Major in Geophysics

Courses are organized into topical blocks (modules) of 12 ECTS. The Geophysics major has four compulsory modules, four modules from the Geophysics offerings and additional elective courses from the complete offerings of the ETH Zurich and of the University of Zurich.

MSc in Earth Sciences – Major in Geophysics

Total 120 ECTS

Required Modules:
1. Geophysical Methods I
2. Geophysical Methods II
3. Two Modules from Geophysics offerings
4. Two Modules from Geosystems offerings
5. Two Modules from Geology offerings
6. Two Modules from Mineralogy & Geochemistry offerings

Elective Courses

- GESS Courses: 2 ECTS
- MSc Project Definition and MSc Proposal: 10 ECTS
- Master Thesis: 30 ECTS

The Major in Geophysics is devoted to processes and structures of the Earth’s interior connecting geophysical observations at the surface with concepts and modelling of physical processes and material properties within our planet. Geophysicists seek to answer questions of global significance such as: What drives plate tectonics and how do lithosphere plates interact with the mantle? How does the magnetic field of the Earth originate? How, where and when do earthquakes form and how can the risks associated with earthquakes be diminished?

Who can apply?

To be eligible for admission to the Master’s Degree Program in Earth Sciences at ETH Zurich, a high-quality bachelor’s degree with a minimum of 80 ECTS (or an equivalent first academic degree) is required. The degree must cover topics in Earth sciences at the university level and include courses in mathematics and physics.

How to apply?

The Admissions Office at ETH Zurich reviews all applications and makes recommendations to the Master’s Admissions Committee. The committee evaluates the applications based on academic performance, motivation, and the quality of the applicant’s academic record.

Further information:

www.erdw.ethz.ch/master

Master's Degree in Earth Sciences

Why Earth Sciences? The Master’s Program in Earth Sciences provides a high level of breadth and depth in earth and natural sciences. The program trains students in system-oriented sciences at the highest academic level. It is designed to enable students to handle complex problems and to develop a wide range of skills. Well-founded knowledge in diverse areas of Earth Sciences makes graduates of the program attractive candidates for government, research or private industry in areas dealing with natural resources, energy management, environmental protection, natural risks assessment or geo-engineering.

By choosing a Major the students define the main area of their educational path.
Geophysicists analyze the state and structure of our planet by using methods originating in physics, mathematics and geology and by developing new instrumentation and computer techniques. They are also involved in the development of space probes to survey other planets. Industrial applications vary from practical investigations of environmental problems to the exploration for raw materials and the assessment of natural hazards. Our program provides the necessary skills and knowledge to thrive in these fields.

Graduates holding a Master's Degree in Geophysics are prepared for the following organizations:

- Geophysical consulting companies working on measurement, modelling, development of new instruments
- International companies working in the area of natural resource exploration and extraction (water, minerals, energy resources including geothermal)
- International finance institutions and insurance companies involved in the assessment of natural hazards and with providing aid to regions with natural catastrophes
- Companies engaged in exploration, planning or supervising the establishment of suitable sites for radioactive or non-radioactive waste disposal and underground storage of waste or CO2
- Public service (international, national and local)
- Doctoral research as the basis for an academic career in the various areas of Earth Science in which quantitative measurements and computer modelling are essential

Program Lecturers, MSc Project and MSc Thesis

The Department of Earth Sciences at ETH Zurich has repeatedly been ranked as one of the world’s leading Earth Science schools. The Master’s program in Geophysics combines classroom teaching with computer exercises, substantial laboratory and field work, learning case study analyses as well as team work. Lectures are taught by ETH staff while some specialized courses are given by external experts from industry and academia.

MSc Project & MSc Thesis: The MSc Project is defined during the second semester in consultation with the project supervisor. Work on the MSc Thesis is expected to comprise about six months of full-time commitment with the fourth semester dedicated to writing the thesis. The MSc Thesis is generally either linked to an applied industry or fundamental research project. The MSc Thesis may be written in the form of an internationally publishable paper.

How we run the program

Course format: Two modules are mandatory and provide students with the necessary technical tools to study all branches of Geophysics. A choice of two additional modules from within the Geophysics offerings allow students to delve more deeply into one of the main areas of Geophysics. An additional 30 ECTS of elective courses may be taken from the full offerings of the ETH Zurich and the University of Zurich, allowing students to either deepen their Geophysics knowledge or to complement it with studies in other disciplines.

Program contents: The compulsory courses cover the core subjects of Geophysics and include geophysical methods such as geophysical data processing, numerical modelling, mathematical methods and continuum mechanics. Students are obliged to select two additional modules within Geophysics with options such as Geomodelling, Physics of the Earth's Interior or Applied Geophysics.

Learning goals in Geophysics

Expected Careers

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