BACHELOR OF ARTS (BA) DEGREE WITH A MAJOR IN ENVIRONMENTAL SCIENCE AND A MAJOR CONCENTRATION IN EARTH SCIENCE

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

Upon completing the BA 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 understand how it applies 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).

Requirements for the BA Degree with a Major in Environmental Science

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

- A minimum of 23-24 courses (66-71 credit hours), depending on course selection, to satisfy major requirements.
- A minimum of 120 credit hours to satisfy degree requirements.
- A minimum of 4-6 courses (12-21 credit hours), depending on declared major concentration, taken at the 300-level or above.
- 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

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).

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/degereworks/officialcertifier/). Students and their academic advisors should identify and clearly document the courses to be taken.

### Summary

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Credit Hours Required for the BA Degree with a Major in Environmental Science</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>Total Credit Hours Required for the Major in Environmental Science</td>
<td>66-71</td>
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### Degree Requirements

#### Core Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOS 201</td>
<td>INTRODUCTORY BIOLOGY I</td>
<td>3</td>
</tr>
<tr>
<td>BIOS 202</td>
<td>INTRODUCTORY BIOLOGY II</td>
<td>3</td>
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<tr>
<td>BIOS 332</td>
<td>ECOLOGY</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 121</td>
<td>GENERAL CHEMISTRY I ¹</td>
<td>3</td>
</tr>
<tr>
<td>or CHEM 111</td>
<td>AP/OTH CREDIT IN GENERAL CHEMISTRY I</td>
<td></td>
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<tr>
<td>CHEM 123</td>
<td>GENERAL CHEMISTRY LABORATORY I ³</td>
<td>1</td>
</tr>
<tr>
<td>or CHEM 113</td>
<td>AP/OTH CREDIT IN GENERAL CHEMISTRY LAB I</td>
<td></td>
</tr>
<tr>
<td>CHEM 122</td>
<td>GENERAL CHEMISTRY II ³</td>
<td>3</td>
</tr>
<tr>
<td>or CHEM 112</td>
<td>AP/OTH CREDIT IN GENERAL CHEMISTRY II</td>
<td></td>
</tr>
<tr>
<td>CHEM 124</td>
<td>GENERAL CHEMISTRY LABORATORY II ³</td>
<td>1</td>
</tr>
<tr>
<td>or CHEM 114</td>
<td>AP/OTH CREDIT IN GENERAL CHEMISTRY LAB II</td>
<td></td>
</tr>
<tr>
<td>MATH 101</td>
<td>SINGLE VARIABLE CALCULUS I</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 105</td>
<td>AP/OTH CREDIT IN CALCULUS I</td>
<td></td>
</tr>
<tr>
<td>MATH 102</td>
<td>SINGLE VARIABLE CALCULUS II</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 106</td>
<td>AP/OTH CREDIT IN CALCULUS II</td>
<td></td>
</tr>
<tr>
<td>STAT 280</td>
<td>ELEMENTARY APPLIED STATISTICS</td>
<td>4</td>
</tr>
<tr>
<td>or STAT 305</td>
<td>INTRODUCTION TO STATISTICS FOR BIOSCIENCES</td>
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</table>

#### Core Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOS 213</td>
<td>INTRODUCTORY LAB IN ECOLOGY &amp; EVOLUTION</td>
<td>2</td>
</tr>
<tr>
<td>ENST 100 / ARCH 105</td>
<td>ENVIRONMENT, CULTURE AND SOCIETY</td>
<td>3</td>
</tr>
</tbody>
</table>

Any course from Earth, Environmental, and Planetary Sciences (ESCI) courses offerings at the 100-level (any course offerings between course numbers ESCI 100 and ESCI 199)
Bachelor of Arts (BA) Degree with a Major in Environmental Science and a Major Concentration in Earth Science

