*This is a nonofficial translation from the German original. Only the German original „**Wegleitung für das Masterstudium Geowissenschaften am Departement Umweltwissenschaften der Philosophisch-Naturwissenschaftlichen Fakultät der Universität Basel**" (23 April 2019) is legally valid.*

GUIDELINES

for the

Master's Studies in Geosciences in the Department of Environmental Sciences, Faculty of Science at the University of Basel

approved by the Faculty of Science on 23 April 2019

GUIDELINES – Master's in Geosciences

1. General Information

The admission requirements and descriptions of the degree programs offered by the University of Basel are listed in the respective regulations and guidelines, and are available online: www.unibas.ch/de/Dokumente.html.

The admission requirement is the proof of a Bachelor's grade of 180 credit points, which is equivalent to a Bachelor's in Geosciences at the University of Basel. These must have been earned at a higher education institution that is recognized by the University of Basel. You can find more detailed information relating to the admission procedure online at https://www.unibas.ch/de/Studium.html.

The master's studies are designed as an English-language program (English level B2 – see the "Regulations concerning English language skills at level B2 or C1 according to the Common European Reference Framework", https://www.unibas.ch/de/Studium/Bewerbung-Zulassung/Zulassung/Sprachkenntnisse.html). However, courses may also be held in German if all course participants are in agreement.

The **University of Basel Study Regulations** includes information about: studies and the European Credit Transfer and Accumulation System (ECTS), general rights and obligations of students, admission and application, as well as matriculation and semester registration (www.unibas.ch/de/Studium/Studierendenordnung.html).

The **Regulations for Bachelor's and Master's Degree Programs** (in short: **Framework Regulations**) lay out general information about the bachelor's and master's degree programs offered by the Faculty of Science at the University of Basel (https://philnat.unibas.ch/de/studium/).

The **Regulations for Master's Studies in Geosciences in the Faculty of Science at the University of Basel** dated 8 December 2015 regulates the master's studies in Geosciences (www.unibas.ch/de/Dokumente.html or https://philnat.unibas.ch/de/studium/master/). More details are given in these guidelines for the "Master's Studies in Geosciences in the Department of Environmental Sciences in the Faculty of Science at the University of Basel".

The study regulations and guidelines apply to all students who begin their studies on 1 August 2016 or later.

The Geosciences Teaching Committee is the responsible body for the master's degree program in Geosciences; its members and tasks are regulated in the Regulations for Master's Studies in Geosciences.

For the successful completion of the master's studies, the Faculty awards the degree of a "Master of Science in Geosciences".

2. Careers

A number of national and international career options are open to geosciences graduates in the fields of nature conservation, water, earth and climate protection, in environmental research, as well as in site planning (e.g. for natural catastrophes) and in research – of resources or materials, for example. As a sub-discipline of geosciences, geography also gives graduates the specialist prerequisites required to train as a upper secondary school teacher ('Gymnasiallehrkraft'). Most geoscientists work at institutions in the private or semiprivate sector, with local or state authorities, with statistical information services, with governmental and non-governmental organizations, as well as in the industrial sector. Career opportunities can be found wherever spatial and temporal data is collected and analyzed using geographical information systems (GIS) and models, and wherever environmental and nature protection data systems are managed, for example. This growing field is playing an increasingly significant role in public administration, and more widely in the environmental reports compiled by organizations contracted to carry out environmental impact assessments and building site reports. Geoscientists are also increasingly in demand in the field of renewable energies. A master's degree is the minimum requirement for most of these professions, and the master's degree also qualifies graduates to pursue doctoral studies. Due to an anticipated shortage of academic staff, there is likely to be a heightened demand for graduates of science degrees in the future.

