

MSc in Hydrogeology and Geothermics

Faculty of Science, University of Neuchâtel

Dedicated to water and underground energy resources as solutions for a sustainable vision

Moving towards sustainable use of subsurface water and energy resources is a major challenge for our society, and for geoscientists in particular. This MSc degree, unique in Switzerland, offers a complete introduction to the current scientific approaches to address this challenge.

The program delivers comprehensive hydrogeological training that covers the relevant physical, chemical, biological and thermal processes, as well as key field investigation techniques.

Prof. in charge of the curriculum

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Enquiries

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Version

Study plan dated 12 May 2023
Valid for the academic year 2023-2024

General structure of the program :

The Master in Hydrogeology and Geothermics is a 120 ECTS credits program planned over the span of 2 years. Intense teaching and practical field work over three semesters provide students with core knowledge and specific skills in hydrogeology and geothermics. The fourth semester is devoted to an individual research project, to be carried out internally or in collaboration with external partners.

Semester 1	Semester 2	Semester 3	Semesters 3 and 4
Fundamentals of Geothermics, Hydrogeology and Hydrochemistry	Hydrogeological Systems	Advanced Methods	Master thesis preparation and research
Fundamental Skills	Methods I	Methods II	
	Resources Management I	Resources Management II	
30 ECTS	30 ECTS	24 ECTS	36 ECTS

First year (semesters 1 and 2)

Modules/courses	Duration	Semester	ECTS	Principal Lecturer(s)	Evaluation
Fundamentals of Geothermics, Hydrogeology and Hydrochemistry			18		
Hydrological and Hydrogeological processes	56	A	6	Prof. P. Brunner	Written, 2 hours
Hydrochemistry	28	A	3	Prof. D. Hunkeler	Written, 1 hour
Geodynamics, Earthquake Physics and Geothermics	56	A	6	Prof. S. Miller	Written, 2 hours
Geothermal Field Trip	7 d	A	3	Prof. S. Miller	CA (pass)
Fundamental Skills			12		
Mathématiques et statistique	28	A	3	Dr J. Straubhaar	Written, 1 hour
Scientific Method and Communication	28	A	3	Prof. S. Miller, Dr L. Halloran	CA (graded)
Essais hydrauliques	28	A	3	Prof. P. Renard	CA (graded)
Field Camp I	7 d	A	3	Dr L. Halloran, Dr C. Roques	CA (pass)
Hydrogeological Systems			9		
Systèmes karstiques	28	S	3	Dr P-Y. Jeannin	CA (graded)
Fractured Systems	28	S	3	Prof. B. Valley	
Systèmes aquifères alluviaux	28	S	3	Dr C. Roques	CA (graded)
Methods I			12		
Natural and Artificial Tracers	28	S	3	Prof. D. Hunkeler	Written, 1 hour
Hydrogeophysics and Borehole Geophysics	28	S	3	Prof. B. Valley, Dr K. Holliger	CA (graded)
Hydrogeological Modelling	28	S	3	Prof. P. Brunner, Dr L. Halloran	CA (graded)
Numerical Modelling of Transport and Geomechanical Processes I	28	S	3	Prof. S. Miller	CA (graded)
Resources Management I			9		
Water Supply and Protection	28	S	3	Profs. B. Valley, D. Hunkeler	CA (graded)
Contaminants Hydrogeology	28	S	3	Prof. D. Hunkeler	CA (graded)
Engineering Geology and Geotechnics	28	S	3	Prof. B. Valley, Dr C. Roques	CA (graded)
Total ECTS First year courses			60		

Second year (semesters 3 and 4)

Modules/courses	Duration	Semester	ECTS	Principal Lecturer(s)	Evaluation
Methods II			12		
Stochastic Hydrogeology	28	A	3	Prof. P. Renard	CA (graded)
Numerical Modelling of Transport and Geomechanical Processes II <i>(not taught in 2023-24, cf. transitional provisions)</i>	28	A	3	Prof. S. Miller	CA (graded)
Hydrogeological Modelling <i>(cf. transitional provisions)</i>	28	A	3	Prof. P. Brunner, Dr L. Halloran	CA (graded)
Field Camp II	14 d	A	6	Dr L. Halloran, Dr C. Roques	CA (pass)
Advanced methods (choose one)			3		
Remote Sensing	28	A	3	Prof. P. Brunner	CA (graded)
Geological Modelling	28	A	3	Dr C. Roques	CA (graded)
Resources management II			9		
Urban Hydrogeology	28	A	3	Prof. M. Schirmer	CA (graded)
Humanitarian Hydrogeology	28	A	3	Dr. E. Milnes, Prof. P. Brunner	CA (graded)
Systèmes géothermiques peu profonds	28	A	3	Dr V. Badoux	CA (graded)
Total ECTS Second year courses			24		
Master thesis preparation and research			36		
Seminar and project	90	A	6	Prof. P. Brunner, D. Hunkeler, S. Miller, B. Valley, P. Renard	CA (pass)
Master thesis		S	30		CA (graded)
Total ECTS MSc in Hydrogeology and Geothermics			120		

Complementary information

Evaluations and regulations

- Course and exam registration in IS-Academia is compulsory for course validation.
- For details regarding Faculty regulations, please consult the *Règlement d'études et d'examens de la Faculté des sciences* and existing directives on the Faculty's webpage (www.unine.ch/sciences).
- Continuous assessment evaluations (pass or graded) are specified in the corresponding course description.

Abbreviations and grades

- CA** = continuous assessment
- d** = days
- N.N.** = teacher to be designated
- A** = autumn semester
- S** = spring semester

Transitional provisions for Methods modules

Students who previously validated all the courses of the Methods I module, according to the 2022-2023 study plan, including *Numerical Modelling of Transport and Geomechanical Processes*, must follow the *Hydrogeological modelling* course during the autumn semester of their second year (semester 3). The course given during the spring semester is intended for 2023-2024 1st year students.

2nd year students who did not previously attend the *Numerical Modelling of Transport and Geomechanical Processes* course will be contacted by the Faculty secretary's office in order to establish personalized transitional provisions.

Students who attended (registered) all courses of the Methods I module but did not obtain all the related ECTS credits, must validate the Methods I module according to the 2022-2023 study plan.

Examination modalities in the case of online exam sessions

If an exam session has to be held online, the examination modalities mentioned in this study plan are maintained and will be following.

- For a written exam to be held during the exam session (1h, 2h or 3h), the online exam will be of the duration mentioned by the study plan. An exception is made when the same exam evaluates two or more different courses simultaneously (indicated as a common or grouped exam in the study plan). In this case, the courses will be examined separately when the exam takes place online. The duration of each part of the on-line exam will be defined by the number of ECTS each examined course. A single mark will be notified for any such split up exam, as specified by the study plan.
- For oral exams to be held during the exam session, the online duration of the exam is maintained as specified in the study plan.
- Continuous assessments (graded or ungraded) remain unchanged even if the exam session is taking place online. If required, the evaluation modality will be adapted to the situation. The course description will be updated accordingly by the teacher in charge.
- All exams and assessments that take place in other Faculties or Universities remain under their responsibility and the FS cannot be held liable for specific rules and regulations regarding those evaluations.