

MASTER'S PROGRAM IN EARTH SCIENCES

Study Guide *(Version v07_2012)*



Cover photograph by: Jean-Daniel Champagnac

This study guide provides practical information on the Master's programs in Earth Sciences. The legally binding documents for each Master's program in the Department of Earth Sciences are:

- *Master's Degree in Earth Sciences*
German version of the program regulations "Studienreglement 2011 für den Master-Studiengang Erdwissenschaften"
- *Master's Degree in Atmospheric and Climate Sciences*
German version of the program regulations "Studienreglement 2006 für den Master-Studiengang Atmospheric and Climate Science"
- *Joint Master's Degree in Applied Geophysics*
English version of the program regulations "Regulations for the Idea league Joint Master's Degree Program in Applied Geophysics"

Students must register for all courses using the ETH on-line tool, myStudies:

http://www.rektorat.ethz.ch/applications/mystudies/index_EN. For administrative reasons an additional registration for excursions and field courses has to be made on <http://www.erdw.ethz.ch/education/excursions>.

Course descriptions and details on performance assessments are listed in the legally binding course catalogue at <http://www.vvz.ethz.ch>. Further sources of information are given in the text.

For the latest information please refer to the departmental website at <http://www.erdw.ethz.ch>

Text and Editing by:

Karin Mellini, Thomas Driesner, Erich Fischer, Marian Hertrich, Edi Kissling, Simon Löw, Björn Oddsson, Sean Willett, Wilfried Winkler

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2 STUDYING EARTH SCIENCES IN ZURICH

Earth Sciences at the ETH Zurich presents a study program characterized by practical training and a rigorous science education. In addition to the study opportunities within the Department of Earth Sciences at the ETH, there are opportunities to combine studies with industry or with programs at other European universities including the University of Zurich, or member universities of the European IDEA League (Imperial College London, TU Delft and RWTH Aachen).

The Earth Sciences department encourages collaborative study within different departments and universities. Earth Sciences has close ties to the Department of Environmental System Sciences (D-USYS) and to the Geography Department at the University of Zurich with the goal of a coordinated educational program to prepare a future generation of systems-oriented natural scientists.

This guide provides information about the goals, requirements, structural organization, career possibilities, specializations and elective options associated with the Master's Study Programs in earth science. The guide is intended for interested undergraduate students. It should be noted that the Study Regulations are the legal binding documents.

The regulations are published at <http://www.rechtssammlung.ethz.ch> and appear with important information about admission formalities on <http://www.erdw.ethz.ch>.

2.1 WHY EARTH SCIENCES?

The earth is a dynamic system. It consists of matter and energy which are being continually formed and redistributed as a result of the interactive processes operating within and around the planet. Earth science is the study of the earth, its history, present state and processes. Methods from all areas of the natural sciences are employed to understand the many interactive dynamic processes involved in shaping this planet.

Earth science is a unique natural science through the central role played by time. The earth, with its rock and ice records of past geologic and environmental conditions, serves as a laboratory and an archive. As a result, the earth can be investigated to understand the otherwise elusive processes of deep geologic time. Fundamental to geologic research is the concept that the past carries the key to understanding the future.

Processes operating over millions of years have caused the continuous alteration of our continents, oceans, biosphere and atmosphere. A study in earth science requires a foundation in all natural science disciplines as well as experience with a variety of investigative methods. These methods enable scientists to examine phenomena at different scales ranging from the global observations made by satellites to the material investigations performed at the atomic scale. Technical developments in global remote sensing and the microscopic investigation of specific materials facilitate investigation of the earth's dynamic processes and its current state. Geophysical and geochemical investigative methods permit the exploration of the earth's otherwise inaccessible interior as well as other celestial bodies in our solar system. Laboratory experimental studies simulate the pressures and temperatures characterizing the earth's interior. Other analytical methods, such as micro-chemical methods, document the exact age and conditions of rock and mineral formation.

Field work plays an essential role in much of earth science and can vary from geologic mapping, to taking samples in extreme mountain environments to using submersibles to retrieve samples from the deep oceans. Accurate field observations form an important basis for new advancements within all areas of earth science. Geophysical mapping of the ocean floor led to the discovery of Plate Tectonics, initiating a profound shift in the earth sciences. In all cases systematic methods are employed to seek solutions for theoretical or practical problems being investigated.

The scientific interpretations of investigations are based on a synthesis of quantitative information from field site discoveries, experimental investigations and from the construction of process models according to physical and chemical laws. Computer simulations, using innovative numerical methods, are increasingly employed to integrate different types of data and test hypotheses quantitatively.

Earth scientists use a holistic approach, employing both practical and theoretical investigations to study the earth and its environment. These scientists make prognoses about the future development of the earth by analyzing information obtained from past records, and using their knowledge of the global processes that steer the internal dynamic of our planet.

Earth scientists make interpretations by utilizing and combining many different types of data, their own observations and their intuition in order to gain a sense of the most important variables. Qualitative interpretations are tested quantitatively, using material investigations in the laboratory or using numerical process models before practical decisions are made. An especially appealing aspect for students of earth science is the ability to work in the field, laboratory, or with the computer, or to combine two or more of these types of working environments. Studying earth science is one way to open a door into a fascinating world leading to versatile professional possibilities.

2.2 EXPECTED CAREERS

Due to their broad scientific education and their ability to rationally analyze multi-layered problems earth scientists are always needed as technical-analytical specialists to find practical solutions to difficult and complex problems.

Graduates of the programs are attractive candidates for government, research or private industry in areas dealing with natural resources, energy management, environmental protection, natural risks assessment or geo-engineering. Concrete career possibilities in private industry depend on the chosen major, on individual motivation and the established social network (based on the MSc Project or industry internship).

The importance of further specialization areas varies and depends on the employment market and the variable size and personal philosophy of each company.

2.2.1 CAREERS IN ENGINEERING GEOLOGY

Scientists holding a Master's degree with a Major in Engineering Geology commonly find careers in the following organizations:

- Small and intermediate size consulting companies working in the field of engineering geology or hydrogeology
- International engineering companies working in the energy, traffic and waste sector
- International mineral resource industries (metals, industrial minerals or energy resources)
- Environmental agencies and cooperatives with management positions in the waste disposal field (chemical, nuclear)
- Public authority service (national and local)
- Universities and other academic institutions, through a sound preparation for PhD research in the fields of rock mechanics, natural hazards, underground excavations, waste disposal, geothermal energy and groundwater flow

2.2.2 CAREERS IN GEOLOGY

A Major in Geology prepares graduates for the following professional activities:

- Consulting work in geology or civil engineering, for risk assessment, environmental impact studies or geotechnical evaluation
- Exploration and extraction of Earth resources, including metallic or non-metallic ores, building materials, ground- and surface water and hydrocarbon, geothermal or nuclear energy resources
- Exploration, planning or supervising the establishment of suitable sites for radioactive or non-radioactive waste disposal and underground storage of waste or CO₂
- Geological investigations for consulting companies, public non-profits or private insurance used for geotechnical decisions, environmental compatibility studies and risk assessment (i.e., rock slides, ground water pollution, floods, the monitoring of active volcanoes, etc.)
- Consultation in the use of digital geo-data for land and city planning
- Supervision and planning of environmental protection-related projects for cantonal and federal offices
- Scientific journalism or scientific administration in private and public communication media
- Research within a PhD program at the ETH Zurich or elsewhere leading to a career in industry or academic research

2.2.3 CAREERS IN GEOPHYSICS

Graduates holding a Master's degree with a Major 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

2.2.4 CAREERS IN MINERALOGY & GEOCHEMISTRY

A Major in Mineralogy & Geochemistry prepares the Graduates for the following professional activities:

- Exploration and extraction of Earth resources like metallic and non-metallic ores, building materials, ground- and surface water and hydrocarbon, geothermal or nuclear energy resources
- Material science and environmental science research in companies and institutions that use chemical, optical or mechanical analytical methods
- Exploration, planning or supervising the establishment of suitable sites for radioactive or non-radioactive waste disposal and underground storage of waste or CO₂
- Geological and geochemical investigations for consulting companies, public non-profits or private insurance used for geotechnical decisions, environmental compatibility studies

and risk assessment (i.e., rock slides, ground water pollution, floods, the monitoring of active volcanoes, etc.)

- Research for companies which develop and distribute analytical instruments used for precise isotope measurement
- Consultation in the use of digital geo-data for land and city planning
- Research with a PhD program at the ETH Zurich or elsewhere leading to a career in industry or academic research

2.2.5 CAREERS IN ATMOSPHERIC AND CLIMATE SCIENCES

Graduates holding a Master's degree in Atmospheric and Climate Science are qualified to work in the following areas:

- Positions in consultation or the public sector which concern weather prediction, air quality, and climate related natural hazards
- Positions as consultants dealing with water supply, snow and glacier observations and the evaluation of the associated risks
- Research towards a doctoral degree, particularly in the fields of paleoclimatology and hydrology

2.2.6 CAREERS IN APPLIED GEOPHYSICS

Graduates holding a Master's degree in Applied Geophysics are qualified to work in the following areas:

- Consulting or project based work in the area of natural resource exploration and extraction (oil-, gas and mineral prospecting) for international companies
- Geotechnical investigations for consulting companies, public non-profits or private insurance used for geotechnical decisions and risk assessment
- Consulting work in civil engineering for ground water management or geotechnical evaluation
- International finance institutions and insurance companies involved in the assessment of natural hazards
- Engineering companies engaged in natural hazard mitigation
- Research with a PhD program at the ETH Zurich or elsewhere leading to a career in industry or academic research

2.3 ADMISSION AND APPLICATION

The Admissions Office of the ETH Zurich informs and advises prospective students (graduates of universities in Switzerland other than ETH and from abroad) concerning the admission procedure and the enrolment requirements. Detailed information is available on:

http://www.rektorat.ethz.ch/students/admission/master/index_EN

The Admissions Office screens all applications and forwards the formally compliant ones to the MSc Admissions Committee. This committee evaluates all applications with respect to the requirements profile and recommends acceptance or rejection to the Admissions Office. This process might take several weeks.

