

UNIVERSITÉ DE FRIBOURG SUISSE
FACULTÉ DES SCIENCES

UNIVERSITÄT FREIBURG SCHWEIZ
MATHEMATISCH-NATURWISSENSCHAFTLICHE FAKULTÄT

Curriculum for the obtention of the Degree of

**Master of Science
in Earth Sciences**

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1 General Remarks

This curriculum describes all the regulations concerning the course of studies in Earth Sciences at the University of Fribourg. It is based on the regulations of the Faculty of Science as defined in the *Règlement pour l'obtention des Bachelor of Science et des Master of Science de la Faculté des sciences [Regulation of 2 February 2004 for the Obtainment of the Bachelors of Science and Masters of Science]* (subsequently called *the Regulation* for short).

1.1 Academic Titles and Programme of Study

The Faculty of Science of the University of Fribourg awards the following official academic titles to students who have successfully completed their respective course of studies:

- **Bachelor of Science in Earth Sciences**, subsequently called **BSc**.
- **Master of Science in Earth Sciences**, subsequently called **MSc**.

The **programme of study of the BSc** in Earth Sciences represents a university course of studies, comprising the basic scientific education in Earth Sciences. The BSc in Earth Sciences gives access to the advanced studies leading to the MSc in Earth Sciences. Every person who is in possession of a federal general qualification for university entrance (*maturité fédérale / eidgenössisches Maturitätszeugnis*) or any equivalent document (cf. Art. 6 of the Regulation) will be admitted to the BSc degree programme.

The **programme of study of the MSc** in Earth Sciences is co-ordinated between the universities of Berne, Neuchâtel, and Fribourg (BeNeFri). This MSc fulfils the standards of the Swiss Association of Geologists CHGEOL. It guarantees the quality that is required for professional geologists.

Persons in possession of a BSc in Earth Sciences of the University of Fribourg or any other Swiss university are admitted to the MSc course of studies (Art. 7 of the Regulation). Persons in possession of a BSc degree in a different subject or equivalent degrees (e.g., after graduating from an engineering school) can also be admitted to the MSc study programme by a decision of the Faculty of Science to be made in each individual case. Provisional admission can be granted, which then depends on the fulfilment of additional requirements (cf. Section 3.5).

The MSc is the starting point for pursuing an academic career (doctoral studies).

1.2 Course Structure

The degree courses leading to the BSc and MSc respectively are subdivided into **course units (UE)** comprising lectures, practicals, excursions, or field camps. To each UE, a number of **ECTS¹ points** is assigned, which by assessment (e.g., successful exams) is converted into ECTS credits (see Section 1.3). The BSc degree course requires 180 ECTS credits (corresponding to a length of study of 6 semesters), and the MSc degree an additional 90 ECTS credits (corresponding to a length of study of 3 semesters).

The BSc degree course is composed of a **major** of 150 ECTS credits, and a selectable **minor** of 30 ECTS. The major consists of the compulsory UE in Geology and the UE of three propedeuticals to be chosen among Mathematics, Physics, Chemistry Informatics, Geography and Biology. The major in Earth Sciences comprises 114 ECTS credits, the propedeuticals 12 credits

¹ ECTS stands for *European Credit Transfer System*. One ECTS point corresponds to an amount of work of approximately 30 hours.

each. The minor may not overlap with the major. There is a choice among Geography, Environmental Sciences, Biology, Computer Science, Physics, Chemistry, Technical Chemistry (in collaboration with the School of Engineering and Architecture of Fribourg), Biochemistry, and Mathematics. If a student wishes to choose a different minor, he/she must consult the student advisor in Earth Sciences in order to work out a suitable curriculum.

The MSc degree programme consists of 90 ECTS credits, which corresponds to 3 semesters of study. Certain lectures are compulsory, others can be chosen from a list of lectures and practicals recommended according to the scientific orientation. For a certain number of lectures there is a free choice, and the UE can be taken outside BeNeFri and outside the Faculty of Science. The choice of the UE must be discussed with the teacher who supervises the master thesis. The master thesis corresponds to 45 ECTS credits. Examinations of the UE of the MSc are only possible after all the requirements for the BSc have been completed. (cf. 1.3).

