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 (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 22-24 courses (61-67 credit hours), depending on course selection, to satisfy major requirements.
- A minimum of 121-127 credit hours to satisfy degree requirements.
- A minimum of 60 credit hours outside of major 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 (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/degeworks/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 Major in Environmental Science</td>
<td>61-67</td>
</tr>
<tr>
<td></td>
<td>Total Credit Hours Required for the BA Degree with a Major in Environmental Science</td>
<td>121-127</td>
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### Degree Requirements

#### Core Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>BIOC 201</td>
<td>INTRODUCTORY BIOLOGY</td>
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<tr>
<td>EBIOS 202</td>
<td>INTRODUCTORY BIOLOGY II</td>
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<td>CHEM 121</td>
<td>GENERAL CHEMISTRY I 1</td>
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<tr>
<td>or CHEM 111</td>
<td>AP/OTH CREDIT IN GENERAL CHEMISTRY I</td>
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<tr>
<td>CHEM 123</td>
<td>GENERAL CHEMISTRY LABORATORY I 1</td>
<td>1</td>
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<tr>
<td>or CHEM 113</td>
<td>AP/OTH CREDIT IN GENERAL CHEMISTRY LAB I</td>
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</tr>
<tr>
<td>CHEM 122</td>
<td>GENERAL CHEMISTRY II</td>
<td>3</td>
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<tr>
<td>or CHEM 112</td>
<td>AP/OTH CREDIT IN GENERAL CHEMISTRY II</td>
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<tr>
<td>CHEM 124</td>
<td>GENERAL CHEMISTRY LABORATORY II 1</td>
<td>1</td>
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<tr>
<td>or CHEM 114</td>
<td>AP/OTH CREDIT IN GENERAL CHEMISTRY LAB II</td>
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</tr>
<tr>
<td>MATH 101</td>
<td>SINGLE VARIABLE CALCULUS I</td>
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<tr>
<td>or MATH 105</td>
<td>AP/OTH CREDIT IN CALCULUS I</td>
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</tr>
<tr>
<td>MATH 102</td>
<td>SINGLE VARIABLE CALCULUS II</td>
<td>3</td>
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<tr>
<td>or MATH 106</td>
<td>AP/OTH CREDIT IN CALCULUS II</td>
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<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

- ENST 100 / ARCH 105 | ENVIRONMENT, CULTURE AND SOCIETY | 3
- ESCI 115 | INTRODUCTION TO THE EARTH | 3 or 4
- or ESCI 110 | THE EARTH SYSTEM, ENVIRONMENT, AND SOCIETY  

Select 1 course from the following:

- ESCI 107 | OCEANS AND GLOBAL CHANGE |
- ESCI 109 | OCEANOGRAPHY |
- ESCI 201 | THE SCIENCE OF CLIMATE CHANGE |
Bachelor of Arts (BA) Degree with a Major in Environmental Science and a Major Concentration in Earth Science

**EBIO 213** INTRO EXPERIMENTAL ECOLOGY AND EVOLUTIONARY BIOLOGY 2

**EBIO 325** ECOLOGY 3

Field Experience

Select 1-2 courses from the following: 2-3

- **EBIO 306** INDEPENDENT RESEARCH FOR ECOLOGY & EVOLUTIONARY BIOLOGY UNDERGRADUATES
- **EBIO 316** LAB MODULE IN ECOLOGY
- **EBIO 317** LAB MODULE IN BEHAVIOR
- **EBIO 319** TROPICAL FIELD BIOLOGY
- **EBIO 320** ECOLOGY AND CONSERVATION OF BRAZILIAN WETLANDS LABORATORY
- **EBIO 324** CONSERVATION BIOLOGY LAB
- **EBIO 327** BIOLOGICAL DIVERSITY
- **EBIO 330** INSECT BIOLOGY LAB
- **ENST 379 / EBIO 379** LAB MODULE IN AQUATIC ECOLOGY WITH SCUBA
- **ESCI 103** FIELD TRIPS FOR THE ENVIRONMENT
- **ESCI 334** GEOLOGICAL TECHNIQUES
- **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 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 423** SOCIOLOGY OF FOOD

**Humanities and Architecture**

Select 1 course from the following: 3

- **ENGL 358** CONSUMPTION AND CONSUMERISM
- **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
- **ENGL 459** STUDIES IN LITERATURE AND ECOSYSTEM
- **HIST 425** 20TH CENTURY AMERICAN CONSERVATION MOVEMENT