Candidates can be admitted to the Master's program in Earth Science without any additional requirements or with the additional requirement to acquire a maximum of 30 ECTS credits from the corresponding ETH Bachelor degree program (requiring approximately 1 - 2 extra semesters). Additional conditions for admission into the specialized Master's study programs Atmospheric and Climate Science are available at <http://www.iac.ethz.ch/education/master> and for Applied Geophysics at <http://www.idealeague.org/geophysics>.

Admission will not be granted to candidates who would require more than 30 ECTS credits as additional requirements or who have substantial deficits in basic knowledge and skills as taught in the first years of an ETH Bachelor program.

Candidates will receive the admission decision in writing from the Admissions Office, as well as a registration form. To accept the study place, the candidate sends the registration to the Admissions Office and will then receive a confirmation, which can be used for visa application.

2.3.1 WHO CAN APPLY?

As a formal prerequisite to be eligible for admission to a Master's program prospective students need to have a high-quality Bachelor degree in Earth Science with a minimum of 180 ECTS (ETH Zurich or Swiss University) or an equivalent first academic degree from an internationally recognized university which must comply in quality, depth and breadth with the requirement profile of the Master's program.

Students who have received a Bachelor's Degree in one of the other natural sciences can also be granted admission to the program, provided a sufficient number of Earth Science courses are completed. With regard to content the prerequisites are described in the requirement profile of the Master in Earth Science program.

Adequate command of the language(s) of instruction (German and/or English) is required for admission (corresponding to the Swiss "Matura" level based on the results of the following recognized examinations TOEFL, IELTS, CAE or CPE).

The admission conditions and the prerequisites depend on the university from which the candidate obtained the Bachelor or equivalent degree. For further details refer to:

<http://www.rektorat.ethz.ch/students/admission/master/prerequisites>

2.3.2 HOW TO APPLY?

Applications to the *MSc in Earth Science* and the *specialized MSc in Climate and Atmospheric Science* are handled by ETH Zurich. Whoever satisfies the admission criteria can apply online at <http://www.eapply.ethz.ch>. Applicants with a BSc degree from the ETH Zurich should apply at <http://www.mystudies.ethz.ch>.

Applications to the *Joint MSc in Applied Geophysics* are handled by Delft University of Technology, see <http://www.idealeague.org/geophysics>.

The online application form must be filled out and all required documents must be sent to the Admissions Office including a certified translation of each document that is in a language other than English, German, French or Italian. Application materials become the property of ETH Zurich and cannot be returned.

Applicants with a BSc from a foreign university or with a Swiss BSc degree from a study area other than earth science should include, in addition the following information:

- GRE Test, except for students who have obtained their Bachelor Diploma in one of the Bologna countries
- Course content information
- Text book used
- Personal statement explaining the motivation for choosing the study program
- Letter of recommendation, except from Swiss and IDEA-league partner university students or applicants to the specialized MSc in Atmospheric and Climate Sciences
- Preferred major (Geology, Mineralogy & Geochemistry, Geophysics, Engineering Geology), except for applicants to the specialized MSc in Atmospheric and Climate Sciences

2.3.3 WHEN TO APPLY?

The **international application period**, compulsory for students who require a visa or for those applying to a scholarship, starts November 1st and ends December 15th.

The **Bologna application period** for students who do not require a visa starts March 1st and ends April 15th. The Admissions Office screens all applications and forwards the compliant ones to the MSc Admissions Committee. This committee evaluates all applications with respect to the requirements and recommends acceptance or rejection to the Admissions Office. This process might take several weeks.

Further information is published on <http://www.admission.ethz.ch/master>

2.4 LEARNING GOALS

The Department of Earth Sciences offers three different Master's programs in Earth Science. The goal of each program is to provide students with an occupation in one of the specialized fields of Earth Sciences. The common goals of all programs include development of the ability:

- to conduct independent analysis to define an earth science thesis (problem) and to construct a research program based on existing knowledge, literature and independent observations.
- to solve complex earth science problems, including the independent use of observation, measurement and model methods.
- to comprehensively present project results, verbally and in writing.
- to work in a team, both in a lead function or within a collaboration

2.5 PERFORMANCE ASSESSMENT AND REQUEST TO ISSUE THE DEGREE

The study program follows a credit system consistent with the European Credit Transfer System (ECTS). A Bachelor's degree program comprises 180 credits; the Master's program in Earth Sciences and the Master's program in Applied Geophysics consist of 120 credits, the Master's program in Atmospheric and Climate Sciences consists of 90 credits. One credit corresponds to 25 – 30 hours of work, including independent study. The award of credits is always contingent on obtaining a pass grade in a performance assessment. A failed performance assessment may be repeated once.

Examination information regarding performance assessment is published prior to start of the semester in the course catalogue and in myStudies. For detailed information about performance assessment see: http://www.rektorat.ethz.ch/students/exams/index_EN.

At ETH Zurich, there are the following types of performance assessmentsⁱ:

Session Examinations are held in written or oral form during the twice-yearly examination sessions: Winter session: weeks 4–7 and Summer session: weeks 32–35. The students have to register in the third and fourth week of each semester via myStudies. These examinations are graded.

End-of-semester Examinations are held in written or oral form during the last two semester weeks or the first two weeks of the semester breaks. The students have to register in the third and fourth week of each semester via myStudies. These examinations are graded.

Semester Performance Assessments comprise either assessments which are integrated into the course unit (e.g., talks, laboratory reports, project work, excursions, written work) or those whose deadlines diverge from the normal semester rhythm (e.g., block courses). These assessments may either be graded or evaluated on a 'pass/fail' basis.

The *personal examination schedule* lists all written and oral session examinations and is displayed in myStudies. No examination schedule is displayed in myStudies for end-of-semester examinations. Students will receive the examination dates directly from the respective lecturers.

The Study Administration Office issues the performance assessments on a periodic basis, including shortly after the grading conference. All achievements for which the confirming decree has been issued, together with the number of credit points obtained, are listed in myStudies, under "Transcript of records" and sent to the students by e-mail. Missing credit points must be reported to the Study Administration Office. The final academic records are sent to the students by post.

The request to issue the degree can be submitted as soon as the minimum credit points required by the regulations have been obtained. It is submitted by printing it out via myStudies and must be signed and handed over to the Study Administration Office, as a rule in person. Based on the request, the following documents are issued:

- a. Final academic record, with or without an addendum
- b. The diploma (degree) certificate

ⁱ The regulations concerning the implementation of all types of study performance evaluations are in the General Ordinance for Performance Assessments (Allgemeine Verordnung über Leistungskontrollen) of the ETHZ (AVL ETHZ from 10. September 2002). These regulations are legally binding <http://www.rechtssammlung.ethz.ch/Nr.322.021>.

3 MASTER'S PROGRAMS IN EARTH SCIENCES

The Master's Program in Earth Sciences at the ETH Zurich provides a high level and broad-based education and trains students in System Oriented Sciences at a high academic level. This program typically follows a Bachelor degree in Earth Sciences which provides a fundamental background in the natural sciences, as well as the basics in Earth Sciences. All programs are designed to teach students to handle complex problems and to develop a wide range of skills as well as knowledge in diverse areas of Earth Sciences.

The Master's program may be extended by completing a continuing education program such as a *doctoral program* which provides the students with the opportunity to complete independent research or the *teaching certificate for geography* (Lehrdiplom Geografie) which is the accreditation to teach geography at a gymnasium in Switzerland.

The D-ERDW offers three different Masters' degrees:

- **Master in Earth Sciences** with four possible majors:
 - Geology
 - Mineralogy & Geochemistry
 - Engineering Geology
 - Geophysics
- **Specialized Master in Atmospheric and Climate Science**
- **Joint Master in Applied Geophysics**

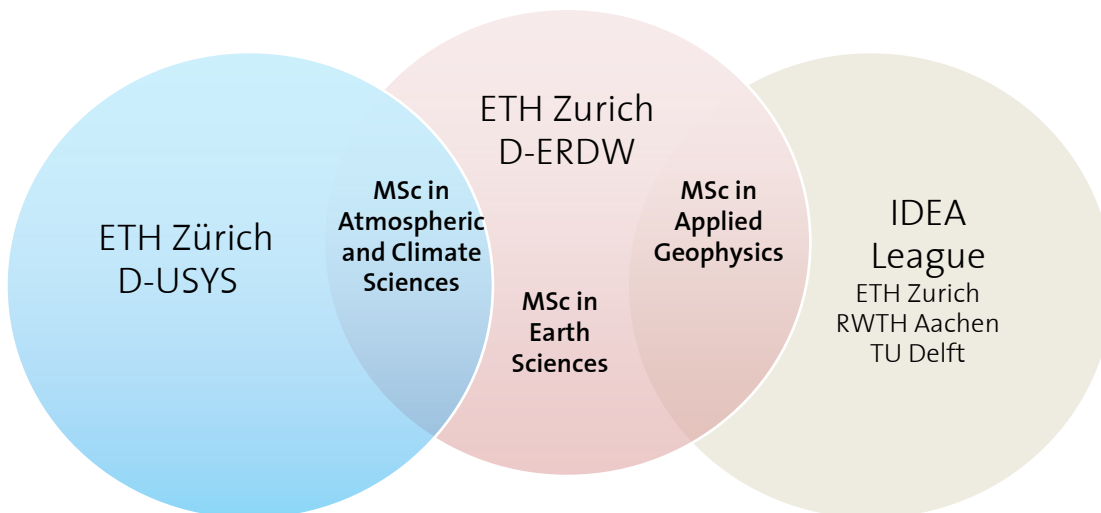


FIGURE 1 Relationship between the partners in the programs

4 MASTER IN EARTH SCIENCES (120 ECTS)

Earth science education becomes more specialized with more advanced studies (from BSc to MSc). Furthermore, students experience an increase in independence, in terms of subject choice, study structure, and the ability to participate in independent projects or an industrial internship. Beginning in the first year, the earth science education program includes excursions and field courses. This is an appealing aspect of a practically oriented education. The students attend lectures, exercises and practical laboratory courses and quickly develop personal contact with instructors and upper level students.