ESCI 321  EARTH AND PLANETARY SURFACE ENVIRONMENTS  4
ESCI 325  OCEANS, ATMOSPHERES AND CLIMATE  4

Field Experience
Select 1-2 courses from the following:  2-3
BIOS 316  LAB MODULE IN ECOLOGY
BIOS 317  LAB MODULE IN BEHAVIOR
BIOS 319  TROPICAL FIELD BIOLOGY
BIOS 320  ECOLOGY AND CONSERVATION OF BRAZILIAN WETLANDS LABORATORY
BIOS 327  BIOLOGICAL DIVERSITY
BIOS 330  INSECT BIOLOGY LAB
BIOS 337  FIELD BIRD BIOLOGY LAB
ESCI 103  FIELD TRIPS FOR THE EARTH
ESCI 334  THE EARTH LABORATORY
ESCI 380 / FOTO 390  VISUALIZING NATURE
ESCI 390  GEOLOGY FIELD CAMP
ESCI 391  EARTH SCIENCE FIELD EXPERIENCE
FWIS 187  EXPLORING THE SCIENCE AND HISTORY OF HOUSTON'S BAYOUS

Major Concentration
Select 1 from the following Major Concentrations (see below for Major Concentration requirements):  9-12
Earth Science
Ecology and Evolutionary Biology

Advanced Electives 3

Social Sciences
Select 1 course from the following:  3
ANTH 348  ANTHROPOLOGIES OF NATURE
ANTH 381  MEDICAL ANTHROPOLOGY
ENST 301  ENVIRONMENTAL JUSTICE
ENST 302 / SOCI 304  ENVIRONMENTAL ISSUES: RICE INTO THE FUTURE
ENST 332 / ANTH 332  THE SOCIAL LIFE OF CLEAN ENERGY
ENST 367 / SOCI 367  ENVIRONMENTAL SOCIOLOGY
ENST 437 / ECON 437  ENERGY ECONOMICS
ENST 480 / ECON 480  ENVIRONMENTAL AND ENERGY ECONOMICS
POLI 332  URBAN POLITICS
POLI 362  COMPARATIVE URBAN POLITICS AND POLICY
SOCI 313  DEMOGRAPHY
SOCI 368  SOCIOLOGY OF DISASTER
SOCI 423  SOCIOLOGY OF FOOD

Humanities and Architecture
Select 1 course from the following:  3
ENGL 269 / ENST 265  SCIENCE FICTION AND THE ENVIRONMENT
ENGL 310  NONFICTION NATURE WRITING
ENGL 358  CONSUMPTION AND CONSUMERISM

ENGL 459  STUDIES IN LITERATURE AND ECOLOGY
ENST 202 / HUMA 202  CULTURE, ENERGY, AND THE ENVIRONMENT: AN INTRODUCTION TO ENERGY HUMANITIES
ENST 313 / ARCH 313  SUSTAINABLE DESIGN
ENST 322 / ARCH 322  CASE STUDIES IN SUSTAINABILITY: THE REGENERATIVE REPOSITIONING OF NEW OR EXISTING RICE CAMPUS BLDGS
ENST 368 / ENGL 368  LITERATURE AND THE ENVIRONMENT
ENST 445  SEMINAR IN URBAN SUSTAINABILITY AND LIVABILITY RESEARCH METHODS AND APPLICATIONS
ENST 446  LAB IN ENGAGED URBAN SUSTAINABILITY AND LIVABILITY RESEARCH
HART 302  FROM THE SUBLIME TO THE SUSTAINABLE: ART, ARCHITECTURE AND NATURE
HIST 321  US ENVIRONMENTAL HISTORY
SPPO 411  LITERATURE AND THE ENVIRONMENT IN LATIN AMERICA

Natural Sciences and Engineering 4
Select 1 from the following:  3-4
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 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
ENST 250  UNDERSTANDING ENERGY, ENERGY LITERACY AND CIVICS
ENST 307 / CEVE 307 / ESCI 307  ENERGY AND THE ENVIRONMENT
Bachelor of Arts (BA) Degree with a Major in Environmental Science and a Major Concentration in Earth Science

