Science, students will be able to:

1. Demonstrate foundational knowledge in the natural sciences that is fundamental to the environmental sciences or application of the environmental sciences to other fields.
2. Integrate knowledge of natural and applied sciences to understand complex natural systems and cycles.
3. Synthesize knowledge from natural sciences and engineering and apply it to the study of the environment.
4. Understand environmental issues from a scientific perspective and be able to solve issues using a variety of interdisciplinary perspectives (e.g., social sciences, economics, humanities, and/or architecture).
5. Demonstrate knowledge and skills suitable for doing research and/or field studies in environmental science.

## Requirements for the BS Degree with a Major in Environmental Science

For graduation requirements, see [Graduation Requirements \(https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/\)](https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/). Students pursuing the BS degree with a major in Environmental Science must complete:

- A minimum of 26-29 courses (76-82 credit hours), depending on course selection, to satisfy major requirements.
- A minimum of 120 credit hours to satisfy degree requirements.
- A minimum of 5-7 courses (15-24 credit hours), depending on declared major concentration, taken at the 300-level or above.
- An advanced field or research experience requirement.
- A capstone senior seminar requirement.
- The requirements of a major concentration. When students **declare the major** (<https://ga.rice.edu/undergraduate-students/academic-opportunities/majors-minors-certificates/#text>) in Environmental Science, students must additionally identify and declare one of two major concentrations, either in:
  - [Earth Science](#) (p. 3), *or*
  - [Ecology and Evolutionary Biology \(https://ga.rice.edu/programs-study/departments-programs/natural-sciences/environmental-science/environmental-science-bs-ecology-evolutionary-biology-concentration/#Ecology\\_Evolutionary\)](https://ga.rice.edu/programs-study/departments-programs/natural-sciences/environmental-science/environmental-science-bs-ecology-evolutionary-biology-concentration/#Ecology_Evolutionary).

Because of the common core requirements, it is possible for students to change their major concentration at any time, even after initially declaring the major. To do so, please contact the [Office of the Registrar \(registrar@rice.edu\)](mailto:registrar@rice.edu).

Environmental Science is an interdisciplinary major that addresses environmental issues in the context of what we know about earth, ecology, and society. In addition to its science core, the major also seeks to provide students with some appreciation of social, cultural, and policy dimensions of environmental issues.

The courses listed below satisfy the requirements for this major. In certain instances, courses not on this official list may be substituted upon approval of the major's academic advisor, or where applicable, the department's Director of Undergraduate Studies. (Course substitutions must be formally applied and entered into Degree Works by the major's [Official Certifier \(https://registrar.rice.edu/facstaff/degreeworks/officialcertifier/\)](https://registrar.rice.edu/facstaff/degreeworks/officialcertifier/).) Students and their academic advisors should identify and clearly document the courses to be taken.

### Summary

Code	Title	Credit Hours
Total Credit Hours Required for the Major in Environmental Science		76-82
Total Credit Hours Required for the BS Degree with a Major in Environmental Science		120

### Degree Requirements

Code	Title	Credit Hours
<b>Core Requirements</b>		
Foundation Coursework		
BIOS 201	INTRODUCTORY BIOLOGY I	3
BIOS 202	INTRODUCTORY BIOLOGY II	3
BIOS 332	ECOLOGY	3
CHEM 121 or CHEM 111	GENERAL CHEMISTRY I AP/OTH CREDIT IN GENERAL CHEMISTRY I	3
CHEM 123 or CHEM 113	GENERAL CHEMISTRY LABORATORY I AP/OTH CREDIT IN GENERAL CHEMISTRY LAB I	1
CHEM 122 or CHEM 112	GENERAL CHEMISTRY II AP/OTH CREDIT IN GENERAL CHEMISTRY II	3
CHEM 124 or CHEM 114	GENERAL CHEMISTRY LABORATORY II AP/OTH CREDIT IN GENERAL CHEMISTRY LAB II	1
MATH 101 or MATH 105	SINGLE VARIABLE CALCULUS I AP/OTH CREDIT IN CALCULUS I	3
MATH 102 or MATH 106	SINGLE VARIABLE CALCULUS II AP/OTH CREDIT IN CALCULUS II	3
STAT 280 or STAT 305	ELEMENTARY APPLIED STATISTICS <sup>1</sup> INTRODUCTION TO STATISTICS FOR BIOSCIENCES	4
Select 1 course from the following:		3-4
PHYS 101 & PHYS 103	MECHANICS (WITH LAB) and MECHANICS DISCUSSION	
PHYS 111	HONORS MECHANICS (WITH LAB)	
PHYS 125	GENERAL PHYSICS (WITH LAB)	
PHYS 141	CONCEPTS IN PHYSICS I	
Data and Quantitation		