4.1 STRUCTURE OF THE PROGRAM

In contrast to the more rigidly structured foundation of the BSc program, the modular structure of the MSc program allows flexibility, while assuring that earth science fundamentals are adequately covered. Courses are organized into topical blocks (modules) of 12 CP and additional elective courses from the complete offerings of the ETH Zurich and of the University of Zurich. Recommended courses are suggested but students also receive personalized advice in order to customize their program according to their career goals. An individual study plan has to be developed with advice and approval by the MSc Committee. With proper planning, it is also possible to experience an exchange semester at a foreign university.

Major in Engineering Geology	Major in Geology	Major in Mineralogy & Geochemistry	Major in Geophysics
Completion of <i>4 modules</i> from Engineering Geology Offerings	Completion of <i>3 modules</i> from Geology offerings, plus <i>1 additional module</i> from complete offerings of D-ERDW	Completion of <i>3 modules</i> from Mineralogy & Geochemistry offerings, plus <i>1 additional module</i> from complete offerings of D-ERDW	Completion of <i>4 modules</i> from Geophysics offerings
(48 CP)	(48 CP)	(48 CP)	(48 CP)
Electives (30 CP)			
MSc Project Proposal (10 CP)			
MSc Thesis (30 CP)			
GESS Courses (2 CP)			

FIGURE 2 Structure of the Study program MSc in Earth Sciences with four possible majors

4.1.1 STUDY PLAN

At the beginning of the MSc studies, students must develop an individual study plan outlining their planned modules and elective courses. This study plan ensures a well-ordered, and rational program while taking the student's individual ideas and expectations into consideration.

The study plan must be discussed with the subject advisor of the chosen major and approved by the MSc Committee. It must be turned in to the subject advisor within three weeks from the start of the semester. Changes to the study plan must be approved by the director of studies.

4.1.2 MODULES (48CP)

Courses are organized into topical blocks (modules) of 12 CP. At least four modules must be chosen from the offerings of the department. The choice of modules depends on the chosen major. Whereas some majors require four compulsory modules others have more freedom of choice of modules within the program.

4.1.3 ELECTIVES (30CP)

At least 30 CP of elective courses are chosen from the complete offerings of the ETH Zurich and the University of Zurich, allowing students to either deepen their earth science knowledge or to complement it with studies in other disciplines.

4.1.4 GESS COURSES (2CP)

The Department of Humanities, Social and Political Sciences (D-GESS) is responsible for the courses of the compulsory elective GESS. These are compulsory for all students of the ETH Zürich.

The aim of the GESS electives is to critically analyze and put specialist knowledge from the natural and technical sciences into a social context. They encourage holistic and future-oriented knowledge communication. This provides awareness of new ways of thinking and alternative scientific approaches and contributes to the personal development of students.

4.1.5 MASTER'S PROJECT PROPOSAL (10CP)

The MSc Project Proposal serves the dual function of defining a thesis topic, and introducing students to methods of research and research communication. The thesis topic is defined during the third semester (fall semester) in consultation with a project supervisor, typically in one of the research fields associated with the selected major. Interdisciplinary projects involving co-supervisors from neighboring fields are common and encouraged. MSc Projects also often involve contacts with engineering or mining companies or include field and/or laboratory-based work that may be developed in cooperation with private industry or public institutions.

Effective organization, and accurate, concise writing are key to communicating in science. A major purpose of the MSc Project Proposal is therefore to prepare students for their MSc Thesis. The students learn how to formulate questions and explain or discuss results in a written scientific form. For detailed information on the Master's Project Proposal please refer to the guidelines published on:

<http://www.erdw.ethz.ch/documents/index>

4.1.6 MASTER'S THESIS (30CP)

The Master's program is concluded by means of a thesis. The entire fourth semester is devoted to the Master's Thesis.

Before starting on the Master's Thesis, students must:

- have obtained their Bachelor's degree
- have fulfilled all additional requirements (if any)
- have successfully completed the MSc Project Proposal

The Master's thesis must be read and approved by two or more lecturers. Students hand in a registration form three weeks before the start of the Master's thesis and must also enroll for the Master's Thesis through myStudies.

The subject of the thesis is defined in the MSc Project Proposal. The focus is in the major study area and will represent either an applied or fundamental research project. The work will be undertaken with the close involvement of at least one supervisor and, in most cases, will be integrated into one of the research groups at D-ERDW.

If geological mapping or sampling are required, early planning of the project is essential to provide flexibility in scheduling time in the field. The MSc Thesis is often written in the form of an internationally publishable paper.

Please refer to the guidelines for further information at:

<http://www.erdw.ethz.ch/documents/index>

4.1.7 MOBILITY AND STUDENT EXCHANGE

Many students entertain the idea of studying abroad for a semester during their Master's program. The interaction of a semester abroad requires some extra planning, but is rewarded by the enduring personal and professional enrichment which the student experiences. There are many interesting courses of study at a variety of European and American universities.

During the Master's studies, a maximum of 30CP may be earned from another university. A personal written study program is established prior to the beginning of the study abroad which must be designed in cooperation with the mobility advisor. The written program will specify the credit points which will be completed at the foreign university. This study program abroad as part of the BSc also requires the approval of the director of studies.

In addition to the 30CP earned through course work, an inter-university cooperation during the execution of MSc research project is possible. The plan for this study abroad must be agreed to, in writing, by the MSc Commission of the corresponding major program.

Further information may be found at: <http://www.mobilitaet.ethz.ch>, or obtained from the mobility advisor of the Earth Science department.

4.2 MAJOR IN GEOLOGY

The Earth is an open system of material and energy fluxes with gradual and episodic change of the land surface, the oceans, biosphere and the atmosphere. The focus of the Major in Geology is the history of our planet, its current state, and its development into the future. The major in Geology provides a general course of study of solid earth processes along with the connections to the ocean, biosphere and atmosphere. Particular focused studies include tectonics, sedimentology, geomorphology, biogeochemical cycles and earth history, including the evolution of life and of the Earth's climate.

The Geology major introduces students to concepts for exploring the significance of rock archives for basin formation and fill, mountain building, climate and biological evolution on a wide range of spatial and temporal scales. It teaches the relationships between geological structures, forces and deformation rates that operate during tectonic activity. The program gives a sound knowledge of the physical, chemical and biological processes working in sedimentary and tectonic systems from the continents to the deep sea and explores the interactions between organisms and their physical and chemical environment. The evolution of climate through geological time and its major forcing factors – orbital, atmosphere chemistry, and tectonics are key topics.

4.2.1 COMPULSORY GEOLOGY MODULE

The Geology major has one compulsory module which introduces students to techniques for investigating the various properties of rocks and minerals.

Analytical Methods in Earth Sciences			
Microscopy Courses (minimum of 6 CP):			
651-4051-00	Reflected-light Microscopy and Ore Deposits Practical	HS ²	2CP
651-4113-00	Sedimentary Petrography and Microscopy	HS ¹	2CP
651-4047-00	Microscopy of Magmatic Rocks	HS ²	2CP
651-4045-00	Microscopy of Metamorphic Rocks	HS ¹	2CP
Analytical Methods Courses (minimum of 6 CP):			
651-4117-00	Sediment Analysis	HS ¹	3CP
651-4055-00	Analytical Methods in Petrology & Geology	HS ¹	3CP
651-4038-00	Analysis of Rock Textures	FS ²	3CP
651-4031-00	Geographic Information Systems	HS ²	3CP
651-4063-00	X-ray Powder Diffraction	HS	3CP

4.2.2 CHOICE OF MODULES FROM GEOLOGY OFFERINGS

The modules from the Geology offerings educate future professionals and academics in the main geological disciplines through an integrated presentation of the relationships between tectonic, sedimentary, climatic and biogeochemical processes on our planet. Students are obliged to take two out of the following modules from the Geology offerings.

Structural Geology			
Compulsory courses (6 CP):			
651-4022-00	Structural Geology (with 4 day field course)	FS ¹	3CP
651-4132-00	Field Course IV (non-alpine)	FS*	3CP
Courses of choice (minimum of 6 CP):			
651-4003-00	Numerical Modelling of Rock Deformation	HS	3CP
651-3521-00	Tectonics	HS	3CP
651-4035-00	Microstructures	HS	3CP
651-4111-00	Rock Physics	HS	3CP
651-4076-00	Anisotropical Behaviour and Rheology of Rocks	FS	3CP
651-4038-00	Analysis of Rock Textures (5 day block course)	FS ²	3CP
651-4050-00	Experimental Rock Deformation (5 day block course)	FS ²	3CP
651-4134-00	Tectonic Geomorphology (with field course)	FS ²	4CP

Palaeoclimatology			
Compulsory courses (6 CP):			
651-4057-00	Climate History and Paleoclimatology	HS	3CP
651-4004-00	Organic Geochemistry and Biogeochemical Cycles	FS	3CP
Courses of choice (minimum of 6 CP):			
651-3421-00	Biochronology and Diversity (UZH)	HS	3CP
651-4043-00	Sedimentology II: Biological and Chemical Processes in Lacustrine and Marine Systems	HS ²	3CP
651-4002-00	Stratigraphy and Time	FS ¹	3CP
651-4054-00	Micropaleontology (3 day block course)	FS*	3CP
651-4056-00	Limnogeology	FS	3CP
651-4058-00	Paleobotany (UZH)	HS	3CP

