unine
Université de Neuchâtel
Faculté des sciences

MSc in Biology

Faculty of Science, University of Neuchâtel

An integral and transversal curriculum
The Master of Science in Biology offers a programme that lets students select their area of specialization and acquire a diverse range of transferable skills. This MSc proposes an integrative approach: it begins with a common core of courses covering key topics in biology, with particular emphasis on methodological and quantitative aspects. Students then choose two of the five available specialisations: chemical ecology, biodiversity, animal behaviour, ecology, and microbial interaction.

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Valid for the academic year 2025-2026

General structure of the programme :
The Master in Biology is a programme given over the span of 2 years and requires 120 ECTS credits to complete. The first semester is dedicated to the core curriculum, whereas the second semester is dedicated to the acquisition of specialisations. Of the five specialisations available in 3 groups, each student chooses two from two different groups. The second year is entirely dedicated to field work and the completion of a Master thesis.

<table>
<tr><td colspan="2">Core curriculum</td><td colspan="2">Specialisations and Master thesis</td></tr>
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<tr><td>Seminars</td><td>Excursions</td><td>Animal behaviour</td><td></td></tr>
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(2nd year)</td></tr>
<tr><td rowspan="2"></td><td>Free electives</td><td>Ecology and conservation</td></tr>
<tr><td></td><td>Chemical ecology</td></tr>
<tr><td>21 ECTS</td><td>15 ECTS</td><td colspan="2">24 ECTS specialization + 60 ECTS Master thesis</td></tr>
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Compulsory courses

Modules/courses	Duration	Semester	ECTS	Principal Lecturer	Evaluation
Generic skills module			**12**		
Statistics	30	A	3	Dr R. Slobodeanu	CA (graded)
Scientific writing	30	A	3	Prof. K. Zuberbühler	CA (graded)
Bioinformatic tools	30	A	3	Dr T. Badet	CA (graded)
Seminars by externals	28	A and S	3	Prof. J. Grant	CA (pass)
Seminars module (choose two)			**6**		
Ecology and sustainability	30	A	3	Prof. J. Vermeer	CA (graded)
Ecology and evolution	30	A	3	Prof. K. Zuberbühler	CA (graded)
Ecology and biodiversity	30	A	3	Prof. D. Croll	CA (graded)
Laboratory methods (choose one)			**3**		
Molecular methods	7 hd	A	3	Dr S. Venkatasalam (Prof. F. Kessler)	CA (graded)
Natural substances analyses	7 hd	A	3	Profs. S. Von Reuss and G. Roeder	CA (graded)
Total ECTS Core compulsory courses			**21**		

Elective courses

Modules/courses	Duration	Semester	ECTS	Principal Lecturer	Evaluation
Special skills			**3-15**		
Introduction to geomatics for biodiversity conservation	28	A	3	Dr S. Boillat	CA (graded)
Microscopy	7 hd	A	3	Dr. S. Zabihzadeh (CSEM)	CA (graded)
Animal conservation	28	A	3	Dr. C. Duccoterd	Written, 1 hour
Methods in biodiversity monitoring	28	A	3	Prof. C. Praz	Written, 1 hour
Plant ecophysiology	28	S	3	Prof. M. Legris	CA (graded)
Plant domestication and breeding	28	S	3	Prof. L. Kalmbach	CA (graded)
Bioinformatics applications	28	S	3	Prof. D. Croll	CA (graded)
Advanced geomatics	28	S	3	Dr S. Boillat	CA (graded)
Genomics of biodiversity	28	S	3	Prof. K. Lucek	CA (graded)

Elective courses

Modules/courses	Duration	Semester	ECTS	Principal Lecturer	Evaluation
Excursion (choose one max.)			**max. 3**		
EXC Tropical forest ethology	7 d	S	3	Prof. K. Zuberbühler	CA (pass)
EXC Marine biology	7 d	S	3	Prof. R. Bshary	CA (pass)
EXC Mediterranean ecology	7 d	S	3	Prof. E. Mitchell	CA (pass)
EXC Alpine ecology	7 d	S	3	Prof. S. Rasmann Prof. J. Grant	CA (pass)
Internship (see remarks)			**max. 6**		
Approved by course controller		A or S	3 - 6	Prof. S. Rasmann	CA (pass)
Free electives (see remarks)			**max. 12**		
Non-validated core compulsory course		A	max. 3		CA (graded)
Approved by course controller		A or S	max. 12		
Total ECTS Core elective courses			**15**		

Specialisations (see remarks)