<i>Select 1 from the following:</i>		3-4	<i>Select 1 course from the following:</i>		3
BIOS 338	ANALYSIS AND VISUALIZATION OF BIOLOGICAL DATA		ANTH 348	ANTHROPOLOGIES OF NATURE	
BIOS 470	COMPUTATION WITH BIOLOGICAL DATA		ANTH 381	MEDICAL ANTHROPOLOGY	
CEVE 421	CLIMATE RISK MANAGEMENT		ENST 301	ENVIRONMENTAL JUSTICE	
COMP 140	COMPUTATIONAL THINKING		ENST 302 / SOCI 304	ENVIRONMENTAL ISSUES: RICE INTO THE FUTURE	
DSCI 101	INTRODUCTION TO DATA SCIENCE		ENST 312	JUSTICE IN THE FOOD SYSTEM	
EEPS 220	INTRODUCTION TO COMPUTATION IN THE EARTH, ENVIRONMENT AND PLANETARY SCIENCES		ENST 332 / ANTH 332	THE SOCIAL LIFE OF CLEAN ENERGY	
EEPS 435	REMOTE SENSING		ENST 367 / SOCI 367	ENVIRONMENTAL SOCIOLOGY	
EEPS 436	GIS FOR SCIENTISTS AND ENGINEERS		ENST 437 / ECON 437	ENERGY ECONOMICS	
PHYS 102 & PHYS 104	ELECTRICITY & MAGNETISM (WITH LAB) and ELECTRICITY AND MAGNETISM DISCUSSION		ENST 480 / ECON 480	ENVIRONMENTAL AND ENERGY ECONOMICS	
PHYS 112	HONORS ELECTRICITY & MAGNETISM (WITH LAB)		POLI 332	URBAN POLITICS	
PHYS 126	GENERAL PHYSICS II (WITH LAB)		POLI 362	COMPARATIVE URBAN POLITICS AND POLICY	
PHYS 142	CONCEPTS IN PHYSICS II		SOCI 313	DEMOGRAPHY	
Core Courses <sup>2</sup>			SOCI 368	SOCIOLOGY OF DISASTER	
BIOS 213	INTRODUCTORY LAB IN ECOLOGY & EVOLUTION	2	SOCI 423	SOCIOLOGY OF FOOD	
ENST 100 / ARCH 105	ENVIRONMENT, CULTURE AND SOCIETY	3	Humanities and Architecture		
Any course (minimum 3 credit hours) from Earth, Environmental, and Planetary Sciences (EEPS) courses offerings at the 100-level (any course offerings between course numbers EEPS 100 and EEPS 199)		3	<i>Select 1 course from the following:</i>		3
EEPS 321	EARTH AND PLANETARY SURFACE ENVIRONMENTS	4	ENGL 269 / ENST 265	SCIENCE FICTION AND THE ENVIRONMENT	
EEPS 325	OCEANS, ATMOSPHERES AND CLIMATE	4	ENGL 310	NONFICTION NATURE WRITING	
Field Experience			ENGL 358	CONSUMPTION AND CONSUMERISM	
<i>Select 1-2 courses from the following:</i>		2-3	ENGL 459	STUDIES IN LITERATURE AND ECOLOGY	
BIOS 204	ENVIRONMENTAL SUSTAINABILITY: THE DESIGN & PRACTICE OF COMMUNITY AGRICULTURE <sup>3</sup>		ENST 202 / HUMA 202	CULTURE, ENERGY, AND THE ENVIRONMENT: AN INTRODUCTION TO ENERGY HUMANITIES	
BIOS 316	LAB MODULE IN ECOLOGY		ENST 205	RECKONING WITH THE ANTHROPOCENE	
BIOS 317	LAB MODULE IN BEHAVIOR		ENST 313 / ARCH 313	CASE STUDIES IN SUSTAINABLE DESIGN	
BIOS 319	TROPICAL FIELD BIOLOGY		ENST 322 / ARCH 322	CASE STUDIES IN SUSTAINABILITY: THE REGENERATIVE REPOSITIONING OF NEW OR EXISTING RICE CAMPUS BLDGS	
BIOS 320	ECOLOGY AND CONSERVATION OF BRAZILIAN WETLANDS LABORATORY		ENST 368 / ENGL 368	LITERATURE AND THE ENVIRONMENT	
BIOS 327	BIOLOGICAL DIVERSITY		ENST 445	SEMINAR IN URBAN SUSTAINABILITY AND LIVABILITY RESEARCH METHODS AND APPLICATIONS	
BIOS 330	INSECT BIOLOGY LAB		ENST 446	LAB IN ENGAGED URBAN SUSTAINABILITY AND LIVABILITY RESEARCH	
BIOS 337	FIELD BIRD BIOLOGY LAB		HART 302	FROM THE SUBLIME TO THE SUSTAINABLE: ART, ARCHITECTURE AND NATURE	
EEPS 103	FIELD TRIPS FOR THE EARTH		HIST 321	US ENVIRONMENTAL HISTORY	
EEPS 309 / FOTO 390	VISUALIZING NATURE		HIST 470	ENCOUNTERING THE ENVIRONMENT: CASE STUDIES FROM THE GARDEN OF EDEN TO THE SPACE AGE	
EEPS 334	THE EARTH LABORATORY		SPAN 403	LITERATURE AND THE ENVIRONMENT IN LATIN AMERICA	
<b>Major Concentration</b>			Natural Sciences and Engineering <sup>5</sup>		
<i>Select 1 from the following Major Concentrations (see below for Major Concentration requirements):</i>		9-12	<i>Select 1 course from the following:</i>		3-4
Earth Science					
Ecology and Evolutionary Biology					
<b>Advanced Electives<sup>4</sup></b>					
Social Sciences					

