



UNIVERSITY OF FRIBOURG
FACULTY OF SCIENCE

Curriculum for the obtention of the degrees of

Master of Science in Geography
« Global Change and Sustainability »

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1 General remarks

This curriculum introduces the course structure of the MSc study programme in geography, which focuses on issues of global change and sustainability. It is based on the regulations of the Faculty of Science 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 of the University of Fribourg awards the official academic title of **Master of Science in Geography**, subsequently called **MSc**, to students who have successfully completed their respective course of studies and obtained the title of Bachelor of Science (BSc) or a recognized equivalent.

The **programme of study of the MSc** in geography represents a scientific course of studies, allowing specialization in the field of global change and sustainability. The MSc in Geography gives access to various professional activities in research, education, environmental consulting and protection, spatial planning, documentation, and administration. Besides, the MSc is the entry requirement for scientific work and deepened scientific education leading to a doctorate. When accompanied by a subsidiary subject in a discipline figuring on higher secondary school curricula, the MSc allows students to follow a complimentary didactics programme leading to the qualification as a higher secondary school teacher (*Fähigkeitszeugnis für das Höhere Lehramt II*).

Persons in possession of a BSc in Geography 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 of 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 2.5).

1.2 Course structure

The MSc study programme in geography spans one and a half years (three terms), corresponding to 90 ECTS credits.

Focusing on « Global Change and Sustainability », it integrates courses in natural and human sciences, offering a specialisation in one of the two orientations. The course programme consists of the following teaching modules:

- A *Core module* totalling 18 ECTS.
- A *Master thesis module*, comprising the Master thesis, a preliminary and a final seminar. Altogether it comprises 40 ECTS.
- A *Specialisation module* in either physical sciences or in humanities (socio-economic module). Each of these two modules consists of compulsory courses and course options destined to bolster the specialisation. It comprises 14 ECTS.
- A *Supporting courses module*, offering additional teaching in geography or other disciplines related to the Master orientation. The selection of the courses is guided by the specialisation and must be approved of by the supervisor of the Master thesis. Its volume amounts to 18 ECTS.

The chief course language will be mainly English, with French and German on certain occasions. For exams and written work (project reports, MSc thesis, etc.) students can choose between German, French, or English.

The MSc courses can only be assessed and recognized after successful completion of the BSc.

1.3 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 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.

Validation packages comprise multiple, separately assessed courses. Art. 18 of the Regulation determines the number of these package 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 course.
- the assessment criteria of courses not examined (practical work, exercises, etc.) 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.

1.4 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.

1.5 Regulations and additional Information

Detailed information about studying computer science can be found in the following documents, which can be obtained from the Office of the Department of Computer Science, chemin du Musée 3, 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 2 February 2004 for the Obtainment of the Bachelors of Science and Masters 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

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.

2. Master of Science

[Version 2005, validation packages: MSc1-GG.0400, MSc2-GG.0500]

2.1 Courses units

Core module

<i>Code</i>	<i>Course</i>	<i>h/week</i>	<i>ECTS</i>	<i>term</i>	<i>Assessment (examination / duration)</i>
GG.0401	Introduction to Global Environmental Change	2	3	winter	written / 60 min.
GG.0402	Methods for Environmental Analysis (RS + Spatial Analysis)	2	3	winter	oral / 15 min.
GG.0403	Sustainability	2	3	winter	written / 60 min.
GG.0404	Drivers behind environmental and social issues	2	3	winter	orale / 15 min.
GG.0405	Natural hazards and industrial risks	2	3	winter	written / 60 min.
GG.0406	Environmental Response to Anthropogenic Stress (lecture)	1	2	winter	written / 60 min.
GG.0407	Environmental Response to Anthropogenic Stress (practical)	1	1	summer	Project
Total			18		

Master thesis module

<i>Code</i>	<i>Course</i>	<i>h/week</i>	<i>ECTS</i>	<i>term</i>	<i>Assessment (examination / duration)</i>
GG.0410	Master Thesis seminar (preliminary)		2	summer	Project
GG.0501	Master Thesis seminar (final)		2	winter	Presentation / 30 min.
GG.0502	Master Thesis		36		Thesis
Total			40		

Physical Sciences Module

<i>Code</i>	<i>Course</i>	<i>h/week</i>	<i>ECTS</i>	<i>term</i>	<i>Assessment (examination / duration)</i>
Compulsory courses			9		
GG.0431	Introduction to Environmental Modelling (lecture + practical)	2	3	winter	Project
GG.0432	Environmental Physical Geodata (from field to analysis)	2	6	summer	Project
Climatology option			5		
GG.0433	Advanced Modelling of Climate and Climate Change	2	3	summer	Project
GG.0434	Seminar in Climatology		2	summer	Project
Geomorphology option			5		
GG.0435	Advanced Geomorphology *	2	3	summer	oral / 15 min.
GG.0436	Dendro-geomorphology	2	3	summer	Project
GG.0437	Cartography in Geomorphology		3	summer	Project
GG.0438	Seminar in Geomorphology		2	summer	Project
Total			14		

