

Curriculum for the award of the Degree of

Specialized Master of Science in Dynamics in Glaciology and Geomorphology

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1 General Remarks

This curriculum describes the course structure of the specialized MSc study programme in Dynamics in Glaciology and Geomorphology. It is based on the regulations of the Faculty of Science and Medicine governing the acquisition of the title of Master of Science (hereafter called Regulations).

1.1 Academic Titles and Programme of Study

The Faculty of Science and Medicine of the University of Fribourg awards the official academic title of **Specialized Master of Science in Dynamics in Glaciology and Geomorphology**, subsequently called **sp-MSc**, to students who have successfully completed their respective study programme and obtained the title of Bachelor of Science (BSc) or a recognized equivalent.

This specialized MSc gives access to various professional activities in research, education, environmental consulting and protection, spatial planning, documentation, and administration. In addition, the MSc is an entry requirement for further scientific work and studies leading to a doctorate. The specialised MSc does not give access to the study programme for teachers at the level of secondary II (DEEM or LDM) of the University of Fribourg.

Admission to the sp-MSc is granted on an individual basis if (a) a BSc degree or a recognised equivalent has been obtained and (b) the application of the student has been accepted by the *Admission committee of the sp-MSc*. The application is hereby evaluated based on the candidate's prior studies and experience relevant to the specialized master (cf. section 2.4).

1.2 Course Structure

The sp-MSc study programme extends over two academic years (four terms), corresponding to a minimum of 120 ECTS credits.

It integrates courses in natural and human sciences, and offers a specialisation in Dynamics in Glaciology and Geomorphology. The course programme consists of the following teaching modules:

- A *Common module* totalling 15 ECTS credits.
- A *Master thesis module*, comprising the Master thesis, a preliminary and a final seminar. Altogether it comprises 60 ECTS credits.
- A *Specialisation module* in Dynamics in Glaciology and Geomorphology. This module consists of compulsory courses and elective courses destined to strengthen the specialisation. It comprises a minimum of 25 ECTS credits.
- A *Supporting courses module*, offering additional teaching in Geography or other disciplines related to the Master orientation. The selection of the courses must be approved by the supervisor of the Master thesis. It comprises the remaining amount of credit to reach the minimum total of 120 ECTS credits.

The course language will be mainly English. For exams and written works (project reports, MSc thesis, etc.) students can choose between German, French, or English.

Assessment of courses and acquisition of ECTS credits for the MSc (see section 1.4) is possible only after successful completion of the BSc.

1.3 Acquired Skills

The aim of the studies leading to the award of a specialized MSc in Dynamics in Glaciology and Geomorphology is to deepen knowledge and to perfect competence in the chosen field. Thus, at the end of the programme, 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 Courses and Acquisition of ECTS Credits

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

Exercises are assessed following the criteria given at the beginning of the course. Admission to the exam corresponding to a lecture course can be subject to meeting the requirements of the corresponding exercise class. **Assessment** of lectures is made by an oral and/or written exam, whose type and duration are regulated in an appendix of this curriculum. Exams take place during the official exam periods (sessions) in spring, summer, and autumn. Students register via the students' web portal MyUniFR (<https://my.unifr.ch>), 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.

Validation packages comprise multiple, separately assessed courses. Art. 18 of the Regulation determines the number of these packages whereas this curriculum determines their content. There are three validation packages:

- The *first package* (30 ECTS credits) consists of the Common Module and the Compulsory courses part of the Specialization Module ;
- The *second package* (30 ECTS credits) consists of the Electives part of the selected Master option Module grouped with the Supporting courses;
- The *third package* (60 ECTS credits) consists of the Master Thesis Module.

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 course.
- The assessment criteria of courses not examined (practical work, exercises, etc.) are met.
- No mark equals 1.0.

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 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 is 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.

1.6 Regulations and Additional Information

Detailed information about studying Geography can be found in the documents referenced on the web page <http://www3.unifr.ch/scimed/en/plans>, which can also be obtained from the Office of the Department of Geosciences – Geography, chemin du Musée 4, CH-1700 Fribourg.

2. Specialized Master of Science

[Version 2018 validation packages: PV-SGG.0000015, PV-SGG.0000016, PV-SGG.0000017]

2.1 Courses Units

Common module

| Code | Course | Semester | tot. h. | ECTS |
|--------------|--|----------|---------|-----------|
| SGG.00409 | Models, modelling and representations | AS | 28 | 3 |
| SGG.00424 | Hazards, risks and vulnerability | AS | 28 | 3 |
| SGG.00426 | Climate change: state of the art and debates | AS | 28 | 3 |
| SGG.00425 | Data and methods for environmental analysis | AS | 28 | 3 |
| SGG.00512 | Geocolloquium ¹ | AS/SS | 28 | 3 |
| Total | | | | 15 |

Master thesis module

| Code | Course | Semester | tot. h. | ECTS |
|--------------|--|----------|---------|-----------|
| SGG.00410 | Master thesis (seminar, preliminary) | AS/SS | 14 | 2 |
| SGG.00503 | Master thesis (with final public presentation) | - | | 58 |
| Total | | | | 60 |

Specialization Module

| Code | Course | Semester | tot. h. | ECTS |
|----------------------------------|---|----------|---------|-------------------------------|
| <i>Compulsory courses</i> | | | | |
| SGG.00444 | Alpine cryosphere | AS | 28 | 3 |
| SGG.00445 | Mountain geomorphology | SS | 28 | 3 |
| SGG.00448 | Modelling of glaciers and permafrost | SS | 28 | 3 |
| SGG.00441 | Applied geophysical methods | SS | 30 | 3 |
| SGG.00443 | Project in cryosphere and geomorphology | AS/SS | - | 3 |
| <i>Elective courses</i> | | | | |
| SGG.00449 | Climatology and glaciology I (seminar) * | AS/SS | 28 | 2 |
| SGG.00450 | Climatology and glaciology II (seminar) * | AS/SS | 28 | 2 |
| SGG.00451 | Geomorphology I (seminar) * | AS/SS | 28 | 2 |
| SGG.00452 | Geomorphology II (seminar) * | AS/SS | 28 | 2 |
| SGG.00453 | Physical geography I (field course) * | AS/SS | 40 | 5 |
| SGG.00454 | Physical geography II (field course) * | AS/SS | 40 | 5 |
| Total | | | | minimum 25, maximum 33 |

* These courses are taught every second year.