**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 the requirements for the major concentration in Earth Science.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESCI 321</td>
<td>EARTH AND PLANETARY SURFACE ENVIRONMENTS</td>
<td>7-8</td>
</tr>
<tr>
<td>ESCI 322</td>
<td>EARTH AND PLANETARY CHEMISTRY AND MATERIALS</td>
<td></td>
</tr>
<tr>
<td>ESCI 323</td>
<td>EARTH AND PLANETARY STRUCTURE AND DYNAMICS</td>
<td></td>
</tr>
</tbody>
</table>

**Capstone Senior Seminar Requirement**

ESCI 495  SEMINAR: TOPICS IN ENVIRONMENTAL SCIENCE  3

Total Credit Hours Required for the Major in Environmental Science  66-71

Additional Credit Hours to Complete Degree Requirements  18-23

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.

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 major requirements may additionally meet distribution requirements.

1 CHEM 151 may be substituted for CHEM 121 or CHEM 111; CHEM 153 may be substituted for CHEM 123 or CHEM 113; CHEM 152 may be substituted for CHEM 122 or CHEM 112, and CHEM 154 may be substituted for CHEM 124 or CHEM 114.

2 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.

3 Students may also petition to complete alternative courses to be applied toward the Advanced Electives requirement.

4 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.

**Elective Requirement**

Select at least 1 course from the following: 3-4

- Any course from Earth, Environmental, and Planetary Sciences (ESCI) courses offerings at the 300-level (or above) designated as Lecture in the course catalog
- ESCI 321  EARTH AND PLANETARY SURFACE ENVIRONMENTS
- ESCI 322  EARTH AND PLANETARY CHEMISTRY AND MATERIALS
- ESCI 323  EARTH AND PLANETARY STRUCTURE AND DYNAMICS
- ESCI 340 / ENST 340  GLOBAL BIOGEOCHEMICAL CYCLES
- ESCI 430  TRACE-ELEMENT AND ISOTOPE GEOCHEMISTRY FOR EARTH AND ENVIRONMENTAL SCIENCE
- ESCI 431  GEOMORPHOLOGY
- ESCI 435  MECHANICS OF SEDIMENT TRANSPORT
- ESCI 452  GIS FOR SCIENTISTS AND ENGINEERS
- ESCI 467  GEOMECHANICS

Total Credit Hours  10-12

**Footnotes and Additional Information**

1 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.

**Policies for the BA Degree with a Major in Environmental Science and a Major Concentration in Earth Science**

**Program Restrictions and Exclusions**

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

- Students pursuing the major in Environmental Science may pursue only one major concentration within the major.

**Transfer Credit**

For Rice University’s policy regarding transfer credit, see Transfer Credit [website](https://ga.rice.edu/undergraduate-students/academic-policies-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 on their website: [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://biosciences.rice.edu/)
- [https://earthscience.rice.edu/academics/undergraduate-program/](https://earthscience.rice.edu/academics/undergraduate-program/)

**Opportunities for the BA 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://qa.rice.edu/undergraduate-students/honors-distinctions/university/) (summa cum laude, magna cum laude, and cum laude) and [Distinction in Research and Creative Work](https://qa.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 ESCI 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://earthscience.rice.edu/academics/undergraduate-program/honors-thesis), a university honor. Details for each program can be found here:

- [BIOS Honors Research](https://biosciences.rice.edu/sites/g/files/bxs1916/f/pdf/undergraduate/Research-Opportunities-Booklet.pdf)
- [ESCI Senior Honors Thesis](https://earthscience.rice.edu/academics/undergraduate-program/honors-thesis)
- [Rice Undergraduate Scholars Program](https://ouri.rice.edu/rusp)

**Additional Information**

For additional information, please see the following websites:

- [https://biosciences.rice.edu/](https://biosciences.rice.edu/)
- [https://earthscience.rice.edu/academics/undergraduate-program/](https://earthscience.rice.edu/academics/undergraduate-program/)