* Takes place in the semester break of spring semester

Sedimentology			
Compulsory courses (9 CP):			
651-4041-00	Sedimentology I: physical processes and sedimentary systems	HS ¹	3CP
651-4043-00	Sedimentology II: Biological and Chemical Processes in Lacustrine and Marine Systems	HS ²	3CP
651-4150-00	Sedimentary Rocks in the Field (field course)	FS ²	3CP
Courses of choice (minimum of 3 CP):			
651-4002-00	Stratigraphy and Time	FS ¹	3CP
651-4901-00	Quaternary Dating Methods	HS ²	3CP
651-4902-00	Quaternary Geology and Geomorphology of the Alps	FS	3CP
651-4004-00	Organic Geochemistry and Biogeochemical Cycles	FS	3CP
651-4134-00	Tectonic Geomorphology (with field course)	FS ²	4CP
651-4080-00	Fluvial sedimentology	FS	3CP
651-4048-00	Provenance Analysis	FS ²	3CP
651-4063-00	X-ray Powder Diffraction	HS	3CP
651-4078-00	Clay Mineralogy	FS	3CP

Biogeochemistry			
Compulsory courses (6 CP)			
651-4044-00	Geomicrobiology and Biogeochemistry	FS	3CP
651-4004-00	Organic Geochemistry and Biogeochemical Cycles	FS	3CP
Courses of choice (minimum of 6 CP):			
651-4043-00	Sedimentology II: Biological and Chemical Processes in Lacustrine and Marine Systems	HS ²	3CP
651-4054-00	Micropaleontology (3 day block course)	FS ^{**}	3CP
651-4056-00	Limnogeology	FS	3CP
651-4058-00	Paleobotany (UZH)	HS	3CP
651-4057-00	Climate History and Paleoclimatology	HS	3CP

4.2.3 OPEN MODULES

Students have to choose at least one open module from the complete offerings of the department. For detailed information on the open modules refer to section 4.6.

^{**} Takes place in the semester break of spring semester

4.3 MAJOR IN MINERALOGY & GEOCHEMISTRY

The major in Mineralogy & Geochemistry provide students with a quantitative understanding of the structure and properties of the materials (rocks, minerals and fluids) that constitute the Earth, how their properties determine the dynamics and character of geological processes such as magmatism, mountain building and formation of energy and mineral resources and how chemical and isotopic fingerprinting methods allow the reconstruction and measurement of – sometimes extreme – pressure-temperature conditions.

Students in Mineralogy & Geochemistry learn to interpret the textures of rocks and minerals, to analyze them with chemical and physical methods, to perform experiments to understand mineral- and rock-forming processes and to use computer tools to simulate geological processes that are too long, too hot or too deep to be investigated directly.

4.3.1 COMPULSORY MINERALOGY & GEOCHEMISTRY MODULE

The Mineralogy & Geochemistry major has one compulsory module which introduces students to techniques for investigating the various properties of rocks and minerals. Students learn how diverse methodologies are used to solve real world problems.

Analytical Methods in Earth Sciences			
Microscopy Courses (minimum of 6 CP):			
651-4051-00	Reflected-light Microscopy and Ore Deposits Practical	HS ²	2CP
651-4113-00	Sedimentary Petrography and Microscopy	HS ¹	2CP
651-4047-00	Microscopy of Magmatic Rocks	HS ²	2CP
651-4045-00	Microscopy of Metamorphic Rocks	HS ¹	2CP
Analytical Methods Courses (minimum of 6 CP):			
651-4117-00	Sediment Analysis	HS ¹	3CP
651-4055-00	Analytical Methods in Petrology & Geology	HS ¹	3CP
651-4038-00	Analysis of Rock Textures	FS ¹	3CP
651-4031-00	Geographic Information Systems	HS ²	3CP

4.3.2 CHOICE OF MODULES FROM MINERALOGY & GEOCHEMISTRY OFFERINGS

The modules designed for the major in Mineralogy & Geochemistry give students a quantitative understanding of the structure and properties of earth materials as well as of the dynamics and character of geological processes responsible for their formation. Students must choose two out of the following modules.

Mineralogy and Petrology			
Compulsory courses (6 CP):			
651-4039-00	Thermodynamics Applied to Earth Materials	HS	3CP
651-4028-00	Physics Structures and Stability of Minerals	FS ¹	3CP
Courses of choice (minimum of 6 CP):			
651-4030-00	Crystalline Geology of the Alps (with excursions)	FS	3CP
651-4223-00	Phase petrology	HS	3CP
651-4291-00	Mineral Physics of the Deep Mantle and Core	HS	3CP
651-4097-00	Applied Mineralogy and Non-Metallic Resources I	HS	3CP
651-4063-00	X-ray Powder Diffraction	HS	3CP
651-4078-00	Clay Mineralogy	FS	3CP

Petrology and Volcanology			
Compulsory courses (3 CP):			
651-4032-01	Volcanology	FS ¹	3CP
Courses of choice (minimum of 9 CP):			
651-4032-02	Volcanology Field Course (10 day excursion)	FS [*]	2CP
651-4098-00	Computational Techniques in Petrology	FS	3CP
651-4233-00	Geotectonic Environments and Deep Global Cycles	HS	3CP
651-4036-00	Field Excursion Module Mineral Resources	FS	3CP
651-4026-00	Applied Mineralogy and Non-Metallic Resources II	FS	3CP
651-4063-00	X-ray Powder Diffraction	HS	3CP

* Takes place in the semester break of spring semester

Mineral Resources			
Compulsory courses (6 CP):			
651-4037-00	Ore deposits I	HS	3CP
651-4097-00	Applied Mineralogy and Non-Metallic Resources I	HS	3CP
Courses of choice (minimum of 6 CP):			
651-4024-00	Ore deposits II	FS ¹	3CP
651-4026-00	Applied Mineralogy and Non-Metallic Resources II	FS	3CP
651-4034-00	Resource Economics and Mineral Exploration (Block course)	HS [*]	3CP
651-4036-00	Field Excursion Module Mineral Resources	FS	3CP
651-4221-00	Numerical Modelling of Ore Forming Hydrothermal Processes	HS	3CP
651-4059-00	Fluid-Rock Interaction: Concepts and Process Modelling	HS	3CP
651-4069-00	Fluid and Melt Inclusions: Theory and Practice (Block course)	HS ^{**}	3CP

Geochemistry			
Compulsory courses (3 CP):			
651-4049-00	Advanced Geochemistry	HS	3CP
Courses of choice (minimum of 9 CP):			
651-4227-00	Planetary Geochemistry	HS	3CP
651-4044-00	Geomicrobiology and Biogeochemistry	FS	3CP
651-4046-00	Hydrothermal Geochemistry	FS	3CP
651-4004-00	Organic Geochemistry and Biogeochemical Cycles	FS	3CP
651-4229-00	Advanced Geochronology	HS	3CP
651-4235-00	Marine Geology and Geochemistry	HS	3CP
701-0423-00	Chemistry of Aquatic Systems	HS	3CP
651-4057-00	Climate History and Paleoclimatology	HS	3CP
651-4225-00	Topics in Geochemistry	HS	3CP

4.3.3 OPEN MODULES

Students must choose at least one open module from the complete offerings of the department. For detailed information on the open modules refer to section 4.6.

^{**} Takes place in the semester break of fall semester

4.4 MAJOR IN ENGINEERING GEOLOGY

The major in Engineering Geology focuses on the interactions between man, engineered structures and geology. Students learn to characterize and predict the behavior of rocks and soils under near-surface loading conditions such as in surface excavations, tunnels, dams, and below roads, buildings and bridges. In addition, students learn how to identify, characterize and cope with natural slope instabilities (landslides, rock falls, mud flows, etc.) and become familiar with fundamental and applied issues of groundwater use and geological waste disposal. More specifically, students attain the ability to characterize the site geology in the form of a comprehensive geotechnical or hydrogeological model. Students learn how to design and execute a targeted site investigation program, how to assemble, interpret and synthesize diverse and often highly-fragmented geological and technical data, and how to transfer such data into an appropriate and scientifically-valid model as required for engineering analysis and design.

4.4.1 COMPULSORY ENGINEERING GEOLOGY MODULES

The four compulsory modules of the Engineering Geology major cover the core skills of engineering geology and provide the foundation knowledge for study of the geo-environment, hazards, hydrogeology, soil and rock mechanics, foundation engineering and underground construction. Engineering geological and hydrogeological properties and processes in rocks and soils are introduced and applied to ongoing projects in Switzerland and abroad.

Fundamentals			
Compulsory courses (12 CP):			
651-4025-00	Rock Mechanics and Rock Engineering	HS ¹	4CP
651-4033-00	Soil Mechanics and Foundation Engineering	HS	4CP
651-4023-00	Groundwater I	HS	4CP

Methods			
Compulsory courses (12 CP):			
651-4065-00	Geological Site Investigations	HS ²	3CP
651-4064-00	Engineering Geological Field Course I (Soils)	FS	3CP
651-4066-00	Engineering Geological Field Course II (Rocks)	FS	3CP
651-4061-00	Hydrogeological Field Course	FS ¹	3CP

Integration			
Compulsory courses (12 CP):			
651-4070-00	Landslide Analysis	FS	4CP
651-4072-00	Engineering Geology of Underground Excavations	FS	4CP
651-4074-00	Landfills and Deep Geological Disposal (Block course) ^a	FS ²	3CP
651-4276-00	Excursions Module Integration (4 days) ^b	FS	1CP

^a Course will be replaced by 102-0337-00 G Landfilling, Nuclear Repositories and Contaminated Sites starting FS 2013

^b From the complete offerings of the department incl. field courses, the excursions have to be approved by the subject advisor

Industrial Internship			
Compulsory course (12 CP):			
651-4071-00	Industrial Internship	HS/FS	12CP

The fourth compulsory module for all students of the Engineering Geology Major is an industrial internship (third semester). The internship consists of 10 weeks practical work in a consultant office, public authority or engineering contractor. The internship concludes with a written report.

The documents describing the regulations and procedure recommendations of the industrial internship are online at https://www.ethz.ch/engineeringgeology/msc/Industry_Practical.