3. Aims and Purpose of the Studies

This three-semester master's studies program offers graduates sound theoretical and practical training in geosciences – the study of the earth's systems – and earns them the degree of an "MSc in Geosciences". Depending on the specialization module they choose, students can deepen their knowledge and broaden their skills in geography and climatology, geology and mineralogy as well as in environmental geosciences and biogeochemistry. The course explores the interdisciplinary topics of global change, natural catastrophes, sustainability, aquatic ecology and soil ecology. The combination of a single subject area and geosciences electives ensures both a breadth of subject knowledge as well as individual specialization. There is also a strong focus on independent work in the master's studies.
Graduates acquire problem-solving and methodological competencies (including geosystem modeling and environmental analytics) and further develop their social skills (e.g. teamwork, project management). In writing a master's thesis, graduates learn how to develop and complete their own research project, and how to present their results in written and verbal forms. At the same time, the master's thesis offers an insight into basic research and applied environmental research – including the challenges these entail when it comes to planning, completing and implementing the results.

4. Subject Areas and Elective Options

4.1 Environmental Geosciences and Biogeochemistry

A key objective of environmental geosciences and biogeochemistry is to gain a deeper understanding of the processes underpinning biogeochemical cycles in terrestrial and aquatic systems. The subject focuses on the material cycles in soils, especially the transfer of materials and energy between soils, the atmosphere, the lithosphere and the hydrosphere. Emphasis is also placed on the significant role of material cycles and ecosystem processes in limnic and marine systems.
An in-depth understanding of the function and effects of individual elements of an ecosystem is essential in order to solve our current environmental problems, especially when it comes to changes in climate and land use. Alongside a strong understanding of processes, another key objective of the subject is to explore the tension that arises between our use of the ecosystem as humans, on the one hand, and the protection of the ecosystem through its sustainable conservation and management on the other. By acquiring a thorough understanding of the function and effects of the different elements in our ecosystem, students learn to take the human factor into account when tackling interdisciplinary problems. In light of current and predicted environmental problems, it is especially important that young scientists are in a position to facilitate understanding between disciplines and coordinate interdisciplinary tasks.
For more information on current research projects and potential master's thesis topics, please refer to the respective websites for Environmental Geosciences, Biogeochemistry and Geoecology.

4.2 Geography and Climatology

Studies in geography focus on the *critical zone* of the earth's surface: the interface between the atmosphere, the soil, rocks, water, vegetation and the animal world – an interface that is both used and shaped by humans. Accordingly, geography is an interdisciplinary subject that covers the sciences and the social sciences. At the University of Basel, it is divided into physical geography and human geography. Both branches of the subject engage with solutions to environmental problems that have arisen as a result of global climate change. In the MSc in Geosciences, graduates who specialize in geography will develop a critical understanding of the most important processes and consequences of global climate change for landscape systems, and the associated risks for environmental services (water, nutrition, energy etc.) and natural catastrophes. Recording, displaying and modeling climate change and its management lie at the center of these studies. The analysis of landscape systems facilitates an understanding of complex geoscientific structures and processes; students scientifically analyze the spatial and temporal characteristics of these structures and processes with the help of models.
The geography elective is designed to give students the option of specializing in the fields of environmental management, geoinformatics or in geographical lab work and fieldwork. This enables graduates to enhance their CV with the expertise and methodical skills required for their desired career path.
Geography is also a mandatory school subject in Switzerland: Studies in geography together with the relevant additional pedagogical courses are a prerequisite for teaching in middle and upper secondary schools.
Atmospheric Sciences/Climatology offers courses to students who want to study the chemical and physical processes in our Earth's atmosphere more intensively. The Earth's atmosphere extends to an altitude of approx. 500 km and represents an important environmental factor, especially in its lower and middle parts. Natural and man-made air pollutants interact directly with weather and climate. The influence of air pollutants on human health and the change in the global climate caused above all by man, with its regional characteristics and peculiarities, represent an important challenge for society and politics today.
Within the scope of this focus, the fundamentals of meteorology, atmospheric chemistry and atmosphere physics are taught as well as important methodological skills which are required in professional life and in the Master's degree. These include the acquisition, analysis and interpretation of atmospheric measurement data. Graduates with a focus on Atmospheric Sciences/Climatology have a sound knowledge of atmospheric chemical and physical processes and their effects on air quality and climate. They master the working methods and processes required in the working environment of air pollution control. The research and teaching of atmosphere sciences at the University of Basel focuses on atmospheric chemical processes and the development of analytical methods for their investigation.