* obligatoire pour l'option de géomorphologie

Socio-economic Module

<i>Code</i>	<i>Course</i>	<i>h/week</i>	<i>ECTS</i>	<i>term</i>	<i>Assessment (examination / duration)</i>
Compulsory courses			11		
GG.0461	Environmental Policies: Background and Legal Issues	2	3	summer	written / 60 min.
GG.0462	Environmental Social Geodata (from field to analysis)	2	6	summer	Project
GG.0466	Environmental Issues from a Soc. Sc. Perspective	2	2	summer	Project
Options			3		
GG.0463	Risk Analysis and Perceptions	2	3	summer	written / 60 min.
GG.0464	Environmental Policies: Implementation	2	3	summer	oral / 15 min.
GG.0465	Global Change and Human Rights Issues	2	3	summer	oral / 15 min.
Total			14		

Supporting Courses Module

<i>Code</i>	<i>Course</i>	<i>h/week</i>	<i>ECTS</i>	<i>term</i>	<i>Assessment (examination / duration)</i>
English					
	Scientific English	4	6	summer	
Géographie (Geography)					
GG.0431	Introduction to Environmental Modelling (lecture + practical)	2	3	summer	Project
GG.0432	Environmental Physical Geodata (from field to analysis)	2	6	summer	Project
GG.0433	Advanced Modelling of Climate and Climate Change	2	3	summer	Project
GG.0434	Seminar in Climatology		2	summer	Project
GG.0435	Advanced Geomorphology	2	3	summer	oral / 15 min.
GG.0436	Dendro-geomorphology	2	3	summer	Project
GG.0437	Cartography in Geomorphology		3	summer	Project
GG.0438	Seminar in Geomorphology		2	summer	Project
GG.0461	Environmental Policies: Background and Legal Issues	2	3	summer	written / 60 min.
GG.0462	Environmental Social Geodata (from field to analysis)	2	6	summer	Project
GG.0463	Risk Analysis and Perceptions	2	3	summer	written / 60 min.
GG.0464	Environmental Policies: Implementation	2	3	summer	oral / 15 min.
GG.0465	Global Change and Human Rights Issues	2	3	summer	oral / 15 min.
GG.0466	Environmental Issues from a Soc. Sc. Perspective	2	2	summer	Project
Sciences de la Terre (Earth Sciences)					
ST.0503	Palaeoecology and Palaeoclimates	2	3	winter	
ST.0514	Palaeoceanography and Pelagic Microfacies	3	1.5	summer	
		days			
ST.0504	Vertebrate Palaeontology and Evolution	2	3	winter	
ST.0519	Surfaces	2	2.5	summer	
ST.0305	Terrains instables (cours)	2	3	winter	
Biologie (Environmental Sciences)					
BL.0205	Ecological field course	12	5	summer	Exercices (A/R)
		days		bloc	
BL.0202	Trophic interactions and invasions	3	4	winter	oral / 30 min.
BL.0201	Advances in evolutionary genetics	3	4	winter	oral / 30 min.

Mathématiques (Mathematics) avec prérequis				
MA.2301	Intro à l'analyse numérique I (cours)	2	2	winter
MA.2361	Intro à l'analyse numérique I (exercices)	2	3	winter
MA.2401	Intro aux probabilités et à la statistique I (cours)	2	2	winter
MA.2461	Intro aux probabilités et à la statistique I (exercices)	2	3	winter
MA.2302	Intro à l'analyse numérique II (cours)	2	2	summer
MA.2362	Intro à l'analyse numérique II (exercices)	2	3	summer
MA.2402	Intro aux probabilités et à la statistique II (cours)	2	2	summer
MA.2462	Intro aux probabilités et à la statistique II (exercices)	2	3	summer
MA.3109	Partielle Differentialgleichungen für Naturwissenschaftler, 1. Teil	2	3	winter
MA.3110	Partielle Differentialgleichungen für Naturwissenschaftler, 2. Teil	2	3	summer
MA.3303	Algèbre linéaire numérique (1)	2	3	winter
MA.3304	Algèbre linéaire numérique (2)	2	3	summer
Total		18		

Courses can also be chosen from other departments of the faculty of sciences, 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 that have been assessed on the occasion of another study plan cannot be chosen again.