4.4.2 RECOMMENDED COURSES IN ENGINEERING GEOLOGY

Engineering Geological Seminar			
Compulsory course (2CP):			
651-4068-00	Engineering Geological Seminar	FS	2CP

The Engineering Geology Seminar (fourth semester) is compulsory for students majoring in Engineering Geology. The seminar consists of lectures given by all the students and by external guest scientists. The lectures given by the students refer to preliminary results of their MSc Project.

In this seminar students learn to work with scientific literature and to approach problems from a scientific point of view. In addition students learn to plan a longer term project and to present and discuss scientific results. The attendance is thus a part of the master proposal and the thesis itself. Furthermore the seminar gives an in-depth knowledge into a few selected research topics in engineering geology.

Detailed information on the seminar is online, refer to:

http://www.erdw.ethz.ch/education/master/MasterEarthScience/major_engineering_geology

It is recommended that students majoring in Engineering Geology use their elective credits to take many or all of the recommended courses listed below. The final selection can be made through the study plan and approved by the MSc Committee.

Recommended Course List in Engineering Geology			
Recommended courses:			
651-4018-00	Borehole Geophysics	FS ¹	3CP
102-0448-00	Groundwater II	FS	6CP
651-4901-00	Quaternary Dating Methods	HS ²	3CP
651-4902-00	Quaternary Geology and Geomorphology of the Alps	FS	3CP
651-4078-00	Clay Mineralogy	FS ²	3CP
651-4031-00	Geographic Information Systems	HS ²	3CP
651-4027-00	Groundwater Chemistry	HS	2CP
651-4007-00	Continuum Mechanics	HS ¹	3CP
651-4003-00	Numerical Modelling of Rock Deformation	HS	3CP
651-4041-00	Sedimentology I: physical processes and sedimentary systems	HS ¹	3CP
651-4022-00	Structural Geology (with 4 day field course)	FS ¹	3CP
651-4132-00	Field Course IV (non-alpine)	FS*	3CP
651-4080-00	Fluvial Sedimentology	FS	2CP
651-4097-00	Applied Mineralogy and Non-Metallic Resources I	HS	3CP
651-4026-00	Applied Mineralogy and Non-Metallic Resources II	FS	3CP
651-4021-00	Engineering Seismology	HS	3CP
651-4109-00	Geothermics	HS	3CP
101-0317-00	Tunnelling I	HS	3CP
101-0326-00	Tunnelling II	FS	3CP
101-0307-00	Design & Construction in Geotechnical Engineering	HS	3CP
	4 CAS Short Courses in Applied Earth Sciences (3CP each)	HS/FS	12CP

* Takes place in the semester break of spring semester

4.5 MAJOR IN GEOPHYSICS

The Major in Geophysics is devoted to study of the 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?

Students learn to integrate geophysical field observations at the earth’s surface with the modelling of physical processes and material properties within our planet. 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.

4.5.1 COMPULSORY GEOPHYSICS MODULES

Two modules are mandatory and provide students with the necessary technical tools to study all branches of Geophysics. 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.

Geophysical Methods I			
Compulsory courses (12 CP):			
651-4005-00	Geophysical Data Processing	HS ¹	3CP
651-4241-01	Numerical Modelling I and II: Theory and Applications	HS	6CP
651-4096-00	Inverse Theory for Applied Geophysics	FS ²	3CP

Geophysical Methods II			
Compulsory courses (12 CP):			
651-4001-00	Geophysical Fluid Dynamics	HS ²	3CP
651-4007-00	Continuum Mechanics	HS	3CP
651-4130-00	Mathematical Methods of Geophysics	HS	3CP
651-4013-00	Potential Field Theory	HS	3CP

4.5.2 CHOICE OF MODULES FROM GEOPHYSICS OFFERINGS

A choice of two additional modules from within the Geophysics offerings allows students to delve more deeply into one of the main areas of Geophysics.

Seismology			
Compulsory courses (12 CP):			
651-4006-00	Seismology of the Spherical Earth	FS	3CP
651-4019-00	Wave Propagation	HS	3CP
651-4015-00	Seismotectonics	HS ²	3CP
651-4021-00	Engineering Seismology	HS	3CP

Physics of the Earth's Interior			
Compulsory courses (12 CP):			
651-4017-00	Earth's Core and the Geodynamo	FS	3CP
651-4008-00	Dynamics of the Mantle and Lithosphere	FS	3CP
651-4010-00	Planetary Physics and Chemistry	FS	3CP
651-3440-00	Geomagnetism	FS ¹	3CP

Applied Geophysics			
Compulsory courses (10 CP):			
651-4087-00	Case Studies in Engineering and Environmental Geophysics	FS ¹	4CP
651-4079-00	Reflection Seismology Processing	FS	6CP
Courses of choice (minimum of 2 CP):			
	Free Electives	HS/FS	2CP

4.6 OPEN MODULES FOR ALL MAJORS

Basin Analysis			
Compulsory courses (6 CP):			
651-4231-00	Basin Analysis	HS ²	3CP
<i>NEW COURSE</i>	Facies Analysis and Basin Architecture ^{NEW}	FS	3CP
Courses of choice (minimum of 6 CP):			
651-4243-00	Seismic Stratigraphy and Facies (Block Course)	HS	2CP
651-4134-01	Tectonic Geomorphology with Field Course	FS ²	4CP
651-4002-00	Stratigraphy and Time	FS ¹	3CP
651-4018-00	Borehole Geophysics	FS ¹	3CP
651-4048-00	Provenance Analysis	FS ²	3CP
651-4232-00	Low-Temperature Thermochrometry	FS ¹	3CP

Quaternary Geology and Geomorphology			
Courses of choice (minimum of 12 CP):			
651-4901-00	Quaternary Dating Methods	HS ²	3CP
651-4902-00	Quaternary Geology and Geomorphology of the Alps	FS	3CP
651-4134-01	Tectonic Geomorphology with Field Course	FS ²	4CP
651-4077-00	Glacial and Periglacial Geomorphodynamics in High-Mountain Regions (UZH)	HS ¹	2CP
651-1513-00	Geomorphology: Preparation to Field Course "Alps" (UZH)	FS	2CP
651-1513-01	Geomorphology: Field Course "Alps" (UZH)	FS	4CP

Geomagnetics			
Compulsory courses (9 CP):			
651-4105-00	Paleomagnetism	FS	3CP
651-4107-00	Rock and Environmental Magnetism	HS	3CP
651-3440-02	Geomagnetism	FS ¹	3CP
Courses of choice (minimum of 3 CP):			
	Free Electives	HS/FS	3CP

^{NEW} New course please refer to the course catalogue for further information <http://www.vvz.ethz.ch>

Shallow Earth Geophysics			
Compulsory courses (13 CP):			
651-4018-00	Borehole Geophysics	FS ¹	3CP
651-4104-00	Geophysical Fieldwork and Processing: Methods	FS ¹	2CP
651-4106-03	Geophysical Field Work and Processing: Fieldwork	FS ²	5CP
651-4109-00	Geothermics	HS ¹	3CP

Lithosphere structure and tectonics			
Compulsory courses (12 CP):			
651-4012-00	Crustal Seismology	FS ¹	3CP
651-4096-00	Inverse Theory for Applied Geophysics	FS ²	3CP
651-4014-00	Seismic Tomography	HS	3CP
651-3521-00	Tectonics	HS	3CP

Earthquake Seismology			
Compulsory courses (9 CP):			
651-4021-00	Engineering Seismology	HS	3CP
651-4103-00	Earthquakes Source Physics	HS ²	3CP
651-4016-00	Gravimetry and Geophysical Geodesy	FS ¹	3CP
Courses of choice (minimum of 3 CP):			
	Free Electives	HS/FS	3CP

Glaciology & Geomorphodynamics			
Compulsory courses (6 CP):			
101-0288-00	Schnee, Lawinen und Schutzkonzepte	FS	3CP
651-4073-00	Gletscher und Permafrost (UZH)	HS	3CP
Courses of choice (minimum of 6 CP):			
651-4077-00	Glacial and Periglacial Geomorphodynamics in High-Mountain Regions (UZH)	HS ¹	2CP
651-1506-00	Gletscher im Umweltkontext	FS	3CP
651-4090-00	Quantification and Modelling of Spatial Processes in High-Mountain Areas	FS	3CP
651-1513-00	Geomorphology: Preparation to Field Course "Alps" (UZH)	FS	2CP
651-1513-01	Geomorphology: Field Course "Alps" (UZH)	FS	4CP

Module Remote Sensing			
Compulsory courses (9 CP):			
651-2330-00	Remote Sensing I (UZH)	FS	3CP
651-4259-00	Remote Sensing I: Exercices (UZH)	HS	6CP
Courses of choice (minimum of 3 CP):			
651-4263-00	Remote Sensing III: Deepening in Remote Sensing (UZH)	HS	6CP

Module Geographic Information Systems			
Compulsory courses (6 CP):			
651-4267-00	Vertiefung Geographische Informationswissenschaft mit Übungen (UZH)	HS	6CP
Courses of choice (minimum of 6 CP):			
651-2351-00	Räumliche Datenbanken GIScience A (UZH)	HS	6CP
651-2352-00	Räumliche Algorithmen GIScience B (UZH)	FS	6CP
651-2353-00	Geographic Information Science Seminar GIScience C (UZH)	HS	6CP
651-2354-00	Geovisualisation (UZH)	FS	6CP

Module Palaeontology			
Compulsory courses (8 CP):			
651-4058-00	Paleobotany (UZH)	HS	3CP
651-4054-00	Micropaleontology (Block Course)	FS ²	3CP
651-3421-00	Biochronology and Diversity (UZH)	HS	2CP
Courses of choice (4 CP):			
651-1380-00	Paläontologische Exkursionen (UZH)	HS	1CP
651-4251-00	Demonstrationen zur Osteologie (UZH)	HS	2CP
651-1322-00	Paläobiologie und Evolution der Gliedertiere (UZH)	FS	1CP
651-1322-01	Paläobiologie und Evolution der Kopffüsser (UZH)	FS	1CP
651-1322-02	Paläobiologie und Evolution der Stachelhäuter (UZH)	FS	1CP

5 SPECIALIZED MASTER IN ATMOSPHERIC AND CLIMATE SCIENCE (90 ECTS)

For detailed, on-line information about the Master's program in Atmospheric and Climate Science please refer to <http://www.iac.ethz.ch/education/master>

The Master's Program in Atmospheric and Climate Science leads to understanding of atmospheric processes and their interactions in space and time - from the molecular scale to the global scale and from short episodes to changes which require millions of years. Students acquire quantitative knowledge of atmospheric dynamics and physical / chemical exchange processes and cycles; they learn how to predict the evolution of the atmospheric flow from weather to climate time scales and how to interpret the uncertainty associated with these predictions.