The purpose of the different forms of UE is as follows:

- **Lectures** give an introduction to the scientific methods in Earth Sciences and advance thinking in a scientific way. They help acquiring the required knowledge and understanding of the fundamental concepts.
- **Block courses** concentrate the teaching into a few days.
- **Practicals** accompany the lectures and are essential for learning of how to observe and interpret geological objects.
- **Excursions** in the field help visualise the themes that are treated in the lectures.
- **Field camps** train the students in geological mapping and stratigraphic logging.
- The **Bachelor thesis** is a supervised study that is carried out in the field and/or in the laboratory.
- The **Master thesis** is an initiation to scientific research and is carried out under the supervision of a teacher.

1.3 Acquired skills

The aim of the studies leading to the award of an MSc in Earth Sciences is to deepen knowledge and perfect competence in the chosen field and at the same time develop skills in scientific English. Thus, at the end of the course, a student will have shown that he/she can apply their knowledge to accomplish a research project and will have learned how to work independently or how to integrate into an interdisciplinary research team. The award of the degree requires creative and self-critical talents as well as the ability to communicate ideas and work both in English and their native language.

1.4 Assessment of Course Units (UE) and Acquisition of ECTS Credits

Acquisition of ECTS credits occurs in three steps: assessment of the UE, grouping of UE into validation packages, and awarding the respective credits.

Practicals, block courses, excursions, and field camps are assessed following the criteria given at the beginning of the semester. These UE are validated immediately after they are finished. **Assessment** of lectures is made by an oral and/or written exam, whose type and duration are regulated in this curriculum. Exams take place during the official exam periods (sessions) in spring, summer, and autumn. Students register in GESTENS within the stipulated delays for each exam according to the on-line procedure. The marks range from 6 (highest mark) to 1 (lowest mark). An exam marked below 4 can be repeated once at the next exam session at the earliest. An exam that has been successfully passed may not be repeated. The Bachelor and Master theses are each evaluated by a mark.

Validation packages comprise multiple, separately assessed UE. Art. 18 of the Regulation determines the number of these packages whereas this curriculum determines their content.

ECTS points are credited according to art. 19 of the Regulation if

- the weighted average of the exam marks of a validation package is at least 4. The weighting is given by the number of ECTS points assigned to a UE.
- the assessment criteria of UE not examined (practicals, block courses, excursions, field camps) are met.

Under these prerequisites, validation packages are validated and the corresponding ECTS points are converted into ECTS credits. By request, the Dean's office issues confirmations in which exam results and credits awarded are acknowledged (Art. 22 of the Regulation), provided the exam fee has been paid.

1.5 Teaching Languages

Each course of the BSc is taught in either German or French. Students can decide in which of the two languages they want to express themselves. Occasionally, courses may be taught in English.

MSc courses are generally taught in English. For exams and written work (reports, MSc thesis) students can choose between English, German or French.

1.6 Ethics and Science

Ethical principles are an integral part of a scientific education. Accepted international conventions must be respected during research and upon the writing up of any scientific work whether it be a project, a lecture, a thesis or a report. In particular, every external source of information (articles, lectures, web pages, etc.) must be correctly cited.

1.7 Regulations and Additional Information

Detailed information about studying Earth Sciences can be found in the following documents, which can be obtained from the secretariat of the Department of Geosciences, Geology-Mineralogy, Chemin du Musée 6, CH-1700 Fribourg:

- Regulation concerning the admission to the University of Fribourg [*Réglement d'admission de l'Université de Fribourg / Zulassungsreglement der Universität Freiburg; (www.unifr.ch/rectorat/reglements)*]
- Regulation of February 2, 2004 for the Obtainment of the Bachelor of Science and Master of Science
- Curriculum for the basic and subsidiary subjects of the Faculty of Science of the University of Fribourg
- Study guide of the University of Fribourg
- University calendar of the University of Fribourg
- More and updated information can be found under www.unifr.ch/geoscience and www.unifr.ch/benefri/sdlt.

Finally, each student obtains a personal and secure space that can be reached using an individual university e-mail password. This space can be reached by the link "Connexion" on web page www.unifr.ch/science/gestens and allows inscription to courses and exams, access to exam results, the initiation of the process of attestation, etc..