**Natural Sciences and Engineering** 4

Select 1 from the following: 3-4

- **CEVE 302 / ENGI 302** SUSTAINABLE DESIGN
- **CEVE 308** INTRODUCTION TO AIR POLLUTION CONTROL
- **CEVE 310** PRINCIPLES OF ENVIRONMENTAL ENGINEERING
- **CEVE 401** CHEMISTRY FOR ENVIRONMENTAL ENGINEERING AND SCIENCE LAB
- **CEVE 404** ATMOSPHERIC PARTICULATE MATTER
- **CEVE 411** ATMOSPHERIC PROCESSES
- **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
- **CHEM 211 & CHEM 213** ORGANIC CHEMISTRY I and ORGANIC CHEMISTRY DISCUSSION
- **ENST 307 / CEVE 307 / ESCI 307** ENERGY AND THE ENVIRONMENT
- **ENST 406 / CEVE 406** INTRODUCTION TO ENVIRONMENTAL LAW
- **PHYS 101 & PHYS 103** MECHANICS (WITH LAB) and MECHANICS DISCUSSION
- **PHYS 102 & PHYS 104** ELECTRICITY & MAGNETISM (WITH LAB) and ELECTRICITY AND MAGNETISM DISCUSSION

**Capstone Senior Seminar Requirement**

- **ESCI 495 / EBIO 495** SEMINAR: TOPICS IN ENVIRONMENTAL SCIENCE 3

**Total Credit Hours Required for the Major in Environmental Science**

61-67

University Graduation Requirements (ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements) 60

Total Credit Hours 121-127
Footnotes and Additional Information

* Includes coursework completed as distribution credit, FWIS, LPAR upper-level, residency (hours taken at Rice), 60 hours outside of the major (if applicable), and any additional academic program requirements. The "hours outside of the major" requirement may include all of the above university 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.

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>
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<tbody>
<tr>
<td>ESCI 321</td>
<td>EARTH SYSTEM EVOLUTION AND CYCLES</td>
<td>7-8</td>
</tr>
<tr>
<td>ESCI 323</td>
<td>EARTH STRUCTURE AND DEFORMATION</td>
<td></td>
</tr>
<tr>
<td>ESCI 340 / EBIO 340 / ENST 340</td>
<td>GLOBAL BIOGEOCHEMICAL CYCLES</td>
<td></td>
</tr>
<tr>
<td>ESCI 380 / FOTO 390</td>
<td>VISUALIZING NATURE</td>
<td></td>
</tr>
<tr>
<td>ESCI 418 / CEVE 418</td>
<td>QUANTITATIVE HYDROGEOLOGY</td>
<td></td>
</tr>
<tr>
<td>ESCI 421</td>
<td>PALEOCEANOGRAPHY</td>
<td></td>
</tr>
<tr>
<td>ESCI 425 / CHEM 425 / ENST 425</td>
<td>ORGANIC GEOCHEMISTRY</td>
<td></td>
</tr>
<tr>
<td>ESCI 430</td>
<td>TRACE-ELEMENT AND ISOTOPE GEOCHEMISTRY FOR EARTH AND ENVIRONMENTAL SCIENCE</td>
<td></td>
</tr>
<tr>
<td>ESCI 431</td>
<td>GEOMORPHOLOGY</td>
<td></td>
</tr>
<tr>
<td>ESCI 435</td>
<td>MECHANICS OF SEDIMENT TRANSPORT</td>
<td></td>
</tr>
<tr>
<td>ESCI 452</td>
<td>GIS FOR SCIENTISTS AND ENGINEERS</td>
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</table>

Elective Requirement

Select at least 1 course from the following:

<table>
<thead>
<tr>
<th>Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ESCI 467</td>
<td>GEOMECHANICS</td>
<td>10-12</td>
</tr>
</tbody>
</table>

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

Transfer Credit

For Rice University's policy regarding transfer credit, see Transfer Credit (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: 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 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 (ga.rice.edu/undergraduate-students/honors-distinctions/university) (summa cum laude, magna cum laude, and cum laude) and Distinction in Research and Creative Work (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: EBIO 403, EBIO 404, 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, a university honor. Details for each program can be found here:
• EBI0 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/rice-undergraduate-scholars-program-rusp-1)

Additional Information
For additional information, please see the following websites:

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