Prerequisites for studies in this area are a solid background in mathematics, physics and chemistry. The Master in Atmospheric and Climate Science offers an optional exchange program with the University of Bern (one day per week), which offers a wide variety of courses ranging from oceanography and paleoclimatology to climate economics.

5.1 COMPULSORY INTRODUCTORY COURSE

The Master in Atmospheric and Climate Science entails a total of 90CP. The students begin their studies during an introductory course prior to the start of the semester together with lecturers and staff of the institute as well as with students in the corresponding program of the University of Bern.

Introductory course			
Compulsory Course			
701-1213-00	Introduction Course to Master Studies Atmospheric and Climate	HS	2CP

During the first two semesters the students attend a choice of modules (24CP) and elective courses (20CP). The students select three of five available modules and complete a minimum of six credits in each module, selected from a list of courses. The number of credit points in the three modules must total 24 CP. The five modules are structured as follows:

5.2 MODULE COURSES

Weather Systems and Atmospheric Dynamics			
Courses of choice (minimum of 6CP):			
701-1221-00	Dynamics of Large-scale Atmospheric Flow	HS	4CP
651-4053-01	Boundary Layer Meteorology and Air Pollution Modelling: Part I	HS	2CP
651-4053-03	Boundary Layer Meteorology and Air Pollution Modelling: Part II	FS	2CP
701-1224-00	Mesoscale Atmospheric Systems – Observation and Modelling	FS	2CP
701-1216-00	Numerical Modelling of Weather and Climate	FS	4CP
701-1226-00	Inter-annual Phenomena and their Prediction	FS	2CP
701-1228-00	Cloud Dynamics	FS	3CP

The module “Weather systems and atmospheric dynamics” encompasses the description and understanding of the fundamental processes that govern atmospheric motion on a wide range of scales (meso, synoptic, planetary). They form the basis of predicting and diagnosing weather and the longer-term climate evolution.

Calculations and predictions of climate and weather are based on our theoretical and experimental understanding of the processes. Atmospheric flow exerts a pronounced influence upon the distribution of the atmosphere’s constituents (including climate-sensitive trace gases and pollution levels in the boundary layer).

Climate Processes and Feedbacks			
Courses of choice (minimum of 6CP):			
701-1235-00	Cloud Microphysics	HS	4CP
701-1251-00	Land-Climate Interactions	HS	3CP
701-1216-00	Numerical Modelling of Weather and Climate	FS	4CP
701-1232-00	Radiation and Climate Change	FS	3CP
701-1252-00	Climate Change Uncertainty and Risk: From Probabilistic Forecasts to Economics of Climate Adaptation	FS	3CP
701-1255-00	Climate Dynamics	HS	3CP

The primary goal of this module is to understand the climate system with special focus on the atmosphere. Lectures will cover the basic physical processes of the atmosphere (thermodynamics, aerosol and cloud physics, radiation and dynamics). Application and analysis of certain aspects will be possible in the accompanying tutorials. Moreover, an overview of numerical methods that are used in weather and climate models with practical applications will be taught.

Atmospheric Composition and Cycles			
Courses of choice (minimum of 6CP):			
102-0635-00	Luftreinigung I	HS	3CP
402-0572-00	Aerosols I: Physical and Chemical Principles	HS	4CP
701-1233-00	Stratospheric Chemistry	HS	4CP
701-1317-00	Global Biogeochemical Cycles and Climate	HS	3CP
651-4053-01	Boundary Layer Meteorology and Air Pollution Modelling: Part I	HS	2CP
651-4053-03	Boundary Layer Meteorology and Air Pollution Modelling: Part II	FS	2CP
701-1234-00	Tropospheric Chemistry	FS	3CP
701-1238-00	Advanced Field and Lab Studies in Atmospheric Chemistry and Climate	FS	3CP

Knowledge of atmospheric composition and chemistry is fundamental to understanding air quality, atmospheric oxidation capacity and climate. This module can be optimally combined with several of the other modules.

Climate History and Paleoclimatology			
Courses of choice (minimum of 6CP):			
701-1317-00	Global Biogeochemical Cycles and Climate	HS	3CP
651-4057-00	Climate History and Paleoclimatology	HS	3CP
651-4049-00	Advanced Geochemistry	HS	3CP
651-4043-00	Sedimentology II: Biological and Chemical Processes in Lacustrine and Marine Systems	HS ²	3CP
651-4002-00	Stratigraphy and Time	FS	3CP
651-4004-00	Organic Geochemistry and Biogeochemical Cycles	FS	3CP

The module climate history and palaeoclimatology adds a historical dimension to the Master's program. The courses Climate History and Paleoclimatology and Climate History and Paleoclimatology are mandatory for this module.

The module introduces methods and approaches in paleoclimatology. The students will have an understanding of the evolution of climate and its major forcing factors through geological time. They will be familiar with the use of most common geochemical climate "proxies" and be able to evaluate the quality of marine and terrestrial sedimentary paleoclimate archives.

Hydrology and Water Cycle			
Courses of choice (minimum of 6CP):			
701-1251-00	Land-Climate Interactions	HS	3CP
701-1250-00	Hydrological Processes and Modelling	FS	3CP
651-4023-00	Groundwater I	HS	3CP
102-0287-00	Fluvial Systems	HS	3CP
102-0237-00	Hydrology II	HS	3CP

Atmospheric processes of weather and climate are intimately related to the hydrological cycle and land-surface processes. The interaction between atmosphere and the terrestrial hydrological system is two-way. Precipitation and evaporation drive the terrestrial hydrological system with important implications for ecosystems and our economy (e.g. floods and droughts). On the other hand, land-surface processes affect the overlying atmosphere and thereby the climate system. This module provides an introduction to hydrological sciences, with particular attention to the weather/climate/land-surface link.

5.3 ELECTIVE COURSES

Elective Courses (20CP)			
Choice of appropriate courses to increase the comprehensiveness of the modules			
	Elective Courses		20CP

The students are free to choose any courses offered at the ETH (except certain language courses, see regulations of ETH rectorate) to deepen or expand the content. Some optional courses covering the same field can be combined to acquire a Minor with 10 credits. After consultation with the student advisor courses from other programs or universities can also be attended.

5.4 LABORATORY AND FIELD WORK

Laboratory- and Field Work			
Courses of choice (minimum of 5CP):			
701-1260-0	Climatological and Hydrological Field Work	FS	2.5CP
701-1262-0	Atmospheric Chemistry Lab Work	FS	2.5CP
701-1264-0	Atmospheric Physics Lab Work	FS	2.5CP
701-1266-0	Weather Discussion	FS	2.5CP

Several practical courses are offered. Some of these courses are block courses (typically field work) in the first weeks of the summer semester break, others will be carried out within the summer term parallel to other courses.

5.5 PREPARATION FOR THE MASTER'S THESIS

Master Seminar Atmosphere and Climate			
Compulsory Courses (6CP)			
701-1211-01	Master Seminar: Atmosphere and Climate 1	HS/FS	3CP
701-1211-02	Master Seminar: Atmosphere and Climate 2	HS/FS	3CP

Preparations for the MSc Thesis will be started in the Master's seminar offered in the second semester. At this time the students will participate in exercises to develop writing skills, train oral presentation techniques and promote team-work.

Colloquium Atmosphere and Climate			
Compulsory Courses (3CP):			
651-4095-01	Colloquium Atmosphere und Climate 1	HS/FS	1CP
651-4095-02	Colloquium Atmosphere und Climate 2	HS/FS	1CP
651-4095-03	Colloquium Atmosphere und Climate 3	HS/FS	1CP

The Seminar and Colloquium in Atmosphere and Climate will encourage the continued integration of the students into a research group and the institute.

MSc Thesis			
Compulsory Course			
651-4275-00	Master's Thesis	HS	30CP

6 JOINT MASTER IN APPLIED GEOPHYSICS (120 ECTS)

The Master of Applied Geophysics is an integrated college study in association with the IDEA League. This MSc program provides students with mobility between the ETH, Zurich, the TU in Delft and the RWTH in Aachen. It consists of 120CP. The students will attend classes on all three university campuses prior to choosing their MSc research theme. The MSc Thesis will be completed at one of the participating universities or another approved laboratory. Many of the ETH courses will be offered together with the Earth Science MSc., Major in Geophysics. It is not possible to transfer from one of these geophysics study programs to the other.

The goal of this inter-university Master's program is to provide students with a comprehensive education in all areas of applied geophysics. The graduates extend their practical knowledge in the area of natural resource exploration and extraction or develop a sound background in their respective field. More details of this program are documented in a separate guide <http://www.idealeague.org/geophysics>.

6.1 TIME SCHEDULE OF THE PROGRAM MSC IN APPLIED GEOPHYSICS

The following listing gives an approximate overview of the program. Please refer to the program's webpage for all important dates:

<http://www.idealeague.org/geophysics/education/schedule>

Year 1	
September – January	TU Delft
February – June	ETH Zürich
July – September	Summer break
Year 2	
October – February	RWTH Aachen
March – August	MSc Project

6.2 COURSES FOR THE JOINT MASTER'S DEGREE IN APPLIED GEOPHYSICS

The joint Masters in Applied Geophysics comprises a significant number of core courses, a selection of specialized courses and a final research-oriented thesis project. The core courses provide the students with fundamental information essential for practicing applied geophysics. Basic processes and important state-of-the-art technologies are taught. Independent thinking and integration of concepts and information are demanded of the students. A key element of the curriculum is a period of field work during which the students design and execute a program of geophysical investigation aimed at resolving actual engineering, environmental or archaeological problems; a broad spectrum of geophysical techniques are available for the investigations. After the field campaign, the students are responsible for the processing and interpretation of the acquired data and for reporting the results of their studies. The specialized courses reflect the research interests of the participating applied geophysics groups. They prepare the students for choosing a thesis research area that best suits their interests, knowledge, skills and experience.