Supporting Courses Module

| <i>Suggested courses</i> | | Semester | tot. h. | ECTS |
|--|---|----------|---------|---|
| <i>English</i> | | | | |
| - | English for Masters Students I | AS | - | 3 |
| - | English for Masters Students II | SS | - | 3 |
| <i>Geosciences</i> | | | | |
| - | Non selected courses from the specialization module | | | |
| Relevant courses from other MSc programmes in the Department (e.g. <i>Earth Sciences</i> or <i>Nature, Society and Politics</i>) | | | | |
| <i>Other disciplines</i> | | | | |
| Courses can also be chosen from other departments of the Faculty of Science and Medicine, from other faculties of the University of Fribourg as well as from other universities in Switzerland or abroad, with the consent of the supervisor of the Master thesis. Courses already assessed in another programme cannot be chosen again. | | | | |
| Total | | | | balance to reach the minimum overall |

2.2 Course Contents of the Master Programme

2.2.1 Lecture Courses

The lectures of the *common module* propose a basic training in the field of geography. They present integrative approaches (SGG.0 0409 and SGG.00426), discuss natural and human factors involved in this process (SGG.00424), and teach methods of generating and analysing geographical information (SGG.00425). The Geocolloquium (SGG.00512) gives an opportunity to the master students to expand their understanding to current topics of research.

The lectures of the *specialization module* develop the study of processes and interactions within the Cryosphere-Climate system and introduce state-of-the art methods in the field of Glaciology, Geomorphology and other High-Mountain research fields.

The lectures of the *supporting courses module* offer a wide range of fields and disciplines and allow the student to further broaden his/her specialisation, to deal with additional and complementary themes and to approach them from different angles. The offer presented in the table can be completed by lectures in other faculties or universities. The choice of supporting courses must be approved by the supervisor.

2.2.2 The Seminars

The seminars (SGG.00449 to SGG.00452) request active participation during the meetings as well as giving an oral presentation and/or writing a seminar paper. Every student must participate in the two seminars (SGG.00410, SGG.00503) related to the Master thesis, as stated below.

2.2.3 The Master Thesis

The preparation and the elaboration of the Master thesis (SGG.00503) are accompanied by two seminars. The first (SGG.00410) shall allow the student to choose and define the topic of his/her research work; it will be organized during the second term of the Master programme. The second seminar (as part of SGG.00503) takes place during the last term of the Master programme; its role is to permit the student to summarise and to present results of his/her research project and share his/her experience with his/her colleagues.

The Master thesis is credited with 58 ECTS; it initiates the student to scientific research, leading to a thesis on a particular theme linked to the chosen specialisation. Work shall begin during the second term and be completed by the end of the fourth term of the MSc programme, crowning the studies. It is a research work undertaken under supervision of a person with solid experience. This thesis helps the Master student to develop his/her liking and his/her aptitude for scientific research. The result is to be presented in written form as a research report and presented orally as a public presentation of 20 minutes during the seminar (SGG.00503). With the Master thesis, the student demonstrates his/her ability to embark on a scientific investigation and strengthens his/her specialization.

A Master thesis can be supervised by more than one person, but the principal supervisor must be a professor at the Geography Unit of the Department of Geosciences.

2.3 Examinations of the MSc and Validation

The **first two validation packages** comprise all the teaching of the MSc common, specialisation, and supporting courses modules. Their total value is 60 ECTS credits.

Teaching units are evaluated according to the modes described in the document “Modalités d’évaluation des UE de la géographie”.

The assessments of the *supporting courses module* take place according to the information provided by the study plans of the concerned departments.

The teaching units of the Master thesis module (SGG.00410, and SGG.00503), including the master thesis, constitute the **third validation package**. The assessments are described in the document “Modalités d’évaluation des UE de la géographie”.

A failed Master thesis can be repeated once on a different subject.

The title of **Specialized Master of Science in Dynamics in Glaciology and Geomorphology, University of Fribourg (sp-MSc)** is conferred upon the validation of all three packages.

2.4 Admission Procedure to the Master Programme

Acceptance to the programme of specialised Master Dynamics in Glaciology and Geomorphology may be granted provided the following two conditions have been met by the applicant:

- Satisfying the University admission requirements as defined in the *Règlement concernant l’admission à l’Université de Fribourg* (<https://www3.unifr.ch/apps/legal/fr/document/274904>),
- They have to be accepted by the *Admission committee of the sp-MSc*, based on the following documents that the applicant has to provide:
 - CV
 - Motivation letter
 - Certificates of prior studies and evaluations
 - Letter describing additional experience in the field of the specialized master

Based on the candidate’s academic qualification, the Commission for Students’ Requests and the Admission committee of the sp-MSc can make its acceptance dependent on the fulfilment of complementary studies, which can be completed as part of the supporting courses module described in section 2.2.1.

The final decision will be made by the Commission for Students’ Requests (*Commission des requêtes des étudiant-e-s*, Dean’s Office, Faculty of Science and Medicine, ch. du Musée 8, CH-1700 Fribourg, Switzerland), and ratified by the Faculty Council of the Faculty of Science and Medicine.