

Graduate Program in Earth and Planetary Sciences Masters' Degree Learning Goals and Assessment

The Graduate Program in Earth and Planetary Sciences (EPS) is designed to provide a challenging yet fostering educational atmosphere that encourages independent and critical thinking, the development of communicative and teaching skills, and the performance of creative and original research. Our goal is to teach students to pose sound hypotheses, collect data to test them, publish results of their research, and communicate their knowledge to a variety of audiences, from professional peers to general public. The program is designed to educate and train competent and technically adept scientists for careers in research, teaching, government, industry, and non-governmental organizations. Interdisciplinary research/study with other physical, biological, chemical, anthropological, and engineering sciences is highly encouraged to provide the student with the broadest possible means to explore the limits of geological and geophysical knowledge.

The Master's of Science degree (MS) offered is a technical proficiency degree, considered by many employers to be the ideal level for technical training. Rutgers requires 24 course credits (typically 8 three-credit courses) and 6 research credits for all MS degrees. We offer several MS programs, including a traditional MS in EPS with thesis, Environmental Geology MS (non-thesis but with a capstone paper based on internship), and a "4+1" for undergraduate EPS majors from Rutgers (with thesis). MS research is independent but generally follows suggestions and guidance of the advisor and two internal committee members. Traditional MS degrees can be completed in two years, the "4+1" is designed to allow BS and MS in 5 years, and the Environmental Geology option offers time flexibility for working students.

The EPS Graduate Program provides a wide array of potential areas of study. We offer a broad range of research projects with a talented faculty

<http://geology.rutgers.edu/people/faculty>. Graduate student research projects can take full advantage of the region's diverse geology, planetary geology and chemistry of terrestrial bodies, icy moons, and asteroids in our solar system, and be part of numerous ongoing national or international research projects. Shared faculty, research, and facilities with several Rutgers' departments such as Marine and Coastal Sciences, Anthropology, Environmental Sciences offer additional means of study and research possibilities, along with ties to the Institute of Earth, Ocean, and Atmospheric Sciences (EOAS), the Rutgers Energy Institute (REI), the Departments of Geography, Chemistry, Physics, Ecology, Evolution, and Natural Resources. Facilities and resources at Lamont-Doherty Earth Observatory (LDEO), Woods Hole Oceanographic Institution, Princeton, and the American Museum of Natural History, are a few of the many nearby research institutions. In addition to course work at Rutgers, students can take advantage of courses at nearby Princeton and LDEO/Columbia universities.

Learning Goal 1 for Students: Attain marked ability, scholarship, research and leadership skills in the Earth and planetary sciences.

Assessment of student achievement of Goal 1:

- Grades in graduate courses
- Review by faculty of student progress with close advising and mentoring
- Placement in positions and careers; at the Ph.D. level, placement of our students in top research universities (e.g., RPI, Michigan State, Columbia), teaching colleges (Keystone State, Queens, Appalachian State), environmental companies, and the energy industry is the true evaluation of the learning of our students.
- Public defense of masters thesis

Role of the program in helping students to achieve Goal 1:

- Close advising to assure that students are being prepared in a coherent and academically rigorous fashion
- Effective monitoring of student progress Includes annual reports on research progress from both the student and the student's committee chair
- Evaluations of teaching effectiveness of instructors in graduate courses
If effectiveness is below expectations, work with instructors to improve effectiveness
- Periodic review of curricular offerings, degree requirements and assessment tools
By program faculty

Learning Goal 2 for Students: Engage in and conduct original research

Assessment of graduate student achievement of Goal 2:

- Preparation of and defense of masters dissertation proposal
- Assessment of quality of masters dissertation:
 - Public defense of dissertation
 - Critical reading of dissertation by committee of graduate faculty members
 - Submission and acceptance of peer-reviewed articles and conference papers based on the dissertation
- Achievement of students as evidenced by professional placements, selection for conference presentations, peer-reviewed publications and individual grant attainment

Role of the graduate program in helping students achieve Goal 2:

- Provide early introduction to research methods and opportunities for research
- Offer seminar courses that focus on research topics
- Provide opportunities to present research and receive feedback
- Maintain adequate funding levels through the research phase
- Provide comprehensive advising and assist in the identification of mentors

Learning Goal 3 for Students: Prepare to be professionals in careers that require training and experience in research, teaching and service

Assessment of graduate student achievement of Goal 3:

- Strongly encourage publications in peer reviewed journals
- Encourage advanced students to teach full courses that develop their teaching portfolios
- Encourage industry interviews annually and provide opportunities for students to learn about industry opportunities
- Develop network connections of students with programs outside of Rutgers
- Encourage papers at major national and international meetings
- Evaluations of teaching effectiveness of graduate student instructors
- Collection of placement data
- Review by external advisory committees, both inside of and external to the academy.
- Survey alumni/ae

Role of the program in helping students achieve Goal 3:

- Provide training in research, library use, course management, interview skills, presentation skills, development of curriculum vitae, use of research tools, the responsible conduct of research, and proposal writing
- Provide flexible options for students with interdisciplinary interests related to the geosciences
- Develop or enhance programs related to job and networking skills, including activity in professional societies and preparation for necessary certifications
- Acquaint students with non-academic career opportunities

The leadership of the Geological Sciences graduate program will regularly review the structure and content of the program and the feedback received from assessments and surveys. These reviews will be used to provide the best possible education to students in order to meet the needs for highly trained individuals in the biological, physical and social sciences that address issues related to the geosciences.