The program comprises 30CP from each university and 30CP for the MSc Project.

A complete description of the courses of the Joint Master program and optional electives can be found on <http://www.idealeague.org/geophysics/education/contents> and in the individual course catalogue and study guides of the partner universities:

TUD: <http://www.studiegids.tudelft.nl>

ETH: <http://www.erdw.ethz.ch/education/master>, <http://www.vvz.ethz.ch>

RWTH: <http://www.campus.rwth-aachen.de>

6.2.1 FIRST YEAR AT TU DELFT AND ETH ZURICH

TU Delft (TUD)		
Core Courses (16CP) 3 out of 4 core courses must be passed		
	Sedimentary Systems	3CP
	Geologic Interpretations of Seismic Data	3CP
	Electromagnetic Methods	4CP
	Advanced Reflection Seismology and Seismic Imaging	6CP
Elective Courses (18CP)		
	Convergence Courses ⁱ	6CP
	Computer (Matlab) Course	3CP
	Geophysical Special Subjects	6CP
	Petrophysics Special Subjects	3CP

ETH Zurich (ETH)		
Core Courses (21CP) 2 out of 3 core courses must be passed		
651-4079-00	Reflection Seismology Processing	6CP
651-4094-00	Modelling for Applied Geophysics	6CP
651-4096-00	Inversion for Applied Geophysicists	
651-4106-01	Geophysical Field Work & Processing Lecture	9CP
651-4106-02	Geophysical Field Work & Processing Field Course	
Elective Courses (14CP)		
651-4087-00	Case Studies in Engineering and Environmental Geophysics	4CP
102-0448-00	Groundwater II	6CP
651-4099-00	Soil Mechanics for Geophysics	4CP

ⁱ A maximum of 6CP can be counted towards the Convergence Courses

6.2.2 SECOND YEAR AT RWTH AACHEN

RWTH Aachen (RWTH)		
Core Courses (21CP) 4 out of 5 core courses must be passed		
	Geophysics Special Methods: NMR	3CP
	Geophysics Special Methods: Spectral IP	3CP
	Geophysical Logging and Log Interpretation	4CP
	Petroleum System Modelling	6CP
	Geothermics	5CP
Elective Courses (12CP)		
	Hydrogeophysics	3CP
	Data Analysis in Geosciences	3CP
	Mineral Exploration	3CP
	Engineering Geophysics	3CP

6.2.3 MSc PROJECT AT TUD, ETH OR RWTH

The final MSc Theses are the result of approximately eight months' of research, report writing, presentation and examination. There is sufficient time for students to make significant contributions to their topics. Many of the theses involve the integration of theory with data derived from field observations, field tests or laboratory work. The academic quality is guaranteed by integrating the theses into the research activities of (a) one of the partner universities or (b) a suitable industrial, governmental or other university laboratory.

TUD, ETH or RWTH (2nd year)		
Compulsory Courses (30CP)		
	Introduction to Potential MSc Thesis Topics	0CP
	MSc Thesis	29CP
	Colloquium	1CP

7 BEYOND THE MASTER'S DEGREE – CONTINUING EDUCATION

7.1 TEACHING CERTIFICATE FOR GEOGRAPHY (60CP)

The ETH offers the opportunity to obtain a teaching certificate (Lehrdiplom) for geography through didactic continuing education <http://www.didaktischeausbildung.ethz.ch>. This provides an alternative career opportunity for students of Earth or Atmospheric Science and can be completed with minimal additional course requirements beyond the master's degree. This additional study can commence once the Bachelor's degree has been completed.

7.1.1 REQUIREMENTS FOR EARTH SCIENCE STUDENTS FROM ETH

Starting 2012 the following requirements in Geographyⁱ are compulsory for students with:

- MSc in Earth Sciences from the ETH Zurich, or
- Specialized Master's study in Atmospheric and Climate Science from the ETH Zurich with a BSc in Earth Sciences

Courses in Geography (24CP)			
Compulsory Courses (18KP)			
651-2601-00	Humangeografie I, Teil 1	HS	3CP
651-2612-00	Humangeografie II	FS	6CP
651-2600-01	Geografie der Schweiz / Einführung in die Raumplanung	FS	3CP
651-4121-00	Grundzüge Kartografie und Visualisierung	HS	3CP
651-2330-00	Grundzüge Fernerkundung I	FS	3CP
Courses of choice (minimum of 6CP)			
651-4088-02	Physische Geografie II	FS	6CP
651-4088-03	Physische Geografie III	HS	6CP
651-4088-04	Physische Geografie IV	FS	6CP
651-2613-00	Humangeografie III	HS	6CP
651-2614-00	Humangeografie IV – Politische Geografie	FS	6CP

ⁱ Completion of the requirements in geography (24CP) during the MSc studies is possible with prior approval from the subject advisor of the chosen major.

7.1.2 REQUIREMENTS FOR GEOGRAPHY STUDENTS FROM UZH

The following requirements are compulsory for students with a MSc degree in Geography from the University of Zurich.

Courses in Earth Science (28CP)			
Compulsory Courses (28KP)			
651-3001-00	Dynamische Erde I	HS	6CP
651-3002-00	Dynamische Erde II	FS	5CP
651-3078-00	Geologie der Schweiz	FS	2CP
651-3002-00	Geologische Exkursionen zu Dynamische Erde	FS	2CP
651-3982-00	Geologischer Feldkurs I	FS	2CP
651-3323-00	Erd- und Klimageschichte	HS	3CP
651-3321-00	Erdwissenschaftliches Kartenpraktikum I	HS	2CP
651-3505-00	Rohstoffe der Erde	HS	3CP
651-4031-00	Geographic Information Systems or equivalent	HS	3CP

7.1.3 REQUIREMENTS FOR STUDENTS FROM OTHER BACKGROUNDS

For students with a Master's degree in another field or from another institution, it is possible to obtain a teaching certification provided the educational background is directly comparable to the Earth Science or Geography degrees of the ETH or University of Zurich. Students must show that they have completed the equivalent of 120 ECTS including the following courses or their equivalent.

Fundamental Courses in Natural Sciences			
Compulsory Courses (15KP)			
401-0253-00	Mathematik I: Analysis	HS	6CP
402-0062-00	Physik I	FS	5CP
529-2001-02	Chemie I	HS	4CP

Fundamental Courses in Earth Science			
Compulsory Courses (24KP)			
651-3001-00	Dynamische Erde I mit Übungen	HS	6CP
651-3002-00	Dynamische Erde II	FS	5CP
651-3002-01	Geologische Exkursionen zu Dynamische Erde	FS	2CP
651-3078-00	Geologie der Schweiz	FS	2CP
651-3482-00	Geologischer Feldkurs I	FS	2CP
651-3323-00	Erd- und Klimageschichte	HS	2CP
651-3321-00	Erdwissenschaftliches Kartenpraktikum I	HS	2CP
651-3505-00	Rohstoffe der Erde	HS	3CP

Courses of choice (minimum of 36CP)			
701-0023-00	Atmosphäre	HS	3CP
701-0401-00	Hydrosphäre	HS	3CP
651-3341-00	Lithosphäre	HS	3CP
701-0501-00	Pedosphäre	HS	3CP
651-3620-00	Geologie der Alpen	FS	3CP
651-3521-00	Tectonics	HS	3CP
651-3422-00	Strukturgeologie	FS	3CP
651-3424-00	Sedimentologie	FS	3CP
651-3402-00	Magmatismus und Vulkane	FS	4CP
651-3301-00	Kristalle und Mineralien	HS	3CP
651-3523-00	Hydrogeologie und Quartärgeologie	HS	3CP
651-3420-00	Paleontology and Biostratigraphy	FS	3CP
701-0412-00	Klimasysteme	FS	3CP
651-3527-00	Erdwissenschaftliches Kartenpraktikum II	HS	2CP

Fundamental Courses in Physical Geography (18CP)			
Compulsory Courses (12CP)			
651-4088-01	Physische Geografie I (UZH)	HS	6CP
651-4088-02	Physische Geografie II (UZH)	FS	6CP
Courses of choice (minimum of 6CP)			
651-4088-03	Physische Geografie III (UZH)	HS	6CP
651-4088-04	Physische Geografie IV (UZH)	FS	6CP

Fundamental Courses in Human Geography (18CP)			
Compulsory Courses (12CP)			
651-2601-00	Humangeografie I, Teil 1 (UZH)	HS	3CP
651-2612-00	Humangeografie II (UZH)	FS	6CP
651-2600-01	Geografie der Schweiz und Raumplanung (UZH)	FS	3CP
Courses of choice (minimum of 6CP)			
651-2613-00	Humangeografie III (UZH)	HS	6CP
651-2614-00	Humangeografie IV – Politische Geografie (UZH)	FS	6CP

Fundamental Courses in Remote Sensing and GIS (9CP)			
Compulsory Courses (9CP)			
651-4121-00	Grundzüge Kartografie und Visualisierung (UZH)	HS	3CP
651-2330-00	Grundzüge Fernerkundung I (UZH)	FS	3CP
651-4031-00	Geographic Information Systems ⁱ	HS	3CP

7.1.4 STRUCTURE OF THE PROGRAM

The following courses are required for the teaching certification. Instruction courses listed here may be taken during the MSc studies, provided other required courses are within 12CP of completion.