Modules/courses	Duration	Semester	ECTS	Principal Lecturer	Evaluation
Group I					
Microbial interactions module			**12**		
Microbiome applications	28	S	3	Prof. D. Croll	CA (graded)
Environmental mycology	28	S	3	Prof. S. Bindschedler	CA (graded)
Microbial ecology	28	S	3	Prof. P. Junier	CA (graded)
Plant pathology	28	S	3	Dr T. Badet	CA (graded)
Animal behaviour module			**12**		
Advanced behavioural physiology	28	S	3	Prof. Z. Triki	CA (graded)
Animal behaviour research	28	S	3	Prof. K. Zuberbühler	CA (graded)
Behavioural ecology	28	S	3	Dr. E. Van de Waal Dr. A. Motes Rodrigo	CA (graded)
Comparative cognition	28	S	3	Prof. K. Zuberbühler	CA (graded)

Specialisations (see remarks)

Modules/courses	Duration	Semester	ECTS	Principal Lecturer	Evaluation
Group II					
Biodiversity module			**12**		
Soil biodiversity	28	S	3	Prof. E. Mitchell	CA (graded)
Plant systematics and evolution	28	S	3	Prof. J. Grant	CA (graded)
Biodiversity and ecosystem functioning	28	S	3	Prof. C. Zemp	CA (graded)
Biodiversity data analysis	28	S	3	Dr E. Defossez	CA (graded)
Group III					
Ecology and conservation module			**12**		
Methods in vegetation ecology	28	S	3	Prof. S. Rasmann	CA (graded)
Advanced population ecology	28	S	3	Dr. E. Martin	CA (graded)
Ecological genomics	28	S	3	Prof. D. Croll	CA (graded)
Animal population monitoring practicals	3 d	S	3	Dr B. Schmidt (info fauna)	CA (graded)
Chemical ecology module			**12**		
Chemical ecology	28	S	3	Prof. P. Zu	Written, 1 hour
Biosynthesis and function of secondary compounds	28	S	3	Profs. J. Vermeer and F. Kessler	CA (graded)
Plant molecular genetics (+labs)	28	S	3	Prof. J. Vermeer	CA (graded)
Natural products chemistry (+labs)	28	S	3	Prof. S. Von Reuss	CA (graded)
Total ECTS Specialisations			**24**		
Master thesis			**60**		
Master thesis		A and S	60		CA (graded)
Total ECTS MSc in Biology			**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).
- Continous assessment evaluations (pass or graded) are specified in the corresponding course description.
- Elective courses must be validated with a sufficient mark (4.0) and cannot be compensated.
- When an evaluation of a course chosen from the modules **Seminars** and **Laboratory methods** is failed and not compensated after a second attempt, students have the option to choose another course of the same module until all choices are exhausted.

Abbreviations and grades

labs = laboratory work
EXE = exercises
EXC = excursions
CA = continous assessment
hd = half-days
d = days
N.N. = teacher to be designated
A = autumn semester
S = spring semester

Remarks

- **Specializations :** Students must choose two specializations from two different groups.
- **Master thesis :** Must be supervised by a professor of the Institute of Biology.
- **Internship :** Students can validate an approx. 4 week internship for 3 ECTS credits during their Master program. For all related details, please contact Prof. S. Rasmann.
- **Free electives :** Up to 12 ECTS credits can be validated as free electives. Courses must be pre approved by the prof. in charge of the curriculum. In addition, they must be Master level courses and in relation to the field of Biology.
- **Excursions :** Available space may be limited (not possible for external students).

Transitional provisions :

- Students that partially validated one of the modified specialisations (cf. list below) by the end of the academic year 2024-2025, will be contacted by the Secretary of the Faculty's office in order to establish individual transitional provisions, if required.
  In general, specialisations must validated according to the study plan in effect at the time they were started.
  Modified specialisations:
  - Animal behaviour module (modified)
  - Biodiversity module (modified)
  - Ecology module (replaces Conservation biology module)

Learning outcomes

On completion of the program, students will be able to:

Knowledge and understanding:
- Specify suitable analytical tools for data problems in the domain.
- Summarise current research in biology.
- Identify main methods in biodiversity.
- Examine major tools in biology in the laboratory.

Applying knowledge and understanding:
- Develop large datasets acquired experimentally or in the field.
- Organise large datasets using suitable computer programs.
- Design models for biological problems.
- Critically analyse scientific publications in the domain to judge their scientific quality.
- Reproduce methods in molecular biology.
- Test natural substance analysis techniques.
- Solve problems of space representation.
- Experiment with real biological problems.
- Use real biological methods.

Making judgements:
- Criticise current research in biology based on acquired knowledge about methods and through literature research.

Communication skills:
- Communicate specific scientific results to scientific and non-scientific audiences in oral and written form (oral presentation, poster presentation, written report and scientific publication).

Learning skills:
- Manage a scientific project including data collection, organisation and analysis of data and presentation of results in oral and written form.