Rice University

Proposal to Change Earth Science (ESCI) Major Name to Earth, Environmental, and Planetary Sciences (EEPS) and Re-align Areas of Specialization

Approved by the Faculty Senate

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Proposal to Change Earth Science (ESCI) Major Name
to Earth, Environmental, and Planetary Sciences (EEPS)
and Re-align Areas of Specialization

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Synopsis:
We propose to change the name of the academic majors, attached to both the B.A., and B.S. degrees, offered within the Department of Earth, Environmental, and Planetary Science from Earth Science (ESCI) to Earth, Environmental, and Planetary Sciences (EEPS). This proposed major name change is designed to better align with the department name, and to be more representative of the curriculum that all majors within the department will receive. The change in the major name will be accompanied by revisions to the areas of specialization within the B.S. major, and will align directly with these new areas. We also plan to expand the choices of introductory courses that students can take to satisfy their 100-level requirements, and revise the content and course offerings within the 300-level core sequence for all majors. These changes are and would be effective beginning with the 2020-2021 Academic Year and would be reflected accordingly in that year’s General Announcements.

Background & Motivation
In 2017, the Department of Earth Science coordinated with the Provost’s Office to change and broaden the department name to Department of Earth, Environmental, and Planetary Sciences. This change was motivated both by changes within the broader field and by the addition of new faculty who expanded the disciplines represented within the department. At the time, we retained the names of the academic majors as Earth Science (ESCI).

Recognizing opportunities provided by expanded faculty expertise and course offerings, as well as a gradual evolution in student interests, the department is currently updating our curriculum. Specifically, we intend to align our areas of specialization directly with the three components of the department name. In concert with these curriculum revisions, we propose to change the name of the academic major to Earth, Environmental, and Planetary Sciences (EEPS). By doing so, we will ensure that all students graduating with a degree from our department will earn an academic credential (e.g., a major or a minor) whose title explicitly encompasses their curricular pursuits, thus better representing the knowledge that undergraduates will gain during their studies and carry forward into their careers.

Proposed Curricular Changes to Academic Majors Accompanying the Name Change
Our department currently hosts two academic degrees, a B.A. and a B.S., each with a major in Earth Science. Under the B.S. degree requirements, students can select from one of five areas of specialization, which were designed ~15 years ago as representative of the state of the discipline of Earth Science at the time. We now recognize greater breadth within our field, which can be better captured with three areas of specialization. Current and proposed areas of specializations

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are shown below. The fifth existing area of specialization, *Self-Designed*, has historically been undersubscribed. It will be replaced by a new area of specialization, *Planetary Science*, supported by recent faculty hires. The current and proposed areas of specialization are shown in Box 1.

<table>
<thead>
<tr>
<th>Current Areas of Specialization</th>
<th>Proposed Areas of Specialization</th>
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<tbody>
<tr>
<td>Geology (1)</td>
<td>Geoscience (merges 1-3)</td>
</tr>
<tr>
<td>Geochemistry (2)</td>
<td>Environmental Earth Science (merges 4)</td>
</tr>
<tr>
<td>Geophysics (3)</td>
<td>Planetary Science (new, replaces 5)</td>
</tr>
<tr>
<td>Environmental Earth Science (4)</td>
<td></td>
</tr>
<tr>
<td>Self-Designed (5, to be eliminated)</td>
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Several other changes are planned as part of this revision. First, we plan to expand the pathways that undergraduates can take into the major, allowing multiple 100-level courses to serve as introductions to the field (Box 2). Each of these courses will include ~2 weeks of essential material that students are expected to know before taking any of the upper level core courses. Thus all of these courses will meet the introductory requirements for students pursuing the major, either in the B.A. or B.S. degree.

<table>
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<tr>
<th>Introductory Courses to satisfy 100-level course requirement for B.A. and B.S. (*Current requirement)</th>
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<tbody>
<tr>
<td>ESCI 101 The Earth (3)*</td>
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<tr>
<td>ESCI 109 Oceanography (3)</td>
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<tr>
<td>ESCI 110 The Earth System, Environment, &amp; Society (3)</td>
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<tr>
<td>ESCI 111 Inhabiting Planet Earth (3)</td>
</tr>
<tr>
<td>ESCI 115 Introduction to the Earth (4)*</td>
</tr>
<tr>
<td>ESCI 201/ENST 201 The Science of Climate Change (3)</td>
</tr>
</tbody>
</table>

In addition, we will update and expand the core sequence (15 credit hours) that all majors, both B.A. and B.S., must take at the 300-level (Box 3). Course names will be revised as well to represent the broadened content. In the revised curriculum, minor content currently covered within *ESCI 324 Earth’s Interior* will be incorporated into *ESCI 323*, and the updated course will be renamed *ESCI 323 Earth’s Interior and Dynamics* (underlined). The existing *ESCI 324* will become an elective course. A new required course will be created, *ESCI 325 Oceans, Atmospheres & Climate* (underlined), providing fundamental understanding of several major parts of the Earth system. The planned course changes will be implemented so as to ensure that students currently in the ESCI major pipeline can still meet their degree requirements, while also offering new course options for both current and incoming majors. The current and proposed core sequences are shown in the table below.
The upper-level courses and requirements for the areas of specialization will not change significantly, although several new courses are being proposed to complement those currently on the books. The revised areas of specialization will draw from available courses, both within and outside the department, to define pre-specified collections of electives that will provide majors with the appropriate content for their chosen specialization.

No other significant changes are planned for the B.A. other than those noted above.