4.3 Geology and Mineralogy

Within the framework of master's studies in geosciences, students of geology and mineralogy consider the processes close to the Earth's surface that take place in rock and water cycles. The constitution and the behavior of the lithosphere and the hydrosphere as well as the interaction of the two systems are explored from a geological perspective and related to geological questions. Comparative analyses of "geological archives" and current geological and environmental processes are key in the assessment and chronological extrapolation of long-term developments.
The issues and topics for a master's thesis in geology and mineralogy are primarily drawn from applied geology and from exogenous sources (sedimentology), whereby the investigation methods include geochemical, geomaterial and geophysical methods. Additional options for strengthening students' practical skills include excursions, interdisciplinary seminars, and soft skills courses.
Graduates with a bachelor's degree in geosciences with a geology and mineralogy major who then go on to specialize in geology and mineralogy during their master's in geosciences fulfill the requirements of the CHGEOL trade association regarding the professional qualification for becoming a geologist.

5. Information, Advice, Transfer of Study and Examination Credits

5.1 General information and advice

(a) Student Administration Office of the University of Basel, www.unibas.ch, Petersplatz 1, 4001 Basel, https://www.unibas.ch/de/Studiensekretariat.html, tel. +41 (0)61 207 30 23
(b) Basel Student Guide, published by the Basel Student Advice Center, Steinengraben 5, 4051 Basel, tel. 061-207 29 30,
(c) Student Advice Center of Basel-Landschaft (Wuhrmattstr. 23, 4103 Bottmingen, tel. +41 (0)61 552 29 00, and Rosenstr. 25, 4410 Liestal, tel. +41 (0)61 927 28 28, and
(d) University of Applied Sciences and Arts Northwestern Switzerland (http://www.fhnw.ch/)

5.2 Information and advice about studying Geosciences

(a) Student Advice Center: https://www.geo.unibas.ch/de/beratung/, the lecturers for geosciences and the administration office for the Geosciences degree program (email: Rosmarie.Gisin@unibas.ch, tel. +41 (0)61 207 36 45)
(b) Website for the Geosciences degree program: https://www.geo.unibas.ch/de/home/
(c) Geosciences specialist group (https://fg-geo.unibas.ch/)
(d) Office of the Dean of Studies in the Faculty of Science, https://philnat.unibas.ch/de/home/, Klingelbergstr. 50, 4056 Basel, tel. +41 (0)61 267 30 54, email: studiendekanat-philnat@unibas.ch

5.3 Transferring study and examination credits

Recognition of academic achievements already completed during the bachelor's degree:
Courses which have been successfully completed in accordance with the guidelines for the Master's program in Geosciences at the Department of Environmental Sciences at the Faculty of Science of the University of Basel - approved by the Faculty of Science on 21 June 2016 - up to and including FS2019 can be credited to the teaching commission in the corresponding modules of the present guidelines without application.

Translated with www.DeepL.com/Translator
On behalf of the Geosciences Teaching Committee, the Faculty of Science Examination Committee takes all decisions concerning the transfer of applicable study and examination credits as well as credit points that have been earned on another degree program or at another higher education institution.

Procedure: A written application containing a detailed list of all study credits to be transferred is submitted to the Office of the Dean of Studies in the Faculty of Science. A copy of all certificates for the study credits must also be submitted with the application, together with a short summary of the contents of the relevant course(s).