BIOS 280	SUSTAINABLE DEVELOPMENT AND REPORTING
BIOS 559	SUSTAINABILITY IMPACT ASSESSMENTS
CEVE 302 / ENGI 302	SUSTAINABLE DESIGN
CEVE 308	INTRODUCTION TO AIR POLLUTION CONTROL
CEVE 310	PRINCIPLES OF ENVIRONMENTAL ENGINEERING
CEVE 314 / BIOE 365 / GLHT 314	SUSTAINABLE WATER PURIFICATION FOR THE DEVELOPING WORLD
CEVE 323	APPLIED SUSTAINABLE PLANNING AND DESIGN
CEVE 401	CHEMISTRY FOR ENVIRONMENTAL ENGINEERING AND SCIENCE
CEVE 404	ATMOSPHERIC PARTICULATE MATTER
CEVE 411	ATMOSPHERIC CHEMISTRY AND CLIMATE
CEVE 412	HYDROLOGY AND WATER RESOURCES ENGINEERING
CEVE 420	ENVIRONMENTAL REMEDIATION RESTORATION
CEVE 434	FATE AND TRANSPORT OF CONTAMINANTS IN THE ENVIRONMENT
CEVE 484 / STAT 484	ENVIRONMENTAL RISK ASSESSMENT & HUMAN HEALTH
CHBE 382	INNOVATION AND SUSTAINABILITY
CHEM 211 & CHEM 213	ORGANIC CHEMISTRY I and ORGANIC CHEMISTRY DISCUSSION I
ENST 250	UNDERSTANDING ENERGY: ENERGY LITERACY AND CIVICS
ENST 281 / CHBE 281	ENGINEERING SOLUTIONS FOR SUSTAINABLE COMMUNITIES
ENST 307 / CEVE 307 / EEPS 307	ENERGY AND THE ENVIRONMENT
ENST 406 / CEVE 406	INTRODUCTION TO ENVIRONMENTAL LAW

**Advanced Field or Research Experience Requirement**

Independent Research (see the Opportunities tab for additional information).<sup>6</sup>

Select 1 course from the following: 3

BIOS 310	INDEPENDENT RESEARCH FOR BIOSCIENCES UNDERGRADUATES
BIOS 401	UNDERGRADUATE HONORS RESEARCH
EEPS 390	GEOLOGY FIELD CAMP
EEPS 391	PRACTICAL EXPERIENCE IN EARTH, ENVIRONMENTAL AND PLANETARY SCIENCE
EEPS 481	UNDERGRADUATE RESEARCH IN EARTH, ENVIRONMENTAL AND PLANETARY SCIENCES