Erziehungswissenschaften			
Compulsory Courses (15CP)			
851-0240-00	Menschliches Lernen	HS	4CP
851-0242-00	Empirische Arbeit zur Lehr- und Lernforschung	FS	3CP
851-0240-01	Die Gestaltung schulischer Lernumgebungen	FS	4CP
851-0238-00	Aktuelle Ergebnisse aus der Lehr- und Lernforschung mit forschungsmethodischem Schwerpunkt		4CP

Fachdidaktische Ausbildung			
Compulsory Courses (12CP)			
651-4239-00	Fachdidaktik I: Spezielle Didaktik des Geographieunterrichts I	HS	3CP
651-2500-00	Fachdidaktik II: Spezielle Didaktik des Geographieunterrichts II	FS	3CP
651-4118-00	Fachdidaktik III: Spezielle Didaktik des Geographieunterrichts III	FS	3CP
651-4120-00	Fachdidaktik IV: Spezielle Didaktik des Geographieunterrichts IV	FS	2CP
651-4124-00	Prüfung Fachdidaktik	FS/HS	1CP

Berufspraktische Ausbildung			
Compulsory Courses (15CP)			
651-2519-00	Einführungspraktikum Geographie	HS	3CP
651-4137-00	Berufspraktische Übungen: Portfolio zum Unterrichtspraktikum		2CP
651-2517-00	Unterrichtspraktikum Geographie	FS/HS	8CP
651-2520-00	Prüfungslektionen Geographie	FS/HS	2CP

ⁱ Equivalent course is also offered by University Zurich

Fachwissenschaftliche Vertiefung			
Compulsory Courses (12CP)			
651-4138-00	Fachwissenschaftliche Vertiefung I: Regionale Geographie	FS	3CP
651-4136-00	Fachwissenschaftliche Vertiefung II: Fachwissenschaft und Ausserschulische Lernorte	FS	3CP
651-4237-01	Fachwissenschaftliche Vertiefung III mit pädagogischem Fokus Geographie: <i>Ringvorlesung</i> : Aktuelle Themen aus der Fachwissenschaft für die geographische Allgemeinbildung	HS	3CP
651-4237-02	Fachwissenschaftliche Vertiefung III mit pädagogischem Fokus Geographie: <i>Fachdidaktik-Seminar</i> : Von der Fachwissenschaft zur geographischen Allgemeinbildung	HS	3CP

Elective Courses			
Courses of choice (6CP)			
	Courses from the complete offerings of the IGB as well as subject related courses, see http://www.igb.uzh.ch for further information	HS/FS	6CP

7.2 CERTIFICATE OF ADVANCED STUDIES IN APPLIED EARTH SCIENCES

The Department of Earth Sciences offers as a part of the Certificate of Advanced Studies (CAS) Continuing Education Program two short courses each year in Applied Earth Sciences (ZLG, former NDK). These multidisciplinary short courses are offered within the framework of “Current problems from applied earth sciences”. The courses address a wide range of topics such as geology for tunnel construction, implementation of isotopic methods in environmental and engineering geology, remote sensing, geothermal mining, remediation of contaminated sites, risk assessment and mitigation measures for natural hazards. The courses are designed for an interdisciplinary audience (engineering geologists, hydrogeologists, geotechnical engineers, other earth scientists and postgraduates) with broad interest in applied earth sciences and environmental issues.

Any short course can be taken singularly or be combined with others to form an individual module of 4 short courses each followed by an examination. When passed, the module awards the Certificate of Advanced Studies (CAS) ETH in Applied Earth Sciences (12 CP).

Further information can be found at <http://www.zlg.ethz.ch>. Information about all continuing education possibilities at all Swiss universities may be found at <http://www.swissuni.ch>.

7.3 DOCTORAL STUDIES (PHD)

The doctoral study provides the individual with the opportunity to pursue an active and, for the most part, independent project on the research edge of scientific knowledge in the Earth Sciences. The doctoral degree is the preliminary step for an academic career or a research position in industry or the public sector. The formal prerequisite for initiating a doctoral study is a diploma, Master's or equivalent college degree which includes an independent project equal to the MSc Thesis. To enter the doctoral program the thematic basis of the MSc is of secondary importance. Doctoral students in Earth Sciences are frequently, chemists, physicists or even mathematicians. The candidate's eligibility for one or more departmental research groups is the crucial factor which determines admittance to the doctoral program. In order to determine the eligibility of the candidate for the doctoral program a qualifying examination may be required, depending on the professional qualifications of the candidate.

Usually the doctoral students are hired for 3 to 4 years as assistants, funded from research grants from government, industry or the ETH. Prospective doctoral students may participate in the writing of a research proposal during their Master's degree by collaboration with a potential doctoral advisor, thereby participating in the project definition. More frequently, however, project positions are advertised internationally and candidates selected from the international talent pool. All doctoral students contribute to teaching or to the administration of the departmental laboratory infrastructures.

Formal ordinances concerning the doctoral are given by the ETH rules of procedure at: <http://www.doktorat.ethz.ch>.

8 FURTHER INFORMATION

The following are sources of information concerning the general study program and study planning at the ETH Zurich:

E-mail: the students receive a personal Email address following admission to the study program. The rectorate, department and lecturers communicate most of their important information over this Email address and not in printed form. For this reason, the address should be checked regularly. The students also should use Email for questions, announcements, information and communication.

The ETH Zurich course catalogue (<http://www.vvz.ethz.ch>) and webpage of the ETH Zurich (<http://www.ethz.ch>) provide comprehensive information about the study structure and procedures as well as an updated course catalogue which can be accessed online. Furthermore, the contents and goals of specific lectures, exercises, and laboratory courses may be accessed.

The homepage of D-ERDW (<http://www.erdw.ethz.ch>) contains the following information: Notification of appointments and reprieves, examination information, regulations, an event calendar about colloquia and excursions, as well as, other general information.

8.1 WHO TO CONTACT FOR ADVICE

8.1.1 STUDY ADMINISTRATION AND STUDY PROGRAM COORDINATION

Questions concerning administration, petitions to the director of studies, announcements and permission for the examinations, grade administration as well as petitions to postpone military duty must be made in conjunction with the Student Administration Office:

Sigrid Trindler, sigrid.trindler@erdw.ethz.ch, office hours Mon - Thu 1.30pm – 4pm,
(limited opening hours during the semester
break: appointment required)

For information and individual guidance concerning all matters which pertain to the study program contact (appointment required):

Study Program Coordination

Karin Mellini, Department of Earth Sciences, karin.mellini@erdw.ethz.ch

Director of Studies:

Prof. Dr. Sean Willett, Geological Institute, swillett@erdw.ethz.ch

For further information and individual guidance concerning all matters which pertain to the department contact (appointment required):

Department Chair:

Prof. Dr. Gerald Haug, Geological Institute, gerald.haug@erdw.ethz.ch

Department Coordinator:

Christoph Schneble, Department of Earth Sciences, Christophe.schneble@erdw.ethz.ch

8.1.2 MSc COMMITTEE AND STUDENT ADVISORS

The MSc Committee consists of the director of studies and the study coordinator along with the subject advisors of the four majors from the MSc in Earth Science program. The MSc Committee is responsible for the evaluation of applications of foreign students, approval of the individual study plan as well as for study-related questions.

For information about various courses of study which may be accessed during the Master's Studies, advice about recommended subject combinations, planning during the studies etc. please contact the subject advisors.

Major in Geology

Prof. Dr. W. Winkler, Geological Institute, wilfried.winkler@erdw.ethz.ch

Major in Mineralogy & Geochemistry

Dr. T. Driesner, Institute of Geochemistry and Petrology, driesner@erdw.ethz.ch

Major in Geophysics

Prof. Dr. E. Kissling, Institute for Geophysics, kissling@tomo.ig.erdw.ethz.ch

Major in Engineering Geology

Prof. Dr. S. Löw, Geological Institute, simon.loew@erdw.ethz.ch

Dr. B. Oddsson, Geological Institute, bjoern.oddsson@erdw.ethz.ch

Joint Master in Applied Geophysics (IDEA League)

Prof. Dr. H. Maurer, Institute for Geophysics, maurer@aug.ig.erdw.ethz.ch

Specialized Master in Atmospheric and Climate Science

Dr. Erich Fischer, Institute for Atmospheric and Climate Science, erich.fischer@env.ethz.ch

Student advisor

Guidance about issues which specifically pertain to women is available from:

Dr. G. Bernasconi-Green, Institute of Geochemistry and Petrology,

bernasconi-green@erdw.ethz.ch

Mobility Advisor

Dr. E. Reusser, Institute of Geochemistry and Petrology, reusser@erdw.ethz.ch

8.1.3 FURTHER ORGANIZATIONS

Organisation for students of Earth Sciences (Erfa)

Erfa <http://www.erfa.ethz.ch>

The association for Earth Science (erfa) organizes student events and has a representative who addresses student's concerns to the Instruction Commission, Proficiency Grade Conference, and Departmental Conference.

Further information and useful links:

Student Advice and Coaching: <http://www.soc.ethz.ch>

Psychological Counselling Center <http://www.pbs.uzh.ch>

Foundation kihz http://www.kihz.ethz.ch/index_EN

Military service and studying: http://www.rektorat.ethz.ch/students/advice/military/index_EN
Simple duty postponement will be signed by the study secretary

Legal advice http://www.rektorat.ethz.ch/students/advice/legal/index_EN

ETH-Alumni <http://www.alumni.ethz.ch/>

9 GLOSSARY

CP	Credit Point (=ECTS)
CAS	Certificate of Advanced Studies
D-ERDW	Department of Earth Sciences
ECTS	European Credit Transfer System
ETH	Swiss Federal Institute of Technology
FS	Spring semester
FS ¹	First half of spring semester
FS ²	Second half of spring semester
GESS	Humanities, Social and Political Sciences
HS	Fall semester
HS ¹	First half of fall semester
HS ²	Second half of fall semester
IDEA League	Network of five leading universities of technology and science
RWTH	RWTH Aachen University
TUD	Technical University Delft
UZH	University Zurich
VVZ	Course catalogue of ETH