GRADUATE EARTH AND ENVIRONMENTAL SCIENCES PROGRAM

The Earth and Environmental Sciences Department offers a program leading to the degree of master of arts in earth and environmental sciences. This program is designed for students who desire further training prior to initiation of a doctoral program at another university or for whom the master’s degree will be the terminal degree. Graduate students are offered a unique opportunity for accelerated and personal instruction in a small department setting, with strengths in geology, volcanology, ocean sciences, planetary science, and environmental science. All admitted students are offered a full tuition waiver, stipend, and benefits for this two-year program.

COURSES

Students who possess the equivalent of a Wesleyan E&ES BA degree are required to take six upper-level course credits (of which at least four must be in E&ES) and two MA thesis research credits (E&ES549 and E&ES550). In addition, students are required to take three years (six semesters) of courses from a minimum of two of the following disciplines: mathematics, chemistry, physics, and biology. Students who do not possess the equivalent of a Wesleyan E&ES BA degree must complete or have completed 11 upper-level courses in the sciences or mathematics, and at least five of these must be E&ES courses. All students are expected to enroll in E&ES557 each semester it is offered. A student’s thesis committee will decide the required coursework for the MA. All full-time graduate students are expected to complete all courses with a grade of B- or better. Failure to achieve these minimal expectations incurs automatic dismissal from the program.

PROGRESS AND QUALIFYING EXAMS

Thesis Proposal and Thesis Committee. Upon admission to the program, the student will meet with the E&ES Graduate Program Committee to discuss the general requirements and goals of graduate study. Students should select an advisor, thesis topic, and thesis committee by the end of the first semester. After students have made a choice of faculty advisor and thesis committee, they must, in cooperation with the advisor, write a one- to two-page thesis proposal, in which they provide an outline of the proposed research. The thesis committee will read the proposal and discuss it with the student before acceptance of the research project. At the beginning of each semester, and at the beginning of the summer, each graduate student will be asked to prepare a written summary (two to three pages) of their progress and accomplishments and meet with their thesis committee. This summary will be reviewed by the thesis committee to discuss and evaluate the student’s progress; failure to make adequate progress can be grounds for dismissal from the program. The discussion of the committee will be summarized by the student’s advisor and relayed to the student in writing.

Qualifying Exam. Competence in general knowledge about the earth and environmental sciences will be assessed by a written examination taken after the end of the second semester. The thesis advisor, in concert with the E&ES faculty, will construct several questions. The student will then have two days to answer these questions. The student can use any written source for guidance ("open book" format), and each answer should not exceed one page (single-spaced). The committee and any interested E&ES faculty will then meet with the student to have a 30-minute conversation about the questions and answers. Based on the outcome of the exam, the committee may suggest coursework or independent study on particular topics.

TEACHING

Graduate students are expected to fully participate in the scholarly activities of the department, including teaching opportunities, attending departmental seminars, and presenting their own work to the Wesleyan and scientific communities.

THESIS | DISSERTATION | DEFENSE

Thesis and Oral Examination. The culmination of the master’s program is the completion and acceptance of a thesis and its successful oral defense. The format of the written work is to be discussed and agreed upon with the student’s advisor and committee. The advisor and thesis committee, in consultation with the student, will agree upon the schedule of the defense. All members of the thesis committee must have read and must approve, in writing, a complete thesis before a defense can be scheduled. Practically, this requires that a thesis draft, already vetted by the advisor, be made available to the remainder of the thesis committee at least one month before any proposed defense date. Once the committee has agreed that the thesis is ready to defend, the form for scheduling the defense can be obtained from the E&ES Department. The student is responsible for following all University requirements for the format and scheduling of the thesis. The oral examination will focus on the thesis.

CONCENTRATIONS

Planetary science is an emerging interdisciplinary field at the intersection of geology and astronomy with substantial contributions from physics, chemistry, and biology. The subject matter is planets, including those around other stars (exosolar systems). The science questions include the most important of our times: How do planets (including Earth) form? How common are they in the universe? What is their range of properties and how do they evolve? Is there or was there ever life on other planets? Certainly, the discovery of even microbial life beyond Earth would rank as one of the greatest human achievements of all time, and this quest lies squarely within the purview of planetary science.

Program of Study. MA or BA/MA students in the natural sciences and mathematics may elect a course of study resulting in the planetary science concentration. The concentration is designed to engage students in the research results, skills, and methods of planetary science. The planetary science concentration requires:

- Completion of a minimum of four courses from the list below with a grade of B- or better. At least one of these courses must be from a department outside the student’s home department.
- Students are also required to attend the Planetary Science Seminar, ASTR555/E&ES555.
- All students must complete a written thesis on a topic relevant to planetary science. A member of the student’s thesis committee will be from the planetary science concentration committee. The planetary science concentration will be designated on the student’s transcript upon the successful completion of this program of study and MA requirements of the student’s home department. For more information, please contact the any

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of the members of the planetary science concentration committee or the graduate school.

**Planetary Science Concentration Committee:** Martha Gilmore, Earth and Environmental Sciences; James Greenwood, Earth and Environmental Sciences; William Herbst, Astronomy; Meredith Hughes, Astronomy; Seth Redfield, Astronomy

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### PLANETARY SCIENCE COURSES

**Planetary Science Courses**

Select at least 4 of the following (one from outside the home department):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTR524</td>
<td>Exoplanets: Formation, Detection, and Characterization</td>
</tr>
<tr>
<td>ASTR531</td>
<td>Stellar Structure and Evolution</td>
</tr>
<tr>
<td>ASTR532</td>
<td>Galaxies, Quasars, and Cosmology</td>
</tr>
<tr>
<td>BIOL214</td>
<td>Evolution</td>
</tr>
<tr>
<td>BIOL231</td>
<td>Microbiology</td>
</tr>
<tr>
<td>CHEM337 &amp; CHEM338</td>
<td>Physical Chemistry I: Quantum Mechanics and Spectroscopy and Physical Chemistry II: Thermodynamics, Statistical Mechanics, and Kinetics</td>
</tr>
<tr>
<td>CHEM361</td>
<td>Advanced Inorganic Chemistry</td>
</tr>
<tr>
<td>CHEM383</td>
<td>Biochemistry</td>
</tr>
<tr>
<td>E&amp;ES513</td>
<td>Petrogenesis of Igneous and Metamorphic Rocks</td>
</tr>
<tr>
<td>E&amp;ES517</td>
<td>Volcanology</td>
</tr>
<tr>
<td>E&amp;ES519</td>
<td>Meteorites and Cosmochemistry</td>
</tr>
<tr>
<td>E&amp;ES521</td>
<td>Planetary Evolution</td>
</tr>
<tr>
<td>E&amp;ES575</td>
<td>Modeling the Earth and Environment</td>
</tr>
<tr>
<td>E&amp;ES580</td>
<td>Introduction to GIS</td>
</tr>
<tr>
<td>PHYS213</td>
<td>Waves and Oscillations</td>
</tr>
<tr>
<td>MATH AND COMP courses as appropriate in consultation with advisor</td>
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</tbody>
</table>

**Seminar**

ASTR/E&ES555 Planetary Science Seminar (offered each semester; take a minimum of three semesters) 0.75

**Thesis**

The MA degree program requires a thesis that demonstrates the student’s ability to perform original, independent research in planetary science. The specific guidelines for the thesis are those of the student’s home department.

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### ADDITIONAL INFORMATION

For additional information, please visit wesleyan.edu/ees/graduate (https://wesleyan.edu/ees/graduate).