**Action requested:**

1.) As referenced above, our department (Earth, Environmental, and Planetary Sciences (EEPS)) requests approval to change the name of our academic major from **Earth Science (ESCI)** to **Earth, Environmental, and Planetary Sciences (EEPS)**, effective 2020-2021 academic year. University guidelines define a name change for a major as a “substantial change” that requires CUC endorsement and Faculty Senate approval. We respectfully request approval for this change.

**For Reference Purposes / FYI**

2.) As noted above, our department (Earth, Environmental, and Planetary Sciences (EEPS)) intends to make adjustments to the Areas of Specializations within our major (B.S. degree), effective 2020-2021. These curricular adjustments are part of a review and update of our curriculum, seizing opportunities provided by expanded faculty expertise and course offerings, as well as a gradual evolution in student interests. With Areas of Specialization being a “pre-specified collection of elective courses” and not a formal academic credential (not requiring CUC/Faculty Senate approval), we wanted to document and share this for information purposes.

3.) In concert with the proposed curricular changes, we plan to revise the Overview text for the General Announcements, effective AY 2020-2021. The revised text is provided below, and also includes text relating to the proposed EEPS minor (a separate proposal).
Earth, Environmental, and Planetary Sciences

Overview | Undergraduate | Graduate | Faculty | Courses | Codes

Earth, Environmental, and Planetary Sciences encompass a range of interrelated disciplines focused on understanding the origin of Earth and planetary systems, the processes that operate within them, and their evolution through time. Topics represented in our field include the physics and chemistry of the solid Earth and its planetary neighbors, the causes and consequences of plate tectonics, and the origin and importance of the oceans and atmosphere. The study of past and present-day environmental processes is integral to understanding the impacts of Earth’s climate, land surface evolution, natural resources, and natural hazards on the biosphere, including humans.

The Department of Earth, Environmental, and Planetary Sciences offers undergraduate and graduate programs for a wide range of interests. All undergraduate majors take a five-course core sequence, typically in the freshman through junior years, gaining a fundamental understanding of earth and planetary systems, processes, materials, history, and interactions. Majors also take a course in applied laboratory, field, and computational techniques, and introductory courses in mathematics, chemistry, and possibly physics and biology. The BS degree provides three areas of specialization:

- Geoscience – focused on Earth systems and processes, including upper level courses in solid Earth geophysics, geochemistry, tectonics, and a range of elective options.
- Environmental Earth Science* – emphasizing interactions between Earth processes and Earth’s biosphere, enhanced by upper level electives selected from Biosciences, Chemistry, Civil and Environmental Engineering, and more.
- Planetary Science – designed to apply our knowledge of the Earth to other planetary systems in our solar system, enhanced by upper level electives in Physics and Astronomy and beyond.

The BS degree in Earth, Environmental, and Planetary Sciences should be chosen by students planning a career or further study in Earth, environmental, or planetary science or related field. The BA degree is a more flexible program that still provides a comprehensive overview of Earth, environmental, and planetary sciences, but can be combined easily with other majors or professional career paths. Many undergraduate students engage in research projects during their careers, gaining the opportunity to work with complex and highly interconnected problems, gaining skills to become leaders and entrepreneurs in the real world - field and laboratory opportunities abound! Future career opportunities include academia, working in industry, business or government, or working with and for societal issues. Many students present their own research projects at national and international professional conferences.
The department also offers an undergraduate minor providing a solid introduction to the broad field of Earth, Environmental, and Planetary Sciences*, and allowing students to gain exposure to additional advanced topics, while pursuing their major in another field.

The department offers two graduate degrees, a Master of Science and Doctor of Philosophy. Students select research projects in concert with their research advisors, and have the opportunity to work on a wide-range of open-ended, complex, and highly interconnected problems.

Faculty members have joint research projects with scientists at over 100 institutions worldwide, giving an international scope to the department with research programs on all the continents, in all of the oceans, and on four planets. Faculty research interests span a wide range of topics; see https://earthscience.rice.edu for more information. Many departmental research programs involve substantial field activities, both on land and at sea. Several courses also include field trips to a variety of destinations and geologic settings.

* Students interested in an undergraduate major with an environmental emphasis have multiple options at Rice University, spanning the Natural Sciences, Engineering, Humanities, and Social Sciences Schools, including:

- **Environmental Earth Science Area of Specialization** under the Earth, Environmental, and Planetary B.S. described above. This major is built upon a strong foundation in Earth Science, and focuses on the interface between the Earth and life.
- **Environmental Science B.S. and B.A.** is a broad and interdisciplinary program that incorporates humanities and social sciences perspectives of environmental issues, in addition to natural sciences. This major is jointly administered by the Biosciences and Earth, Environmental, and Planetary Sciences departments, and offers two corresponding Concentrations: Ecology and Evolutionary Biology and Earth Science.
- **Environmental Engineering Area of Specialization** within the Bachelor of Science in Chemical Engineering degree
- **Environmental Engineering Concentration** within the Bachelor of Arts degree in Civil and Environmental Engineering.

Similarly, students interested in an undergraduate minor with an environmental emphasis have three options at Rice University:

- **Minor in Earth, Environmental and Planetary Sciences** offered by the Earth, Environmental, and Planetary Sciences department, with a strong Earth Science basis.
- **Minor in Energy and Water Sustainability** offered through the Civil and Environmental Engineering department, highlighting engineering and economic considerations.
- **Minor in Environmental Studies**, an interdisciplinary minor drawing broadly from the Schools of Natural Sciences, Engineering, Humanities, and Social Sciences.