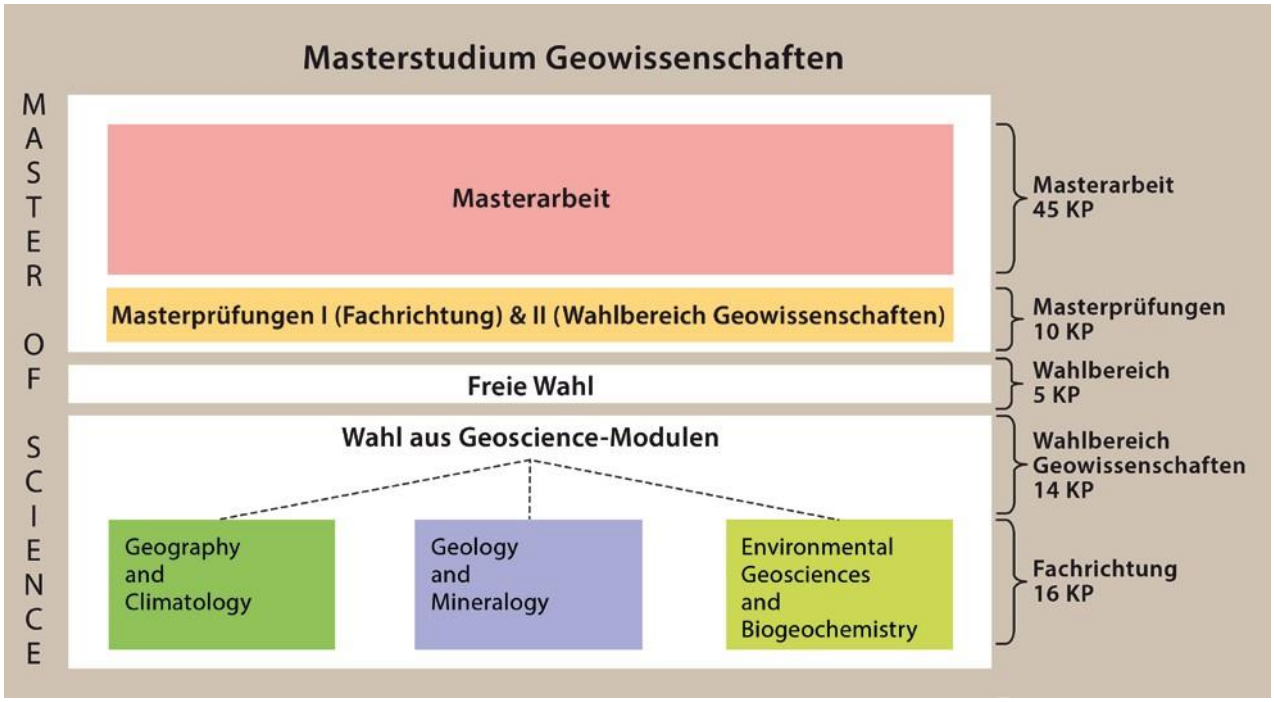
Students are informed in writing about the transfer of study and examination credits as well as credit points. The letter is issued by the Office of the Dean of Studies of the faculty.

Further information is available from the administration office for the Geosciences degree program (email: Rosmarie.Gisin@unibas.ch, +41 (0)61 207 36 45).

6. Program Structure

Translation graphic

Masterstudium Geowissenschaften	Master's in Geosciences
Masterarbeit	master's thesis
Masterprüfungen I (Fachrichtung) & II (Wahlbereich Geowissenschaften)	master's examinations I (subject area) & II (geosciences elective)
Freie Wahl	free choice
Wahl aus Geoscience-Modulen	choice from geoscience modules
Masterarbeit	master's thesis
Masterprüfungen	master's examinations
Wahlbereich	elective
Wahlbereich Geowissenschaften	geosciences elective
Fachrichtung	subject area
KP	CP



6.1 Start and duration of the studies

The duration of the master's studies program is three semesters. In the case of part-time studies, the duration of the studies is extended accordingly. It is usually only possible to begin the master's studies in the fall semester. Starting in the spring semester may result in an extension of the stipulated regular period of study.

6.2 Master's thesis

The master's thesis is the most important component of the master's studies program. For this reason, students should contact a potential supervisor as early as possible. The master's thesis can be supervised by a staff member who has completed his/her habilitation or who holds an equivalent qualification, and who has been approved by the Teaching Committee. The master's thesis can also be completed outside of the university (e.g. with an environmental authority, environmental assessment office, institutions abroad) on the condition that a specialist supervisor can be guaranteed and that the topic of the thesis and its realization has been discussed with the responsible course leader before work on the thesis begins (refer also to the Regulations for Master's Studies in Geosciences).

The master's thesis is worth 45 credit points and corresponds to nine months of full-time studies. Students choose the topic and scope of the master's thesis, as well as the most thematically relevant courses to take, in collaboration with their supervisor. The writing time for the master's thesis begins with the creation of the master's agreement. This agreement officially stipulates the thesis title, beginning date and end date, as well as the supervisor and any co-supervising institution. The first written draft of an introductory chapter should be completed by this stage.

