EARTH SCIENCES, MS

Contact

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Faculty

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Program Description

Graduate study in the Department of Earth and Environmental Sciences offers students opportunities for field-based geological and geophysical research worldwide. Ongoing research in the department is focused primarily in the areas of solid earth sciences/tectonics/crustal evolution, climate science and water resources/hydrology. The department is housed in the William B. Heroy Geology Laboratory, which contains state-of-the-art analytical and computing facilities, and modern well-equipped teaching spaces. All faculty are engaged in research and teaching.

The department typically has a combination of students pursuing either the M.S. or Ph.D. degree. Several of our faculty-led research projects are large collaborative, multi-institutional, multi-national programs that afford our graduate students' opportunities to work in diverse parts of the world with teams of internationally recognized scholars. Department faculty and graduate students are currently pursuing field studies worldwide.

Admission

Applicants must hold a B.S. or a B.A. degree and have at least three relevant courses in the geosciences (or take during their first year of graduate study), such as: Paleobiology, Sedimentology, Mineralogy, Structural Geology, Geochemistry, Geophysics, Climatology, Geomorphology and/or Hydrogeology. In addition, all incoming graduate students are expected to have successfully completed a full year (2 semesters) of Calculus, Chemistry, and either Physics or Biology. Any missing coursework must be completed during the two year duration of completing the other M.S. degree requirements. It is recommended that applicants have already participated in a field course or approved field experience. The department admits only students that have identified faculty advisors, so it is recommended you contact potential advisors in your field of interest prior to submitting an application. GRE scores are now optional for admission and departmental support (teaching and research assistantships) for the graduate program in earth and environmental sciences. We evaluate applications based on fit with your advisor, grades and GPA, coursework, personal statement and research experience, letters of recommendation, plus other evidence indicating an ability and desire to conduct and complete graduate-level research. International/non-native English speakers must present scores from one of the Syracuse University approved proficiency examinations. While we require a minimum composite TOEFL score of 85 and no sub-score below 20, competitive applicants typically have scores > 100.

Degree Programs

The Department offers programs of graduate study leading to the M.A., M.S., and Ph.D. Minimum requirements for each degree are an average GPA of 3.0 in major subjects and an overall average of 2.8.

Students who wish to continue graduate study toward a Ph.D. in Earth Sciences following a master's degree must submit a Syracuse University Graduate School application form, including letters of reference, to the Department.

Graduate Awards

Graduate students are expected to pursue their studies energetically and to complete their advanced degree work without undue delay. Financial support typically will be given to a student for four semesters at the master's level or eight semesters in the Ph.D. program.

Graduate Scholarships Awarded to students with superior qualifications, provide, in most cases, full tuition for the academic year.

Graduate Teaching Assistantships:

Offered to some Graduate Scholarship recipients; no more than 20 hours of work per week (9 months); stipend in addition to 24 tuition scholarship credits per year as needed. Students must be in good standing with no missing or incomplete grades; have made progress in completing core requirements.

Graduate Research Assistantships:

Offered to some Graduate Scholarship recipients; no more than 20 hours per week (9 to 12 months); a stipend in addition to 24 tuition scholarship credits per year as needed. Students must be in good standing with no missing or incomplete grades; have made progress in completing core requirements.

Department Research Support:

The Department has various funds available to support graduate student travel and research.

Facilities

The Heroy Geology Laboratory has well-equipped laboratories and graduate student offices. The department houses state-of-the-art workstation-based seismic data processing, GIS, and image-processing facilities; first-class laboratory space for clean and ultra-clean geochemistry. The department hosts two regional user facilities - the Electron Microprobe Lab (with a Cameca SXFive instrument, plus a Renishaw Raman Spectrometer) and the Multi-Sensor Core Logging Lab. Also housed in Heroy are the stable isotope geochemistry lab, the paleoclimate dynamics lab, a low-temperature geochemistry lab, a water chemistry lab and a water dynamics lab. Amongst other instrumentation are a scanning electron microscope, a number of unmanned aerial vehicles (drones) with various cameras, geophysical equipment such as ground-penetrating radar and resistivity systems, and a 384-core computing cluster. The department also has a range of sample preparation facilities.

Student Learning Outcomes

1. Conduct scientific research in the Earth and Environmental Sciences at the specialist level

2. Present and communicate scientific information to a general audience through undergraduate teaching of laboratories and recitations
3. Analyze and evaluate research results
4. Communicate scientific research in writing at the specialist level
5. Describe fundamental concepts in earth sciences relevant to the area of specialization

MS in Earth Sciences

30 credits are required. The 24 credit hours of graduate course work (500 or higher) include the 9-credit Foundations and Graduate Scope of Earth Sciences blocks. The remaining six credits comprise thesis credits (EAR 997 Masters Thesis). M.S. candidates must pass an oral defense of their written thesis.

Foundations (9 Credits)

Practicum and Communication (4 credits)

- EAR 616 Practicum in Earth and Environmental Scientific Communication 2 credit(s)
  and
- EAR 636 Foundations of Geosciences
  and
- EAR 634 Professional Development

1 Numerical Skills Lecture Course: (3 Credits)

- EAR 602 Numerical Methods in Geosciences 3 credit(s)
  or
- EAR 609 Environmental Data Science 3 credit(s)
  or
- Other numerical/coding course approved by the graduate advisory committee

Discipline-Specific Seminar Course (2 Credits)

- EAR 612 HydroReads 1 credit(s)
  (1 credit, repeated once)
  or
- EAR 628 PaleoX Research Seminar 1 credit(s)
  (1 credit, repeated once)
  or
- EAR 666 The SESSion - Solid Earth Seminar Series 1 credit(s)
  (1 credit, repeated once)

Graduate Scope of Earth Sciences (9 Credits)

1 cross-disciplinary course in the Earth System Sciences: (3 credits)
courses that are relevant across all facets of the Earth Sciences

Code	Title	Credits
EAR 610	Applications of GIS in the Earth Sciences	3
EAR 617	Geochemistry	3
EAR 622	Applications of Electron Probe Microanalysis	3
EAR 623	Stable Isotope Geochemistry	3

2 courses chosen from 2 of the 3 department disciplinary areas: (6-7 credits)
cross-cutting courses only count once

Solid Earth/Geodynamics

Code	Title	Credits
EAR 603	Geomorphology	3
EAR 608	Sedimentary Basin Analysis	3
EAR 611	Environmental Geophysics	3
EAR 618	Petrology	4
EAR 631	Plate Tectonics	3
Other relevant course approved by the graduate advisory committee		

Ancient Climates and Ecosystems

Code	Title	Credits
EAR 607	Climate Change and Human Origins	3
EAR 614	The Holocene: Climate and Environmental Change	3
EAR 615	Introduction to Climate Dynamics	3
EAR 629	Topics in Paleobiology	3
EAR 655	Geochemical Patterns in the History of Earth and Life	3
Other relevant course approved by the graduate advisory committee		

Water Science

Code	Title	Credits
EAR 601	Hydrogeology	3
EAR 603	Geomorphology	3
EAR 619	Environmental Aqueous Geochemistry	3
EAR 620	Contaminant Hydrogeology	3
EAR 665	Groundwater Modeling	3
Other relevant course approved by the graduate advisory committee		