2.2 Course contents of the MSc « Global Change and Sustainability »

2.2.1 Lecture courses

The lectures of the *core module* propose a basic training in the field of global change. They present the problem in an integrated way (GG.0401), natural and human factors involved in this process (GG.0403 à GG.0406), and methods of generating and analysing geographical information (GG.402).

The lectures of the *specialization module* develop the study of either natural or socio-economic aspects (physical sciences and socio-economic modules respectively) and of their interactions in the global change process. The physical sciences module offers an additional option as the specialization can be continued in climatology or geomorphology. Depending on the choice of specialization, lectures GG.0433 or GG.0435 are compulsory.

The lectures of the *supporting courses module* offer a wide range of fields and disciplines related to the process of global change. They allow the student to further broaden his/her specialization, 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, however, be in relation to the Master thesis and must be approved of by the supervisor.

2.2.2 The seminars

The seminars (GG.0434, GG.0438, GG.0466) request active participation during the meetings as well as producing a seminar paper. Every student must participate in the two seminars (GG.0410, GG.0501) related to the Master thesis, as outlined below.

2.2.3 The Master thesis

The preparation and the elaboration of the Master thesis are accompanied by two seminars. The first (GG.0410) 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

(GG.0501) takes place during the third term of the Master programme; its role is to permit the student to account of his/her progress in the research project and share his/her experience with his/her colleagues.

The Master thesis is credited with 36 ECTS; it initiates the student to scientific research, leading to a thesis on a particular theme linked to global change. Work shall begin during the second term and be completed by the end of the third 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 presentation of 30 minutes during the seminar (GG.0501). 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 **validation package MSc1** comprises all lectures of the MSc core, specialization, and supporting courses modules. Its value is 50 ECTS credits.

The lectures of the *core* and *specialization modules* are assessed according to the following types of exams:

1. Written exams of 60 minutes for each of the following lectures: GG.0401, GG.0403, GG.0405, GG.0406, GG.0461, GG.0463 ;
2. Oral exams of 15 minutes for each of the following lectures: GG.0402, GG.0404, GG.0435, GG.0464, GG.0465 ;
3. A project (marked by the respective teacher) for each of the following lectures: GG.0431, GG.0432, GG.0433, GG.0434, GG.0436, GG.0437, GG.0438, GG.0462, GG.0466.

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

2.4 Master thesis and validation

The courses of the Master thesis module (GG.0410, GG.0501 et GG.0502) constitute the **validation package MSc2**. They are assessed in the following manner:

4. The Preliminary Master thesis seminar (GG.0410) is assessed through the participation in the meetings and the preparation of the project concerning the Master thesis;
5. The Final Master thesis seminar (GG.0501) is assessed through the participation in the meetings and the oral presentation (30 minutes) of the Master thesis;
6. The Master thesis – (GG.0502) is assessed by a mark between 6 (best) and 1 (worst). A pass is accorded if the mark is at least 4. A failed Master thesis can be repeated once on a different subject.

The title of Master of Science (MSc) in Geography is conferred upon the validation of the packages MSc1 and MSc2.

2.5 Admission procedure to the Master programme

Admission to the programme of Master in Geography « Global Change and Sustainability » is granted upon two conditions: the applicants have to comply with the admission criteria of Fribourg University (as defined by the Regulations for the Admission to the University of

Fribourg [*Reglement über die Zulassung an der Universität Freiburg / Règlement concernant l'admission à l'Université de Fribourg*]), and they must hold the title of Bachelor in Geography of Fribourg University or another degree considered equivalent by the Faculty of Science.

The Faculty draws up a list of those titles that are considered equivalent. Applicants with one of these titles will automatically be accepted. Applicants whose title is not included in this list can send the Faculty of Science an application letter. The final decision will be made by the *Admission Commission* of the Faculty, a body appointed by the Faculty Council.

Depending on the academic qualification, the Admission Commission can make its acceptance dependent on the fulfilment of complementary studies. If they are of a minor scope, they can be completed in parallel to the Master programme. Otherwise, applicants are admitted to a “pre-master programme” and can start with the master degree programme only after fulfilling the requirements initially laid down for the pre-master.

Students holding the title of Bachelor or a title judged equivalent by the Faculty in another discipline than geography must follow and successfully complete at least one of the two complementary programmes in Geography BSc-60 in order to be admitted the programme of Master in Geography « Global Change and Sustainability ». The courses of one of these two programmes, which have been frequented and assessed during former Bachelor studies, are recognised, as well as courses judged as equivalent. The remaining courses constitute the complementary programme and have to be assessed. If they are of a minor scope, they can be completed in parallel to the Master programme. Otherwise, applicants are admitted to a “pre-master programme” and can start with the master degree programme only after fulfilling the requirements initially laid down for the pre-master.