The thesis is usually written in German or English; other languages are accepted in agreement with the responsible course leader and with permission from the teaching committee.
Students are permitted to interrupt their master's thesis within the first two months. Stopping at a later point results in a fail grade for the thesis, unless an extension due to illness or an accident is required.
In exceptional cases and with good reason, students may submit an application to extend the writing time to the Geosciences Teaching Committee.

Assessments are carried out in writing by the supervisor and are usually handed over to the office for the degree program six weeks after thesis submission at the latest (see Chapter 7 for the assessment template).

Copies of the thesis: One copy is given to the supervisors, and one copy is stored in the archive of the library of the respective supervisor. In addition, a CD with a copy of the thesis as a PDF is also desirable – for legal reasons, the submission of a CD is to be negotiated between the student and supervisor. In terms of format, ring binding is the only binding format that is not permitted.

6.3 Master's examinations

The Master's examinations are comprised of two oral examinations with different examiners. Present are an examiner and an observer. The duration of the examination part I for the selected subject area (6 CP) lasts 45 minutes, and the examination part II (4 CP) lasts 30 minutes. Any examiner (with a professorship or equivalent qualification) can be chosen from the examiners approved by the teaching committee. The candidate should contact the examiner in good time (around three months before the desired examination date) in order to clarify the examination formalities (including the invigilator, who should possess a Master's of Science or equivalent qualification). Candidates must register for examinations in person with the administration office for the geosciences degree program at least three weeks before the examination date.
The examinations cover the material from the individual courses and are intended to show that candidates have gained an interdisciplinary overview of the subject area.

6.4 Elective module (5 CP)

The courses can be selected from the entire curriculum of the University of Basel. A maximum of 1 CP can be earned through a poster or a presentation at a scientific conference, and a maximum of 4 CP can be earned from tutorial work, as well as maximum 1 CP for participating in academic self-government. A learning contract must be drawn up with the signatures of the student, the relevant lecturer and the chair of the teaching committee (see Chapter 7 for information about the learning contract) before any assessments are undertaken.

6.5 Elective module in geosciences (14 CP)

For the elective module in geosciences, students can choose courses from the entire geosciences curriculum. This allows students to strengthen their competencies within geosciences, either by specializing further within the selected subject area (noting that for the examiner for examination part II cannot be the same as the examiner of examination I) or by supplementing their expertise with other subject areas. Students must choose courses from the geosciences master's curriculum amounting to 14 CP.

6.6 Module from the subject areas (16 CP)

Students can choose from modules in environmental geosciences and biogeochemistry, geography and climatology, and geology and mineralogy. This allows them to specialize in one of these subject areas within geosciences. From the teaching curricula for these modules, students must choose courses amounting to 16 credit points, ensuring that they take any mandatory courses for these subject areas (see the respective modules).

Information about the current semester is available on the website https://www.geo.unibas.ch/de/laufendes-semester/, on the websites for the different subject areas https://duw.unibas.ch/de/forschungsgruppen/, and via the online course directory for the University of Basel.

V = Vorlesung / lecture
Ü = Übung /practical course
FS = Forschungsseminar/ research seminar
E = Exkursion / excursion
GP = Geländepraktikum / practical field course
P = Praktikum / practical course
S = Seminar / seminar

Environmental Geosciences and Biogeochemistry	**Type**	**Min. 16 CP**	**Core**
Current Topics in Geosciences	V	1	•
Pedosphere and Hydrosphere – Biogeochemistry and Modelling of Element and Sediment Cycling	V+Ü	Max. 4	•
Scientific Writing in Natural Sciences	Ü	2	•
Current Studies *(field of master's thesis)*	FS	1-2	•*
Recent and Classic Papers in Environmental Sciences	S	2	
Introduction to Geo-Microbiology and Organic Geochemistry	V+Ü	3	
Soil System Sciences: *(different topics)*	V+Ü	Max. 5	
Sustainability in Ecosystem Research	E Project	2 3	
Marine Biology and Biogeochemistry	GP	4	
Oceanography: Regional Oceanography and Marine Ecosystems	V	2	
Environmental Systems: *(different topics)*	V+Ü/V	Max. 5	
Microbial Ecology and Biogeochemistry of Alpine Aquatic Ecosystems	GP	2	
Hands-on Laboratory Practice in Environmental Microbiology	P	2	
Terrestrial Palaeoenvironments and Long-Term Ecology	V+Ü	2	
Biotic Indicators and Palaeoecological Reconstruction	V	Max. 2	
Biological and Integrated Pest Management	V+Ü	2	
Environmental Geosciences, Biogeochemistry and Geoecology *(3 days)*	E	1	