3 Master of Science (MSc) in Earth Sciences

[Version 2007, validation packages: MSc1-ST.0007, MSc2-ST.0004]

The program of the MSc in Earth Sciences has a duration of one year and a half and is equivalent to 90 ECTS points. The courses amount to 45 ECTS points. They are composed of ex-cathedra courses and practicals on a weekly basis during the two winter terms and of block courses and excursions during the summer term. The teaching of the MSc in Earth Sciences is co-ordinated with the universities of Berne and Neuchâtel (BeNeFri). The MSc study includes a master thesis of a value of 45 ECTS points.

The courses can be evaluated and validated only after the BSc certificate has been obtained.

3.1 Courses of the MSc

The courses on the level of the MSc comprise a block of mandatory courses that must be taken by each student, a block of optional courses that are recommended according to the envisaged specialisation, and a block of courses of free choice. The study prospectus must be established together with the teacher who supervises the master thesis.

The compulsory courses have a volume of 17 ECTS credits:

Code	Course	ECTS
ST.0405	Oceans, Climates and Life through Time	3
ST.0406	Sedimentary Environments	3
ST.0407	Global Geochemical Cycles I	2
ST.0408	Field Course: Swiss Geotraverse	3
ST.0503	Paleoecology and Paleoclimates	3
	Soft Skills	3

According to the specialisation chosen by the student and in accordance with the teacher supervising the master thesis, the optional courses, practicals, block courses, and excursions will be selected within the following domains:

- a. Internal Earth Processes
- b. Earth Surface Processes
- c. Evolution and Global Change
- d. Analytical Methods and Modelling
- e. Applied Geosciences
- f. Field Courses

The list of soft skills, optional courses, practicals, block courses, and excursions is available on the web site of the BeNeFri Earth Sciences (<http://www.unifr.ch/benefri/sdlt/>).

The free courses can be chosen from the list of optional courses in order to enlarge or strengthen the chosen speciality in Earth Sciences, and/or from another branch at the Faculty of Sciences, and/or from outside the Faculty (for example Law or Ethics). For details concerning these courses see the study prospectus of the corresponding faculties.

3.2 Contents of the courses

For the up-to-date contents of the courses see the web site of the BeNeFri Earth Sciences (www.unifr.ch/benefri/sdlt).

3.3 Exams and validation

The sum of the courses taken for the MSc constitutes the **validation package MSc1** and is equivalent to 45 ECTS credits. Each ex-cathedra course in Earth Sciences is validated by a written and/or oral examination through the responsible teacher. Block courses, practicals, and excursions are validated at their end. For the courses taken outside of the Earth Sciences refer to the respective regulations.

3.4 Master thesis and validation

The master thesis (ST.0404) constitutes **validation package MSc2**. The subject is chosen in accordance with the teacher who supervises the thesis. The work begins with a data collection in the field and/or in the laboratory, followed by an analysis and a detailed scientific interpretation. The thesis is written following the standards of a scientific publication. The results are presented at a public conference of 30 minutes, which is followed by 30 minutes of questioning. The volume of the master thesis corresponds to 45 ECTS points.

The master thesis is evaluated by a mark, which is the weighted mean of the mark for the manuscript (80%) and of the mark for the oral presentation (20%). The thesis is validated if a mark of at least 4 has been obtained. A thesis considered to be of insufficient quality may not be presented. It has to be improved until a sufficient mark is reached, or a new thesis has to be commenced according to art. 20 of the Regulation.

The validation of packages MSc1 and MSc2 confers the title of **Master of Science in Earth Sciences, University of Fribourg (MSc)**.

3.5 Access to the Master study

The access to the Master of Sciences in Earth Sciences depends on two conditions: satisfy the conditions of admission to the University of Fribourg – defined in the *Regulations concerning the admission to the University of Fribourg* – and to be in possession of a Bachelor of Science in Earth Sciences of the University of Fribourg or of another Swiss university, or of a title considered to be equivalent by the Faculty of Sciences.

The Faculty of Sciences establishes a list of equivalent titles. If the candidate has a title that is cited in this list, the admission is granted. A candidate holding a title that is not on the list must deposit a dossier to request admission. The Commission of student's requests, elected by the Faculty council, will decide on the acceptance.

In certain cases, the Commission can ask for complements. If these are limited, the student can comply with them during the master study. If they are important, a “pre-Master” has to be accomplished first and the admission will not be granted before the requested conditions are satisfied.