**Capstone Senior Seminar Requirement**

BIOS 495 / EEPS 495	SEMINAR: TOPICS IN ENVIRONMENTAL SCIENCE	3
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**Total Credit Hours Required for the Major in Environmental Science**

Additional Credit Hours to Complete Degree Requirements <sup>*</sup>	7-13
University Graduation Requirements ( <a href="https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/">https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/</a> ) <sup>*</sup>	31
<b>Total Credit Hours</b>	<b>120</b>

**Footnotes and Additional Information**

<sup>\*</sup> **Note:** University Graduation Requirements include 31 credit hours, comprised of Distribution Requirements (Groups I, II, and III), FWIS, and LPAP coursework. In some instances, courses satisfying FWIS or distribution requirements may additionally meet other requirements, such as the Analyzing Diversity (AD) requirement, or some of the student's declared major, minor, or certificate requirements. Additional Credit Hours to Complete Degree Requirements include general electives, coursework completed as upper-level, residency (hours taken at Rice), and/or any other additional academic program requirements.

<sup>1</sup> STAT 180 may be substituted for STAT 280.

<sup>2</sup> The Core Courses acquaint students with a range of environmental topics encountered by scientists, engineers, managers, and policy makers. Core Courses stress the components of the global environment and their interactions, culminating with a tropical seminar that integrates across the field.

<sup>3</sup> BIOS 204 *Environmental Sustainability: The Design & Practice of Community Agriculture* (1 credit hour) may only be applied once toward the Field Experience Requirement.

<sup>4</sup> Students may also petition to complete alternative courses to be applied toward the Advanced Electives requirement.

<sup>5</sup> In addition to the courses in the Natural Sciences and Engineering Advanced Electives list, students may complete 1 course listed in the major concentration requirements outside of the student's declared major concentration.

<sup>6</sup> Students are encouraged, but not required, to undertake independent research on environmentally related topics.

**Major Concentration: Earth Science**

Students must complete a total of 3 courses (minimum of 10-12 credit hours, depending on course selection) as listed below to satisfy requirements for the major concentration in Earth Science.

Code	Title	Credit Hours
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**Core Requirements**

Select 2 courses from the following: 7-8

EEPS 220	INTRODUCTION TO COMPUTATION IN THE EARTH, ENVIRONMENT AND PLANETARY SCIENCES
EEPS 322	EARTH AND PLANETARY CHEMISTRY AND MATERIALS
EEPS 323	EARTH AND PLANETARY STRUCTURE AND DYNAMICS
EEPS 340	GLOBAL BIOGEOCHEMICAL CYCLES

**Elective Requirement**

Select at least 1 course from the following: <sup>1</sup> 3-4

Any course from Earth, Environmental, and Planetary Sciences (EEPS) courses offerings at the 300-level (or above) designated as Lecture in the course catalog

EEPS 321	EARTH AND PLANETARY SURFACE ENVIRONMENTS
EEPS 322	EARTH AND PLANETARY CHEMISTRY AND MATERIALS
EEPS 323	EARTH AND PLANETARY STRUCTURE AND DYNAMICS
EEPS 340	GLOBAL BIOGEOCHEMICAL CYCLES
EEPS 415	GEOCHEMISTRY OF EARTH'S SURFACE
EEPS 417	TRACE-ELEMENT AND ISOTOPE GEOCHEMISTRY FOR EARTH AND ENVIRONMENTAL SCIENCE
EEPS 420	ORGANIC GEOCHEMISTRY
EEPS 426	GEOMORPHOLOGY
EEPS 427	MECHANICS OF SEDIMENT TRANSPORT
EEPS 429	PALEOCEANOGRAPHY
EEPS 432	FLUID FLOW IN FRACTURED ROCKS
EEPS 433	CLIMATE DYNAMICS
EEPS 434	CLIMATE OF THE COMMON ERA
EEPS 435	REMOTE SENSING
EEPS 436	GIS FOR SCIENTISTS AND ENGINEERS
EEPS 437	EARTH'S NATURAL RESOURCES FOR THE ENERGY TRANSITION
EEPS 439	GEOMICROBIOLOGY
EEPS 467	GEOMECHANICS

**Total Credit Hours****10-12****Footnotes and Additional Information**

<sup>1</sup> Please note that the course not completed in the Core Requirements list for the major concentration in Earth Science may be completed and applied towards the major concentration's Elective Requirement. Courses previously used to meet Core Requirements cannot be counted a second time as an Elective Requirement.