Geography and Climatology	**Type**	**Min. 16 CP**	**Core**
Current Topics in Geosciences	V	1	•
Current Studies (*field of master's thesis)*	FS	1-2	•
Physical Geography and Environmental Change	S	3	PG
Ecozones of the Earth	V+Ü	3	
Use of UAV's in Geography	V+Ü	2	
Research Course in Geography *(variable intervals)*	GP	Max. 5	
Physical Geography	P	3	
Applied Geomorphology *(different topics)*	Ü	Max. 4	
Extended Fieldtrips *(variable intervals)*	E	Max. 6	
Field Trip in Upper Rhine Thematic Geography *(different topics)*	E	Max. 2	
Environmental Systems: Atmosphere	V	3	
Urban Climatology	V	3	
Air Pollution Control	P	3	
Research Seminar in Human Geography *(different topics)*	S	3	HG
Statistical Applications in Urban and Regional Development	V+Ü	3	
Statistical and GIS-Applications in Urban and Regional Development	P	3	
Advanced Methods in Scientific Literature Research	Ü	2	
Scientific Writing in Natural Sciences	Ü	2	

PG: Mandatory if the master's thesis is written in Physical Geography.
HG: Mandatory if the master's thesis is written in Human Geography.

Geology and Mineralogy	**Type**	**Min. 16 CP**	**Core**
Current Topics in Geosciences	V	1	•
Current Studies (field of master's thesis)	FS	1-2	•
Geophysical Methods in Environmental Sciences	V+Ü	2	
Hydrogeological Modelling	V+Ü	2	
Geosciences for Urban Resource Management	V+Ü	2	
Introduction to Micropaleontology	V+Ü	3	
Marine and Coastal Sedimentology	V+Ü	3	
Advanced Mineralogy	V+Ü	2	
Methods in Geochemistry	P	2	
Microscopy of Metamorphic Rocks	V+P	3	
Polarization Microscopy of Magmatic Rocks	V+P	3	
Introduction into Gemmology	V	3	
Methods in Gemmology	P	2	
Analytical Gemmology	Ü	2	
Gemmology	E	1	
Low Temperature Thermochronology	V+Ü	2	
Plancton Stratigraphy	V+Ü	3	
Scientific Writing in Natural Sciences	Ü	2	
Geology and Mineralogy	E	1	

7. Course Certificates and Examinations

Credit points are awarded for the passing of course assessments. These reflect the amount of work that is required to pass a particular assessment.

They are awarded for:

a) Sufficient credits in graded written and oral examinations (at least one grade of 4.0)
b) A pass in ungraded assessments in individual courses
c) Poster/presentation, tutorial work and participation in academic self-government

In geosciences, course assessments for the master's studies program take the form of continuous assessment in accordance with section 13 of the Framework Regulations.

Course assessments for a poster or presentation, tutorial work, or through participation in academic self-government are awarded on the basis of a learning contract in accordance with section 14 of the Framework Regulations.

Master's examinations are conducted in accordance with section 15 of the Framework Regulations.

The master's thesis is assessed based on an agreement (access the form here: https://www.geo.unibas.ch/de/studiengaenge/msc-geowissenschaften/) in accordance with section 16 of the Framework Regulations. The master thesis is graded.
The template for the master's thesis assessment can be found at:
https://www.geo.unibas.ch/de/studiengaenge/msc-geowissenschaften//

Assessments for courses taken as electives outside geosciences are conducted in accordance with the study regulations and guidelines of the respective degree programs.

8. Quality Assurance

The quality of the courses offered is monitored by lecturers through regular student evaluations. Additional evaluations may be recommended or requested by the Geosciences Teaching Committee.