

## DEPARTMENT OF EARTH, ATMOSPHERIC, AND PLANETARY SCIENCES

### Graduate Study

The Department of Earth, Atmospheric, and Planetary Sciences offers opportunities for graduate study and research in a wide range of fields:

- Atmospheric chemistry
- Atmospheric dynamics
- Biogeochemistry
- Climate chemistry
- Climate dynamics
- Computational earth, atmospheric, and planetary sciences (in conjunction with the Computational Sciences and Engineering Program)
- Geology
- Geobiology
- Geochemistry
- Geophysics
- Paleoclimate
- Planetary sciences

Study in chemical, physical, and biological oceanography, as well as marine geology and geophysics, is offered in cooperation with the Joint Program with Woods Hole Oceanographic Institution (<http://mit.whoi.edu>).

Coursework during the first two years is the usual prelude to a thesis demonstrating that the student is capable of independent and creative research. The department offers the following degrees: a Master of Science, a Doctor of Philosophy, or a Doctor of Science in the field of specialization.

A graduate thesis may have either a theoretical, experimental, or observational focus. Modern laboratory facilities, computers, instrumentation, and extensive collections of specimens and data are available to students. Field study is an essential part of the graduate curriculum in geology, geophysics, and geochemistry, and special arrangements may be made for summer employment and field research on departmental projects and with industrial organizations and government agencies. In atmospheric science and climate studies graduate study includes a mixture of theoretical and experimental studies sharing a common appreciation of the dynamics of the underlying processes.

#### **Admission Requirements for Graduate Study**

In addition to the general institute requirements for admission (<http://catalog.mit.edu/mit/graduate-education>) listed in the section on Graduate Education, the department requires preparation equivalent to the curriculum for the Bachelor of Science in

Earth, Atmospheric, and Planetary Sciences at MIT for graduate studies in that field. For atmospheric sciences, climate studies, meteorology, and oceanography, the most essential element is a sound preparation in mathematics and physics, supplemented if possible by some chemistry. Students taking their undergraduate work at other institutions are advised to include in their programs the equivalent of the mathematics and physics contained in the MIT undergraduate curricula. If students are not fully prepared in certain of the fields or required subjects, they usually are asked to extend their studies in these areas while pursuing advanced work. The doctoral program can be entered without a Master of Science as a prerequisite.

#### **Master of Science in Earth and Planetary Sciences, in Atmospheric Science, or in Climate Science**

The General Degree Requirements (<http://catalog.mit.edu/mit/graduate-education>) for the degree of Master of Science in Earth and Planetary Sciences, in Atmospheric Science, or in Climate Science are described under Graduate Education. An individual program of study and research is arranged to suit the special background, needs, and goals of each student. The program is worked out in detail by the student with his or her personal faculty advisor and a departmental committee. There are no foreign language requirements for the degree.

#### **Doctor of Philosophy and Doctor of Science in Earth, Atmospheric, and Planetary Sciences Fields**

In consultation with a faculty advisor and a departmental committee, each student in the department's Doctor of Philosophy or Doctor of Science in an Earth, Atmospheric, and Planetary Science Field (<http://catalog.mit.edu/schools/science/#degreesandprogramstext>) program develops and follows a specialized program of study and research (<http://catalog.mit.edu/degree-charts/phd-earth-atmospheric-planetary-sciences>) tailored to their particular background, needs, and goals. A doctoral candidate's program should be broad and may include formal study in other departments in addition to the specialized subjects that prepare the candidate for thesis research. There is no foreign language requirement for the degree. Thesis research normally begins immediately after successful completion of the general examination by the end of the second year. The general examination is intended to test the candidate's aptitude and preparation for independent research.

Thesis research is closely supervised by one or more faculty members interested in and knowledgeable about the research topic, who are chosen by the student and may be members of other departments. The thesis is expected to meet high professional standards, and to be a significant original contribution to the scientific field.

Upon successful completion of the student's designated program and thesis defense, the student is awarded the Doctor of Philosophy or Doctor of Science in the designated field of earth, atmospheric, and planetary sciences.

### ***Interdisciplinary Programs***

#### **Computational Science and Engineering Doctoral Program**

The Doctoral Program in Computational Science and Engineering (CSE PhD) (<https://cse.mit.edu/programs/phd>) allows students to specialize in a computation-related field of their choice through focused coursework and a doctoral thesis through a number of participating host departments. The CSE PhD program is administered jointly by the Center for Computational Science and Engineering (CCSE) and the host departments, with the emphasis of thesis research activities being the development of new computational methods and/or the innovative application of computational techniques to important problems in engineering and science. For more information, see the full program description (<http://catalog.mit.edu/interdisciplinary/graduate-programs/computational-science-engineering>) under Interdisciplinary Graduate Programs.

#### **Joint Program with the Woods Hole Oceanographic Institution**

The Joint Program with the Woods Hole Oceanographic Institution (WHOI) (<http://mit.who.edu>) is intended for students whose primary career objective is oceanography or oceanographic engineering. Students divide their academic and research efforts between the campuses of MIT and WHOI. Joint Program students are assigned an MIT faculty member as academic advisor; thesis research may be supervised by MIT or WHOI faculty. While in residence at MIT, students follow a program similar to that of other students in their home department. The program is described in more detail (<http://catalog.mit.edu/interdisciplinary/graduate-programs/joint-program-woods-hole-oceanographic-institution>) under Interdisciplinary Graduate Programs.

#### ***Financial Support***

The department offers a considerable number of research and teaching assistantships each year. Research assistants work on one of the many research projects in the department, often related to the student's thesis research. Teaching assistants assist in laboratory instruction or in the preparation of teaching materials and the grading of papers.

The department also offers several fellowships beyond normal teaching and research assistantships. Selection of individuals is based on the excellence of the applicant's record.

#### ***Inquiries***

Additional information regarding academic and current research programs in the department, admission requirements, assistantship appointments, and financial aid may be obtained by writing to the department's Education Office, Room 54-912, 617-253-3381.