## Policies for the BS Degree with a Major in Environmental Science and a Major Concentration in Earth Science

**Program Restrictions and Exclusions**

Students pursuing the BS Degree with a Major in Environmental Science and a Major Concentration in Earth Science should be aware of the following program restrictions:

- As noted in [Majors, Minors, and Certificates](https://ga.rice.edu/undergraduate-students/academic-opportunities/majors-minors-certificates/) (<https://ga.rice.edu/undergraduate-students/academic-opportunities/majors-minors-certificates/>) under *Declaring Majors, Minors and Certificates*, students may not obtain both a BA and a BS in the same major. Students pursuing the BS Degree with a Major in Environmental Science and a Major Concentration in Earth Science may not additionally pursue the BA Degree with a Major in Environmental Science.
- Students pursuing the major in Environmental Science may pursue only one major concentration within the major.
- Students pursuing the major in Environmental Sciences and a major concentration in Earth Science may not additionally declare the minor in Earth, Environmental and Planetary Sciences.

**Transfer Credit**

For Rice University's policy regarding transfer credit, see [Transfer Credit](https://ga.rice.edu/undergraduate-students/academic-policies-transfer-credit/) (<https://ga.rice.edu/undergraduate-students/academic-policies-transfer-credit/>).

[procedures/transfer-credit/](#)). Some departments and programs have additional restrictions on transfer credit. The Office of Academic Advising maintains the university's official list of [transfer credit advisors](https://oaa.rice.edu/advising-network/transfer-credit-advisors/) (<https://oaa.rice.edu/advising-network/transfer-credit-advisors/>) on their website: <https://oaa.rice.edu>. Students are encouraged to meet with their academic program's transfer credit advisor when considering transfer credit possibilities.

**Program Transfer Credit Guidelines**

Students pursuing the major in Environmental Science should be aware of the following program transfer credit guidelines:

- Requests for transfer credit will be considered by the program director (and/or the program's official transfer credit advisor) on an individual case-by-case basis.

**Additional Information**

For additional information, please see the following websites:

- <https://biosciences.rice.edu/>
- <https://earthscience.rice.edu/academics/undergraduate-program/>

## Opportunities for the BS Degree with a Major in Environmental Science and a Major Concentration in Earth Science Academic Honors

The university recognizes academic excellence achieved over an undergraduate's academic history at Rice. For information on university honors, please see [Latin Honors](https://ga.rice.edu/undergraduate-students/honors-distinctions/university/) (<https://ga.rice.edu/undergraduate-students/honors-distinctions/university/>) (*summa cum laude*, *magna cum laude*, and *cum laude*) and [Distinction in Research and Creative Work](https://ga.rice.edu/undergraduate-students/honors-distinctions/university/) (<https://ga.rice.edu/undergraduate-students/honors-distinctions/university/>). Some departments have department-specific Honors awards or designations.

**Independent Research**

Students are encouraged to undertake independent research on environmentally related topics as part of their degree programs, in cooperation with one or more faculty. Course options for independent research, repeatable for credit, include: BIOS 401, BIOS 402, and EEPS 481.

Students also can enroll in senior honors thesis programs within their major concentrations, or by arrangement with other departments, and/or through the Rice Undergraduate Scholars Program. Students completing a thesis will also be eligible for the [Distinction in Research and Creative Work](https://ga.rice.edu/undergraduate-students/honors-distinctions/university/) (<https://ga.rice.edu/undergraduate-students/honors-distinctions/university/>), a university honor. Details for each program can be found here:

- **BIOS Honors Research** (<https://biosciences.rice.edu/research-overview> (<https://biosciences.rice.edu/research-overview/>))
- **EEPS Senior Honors Thesis** (<https://eeps.rice.edu/eeps-honor-thesis> (<https://eeps.rice.edu/eeps-honor-thesis/>))
- **Rice Undergraduate Scholars Program** (<https://ouri.rice.edu/rusp> (<https://ouri.rice.edu/rusp/>))

## **Additional Information**

For additional information, please see the following websites:

- <https://biosciences.rice.edu/>
- <https://earthscience.rice.edu/academics/undergraduate-program/>