Environmental Biology

Degree conferred
Master of Science in Environmental Biology

Options
Four options are available:

- Ecology and Evolution
- Plant and Microbial Sciences
- Applied Environmental Biology
- Teaching

Languages of study
Study in English

Commencement of studies
Commencement of studies in the Autumn Semester (September) or in the Spring Semester (February).
You are recommended to commence your studies in the autumn semester (September).

Access to further studies
This master programme qualifies students for the doctoral programme **Biology**

Major environmental problems, in particular global change and its consequences for biodiversity and ecosystem functioning, are intimately interconnected and pose a threat to our future. Solving these problems requires an integrative and synergistic approach in terms of both fundamental and applied research. The Department of Biology of the Faculty of Science and Medicine offers a multidisciplinary *Master of Science in Environmental Biology*. The programme ranges from fundamental concepts in ecology and evolution to molecular aspects of plant and microbial sciences through applied solutions for environmental policies and sustainable development. It provides students with state-of-the-art training and background in conceptual, technical, and applied aspects of environmental biology. Master students are integrated into active research teams and can thus gain extensive experience in basic and applied academic research in environmental biology.

Profile of the study programme

The master students in this programme will acquire cutting-edge knowledge and skills in basic and applied aspects of environmental biology. The programme emphasises the development of both scientific and soft skills, e.g. independent analytical thinking, problem-solving, critical evaluation and analysis of data, oral and written communication, and the ability to work in a team. Courses are accompanied by discussions, student presentations and project writing exercises. The master thesis (60 ECTS credits in case of the three 120 ECTS options; 45 ECTS credits in case of the 90 ECTS «Teaching» option) is carried out in one of the research teams, possibly in collaboration with other research institutions, giving students the opportunity to experience all aspects of the daily life of a research scientist. Students also have the opportunity to present their work during a research seminar. An agreement with the Universities of Bern and Neuchâtel (BENEFRI Framework Convention) allows students to take elective courses in these institutions and to have them credited for the study programme in Fribourg. The master programme in Environmental Biology is accessible to students who have completed their Bachelor of Science in Biology. Students who have completed their Bachelor of Science in Biochemistry are also eligible provided they have chosen the necessary courses in their BSc curriculum.

The *Master of Science in Environmental Biology* offers four options. These options are complementary but also contain shared courses, and students have the opportunity, next to a set of mandatory courses, to customise their study plan according to their interests. The three 120 ECTS options below focus on research; the fourth option («Teaching», 90 ECTS) is appropriate for students who would like to become teachers. The four options are:

1. Ecology and Evolution (120 ECTS credits)
This option is centred on the conceptual and empirical aspects of ecology and evolution. It covers fundamental areas ranging from population, community to ecosystems ecology; theoretical ecology and evolution; eco-evolutionary feedback dynamics; evolutionary and population genetics; evolutionary and ecological genomics; behavioural ecology; the evolution of life histories and aging; as well as phylogenetic analyses of organismal relationships. Research groups in these areas work on a variety of study systems and use a broad range of experimental, observational, and theoretical approaches. Biological systems include various insects; birds; plants and their microorganismal communities; microbial soil communities; relict tree species; threatened aquatic species; invasive species; and alpine vegetation ecosystems. Methods encompass laboratory experiments; field observations and experiments; genomics and bioinformatics; statistical analyses; computer simulations and theoretical modelling.

2. Plant and Microbial Sciences (120 ECTS credits)
This option focuses on the molecular aspects of plant health and development and includes the study of plant-associated microbiota. It covers an exciting range of subjects such as molecular signalling systems, resistance and tolerance of plants to biotic and abiotic stress, the molecular basis of immunity, interactions between plants and their symbionts, plant microbiota, plant biotechnology, as well as plant systematics and biogeography. To address questions in these areas, research teams use various well-established model plants (Arabidopsis, Petunia, tobacco) and plants of agronomical relevance (potato, tomato, grapevine). They rely on a wide array of methods including biochemistry, molecular biology, genetics, genomics, proteomics and metabolomics as well as cellular imaging. Researchers collaborate with agronomical research institutions such as Agroscope, FiBL (Forschungsinstitut fu?r biologischen Landbau), and the agricultural school in Grangeneuve, amongst others.

3. Applied Environmental Biology (120 ECTS credits)
This option addresses important applied facets of environmental biology, especially in terms of biological invasions, conservation biology and sustainable crop protection; it also addresses the consequences of global change. In collaboration with the Environmental Sciences and Humanities Institute, students have the opportunity to learn about major current issues in environmental ethics, policy making and sustainable development. Research methods in this area include for example field and laboratory experiments; database mining and meta-analyses; computer simulations; as well as working out policy recommendations. Researchers in this field (working mostly on applied aspects of ecology and microbiology) collaborate with applied research institutions such as Agroscope, FiBL (Forschungsinstitut fu?r biologischen Landbau), or CABI. This master option also offers the opportunity to carry out either a short research internship or the master project in such a partner research institution.

4. Teaching (90 ECTS credits)
This option combines core courses from the 3 options above and is appropriate for students who are interested in becoming teachers at the secondary level II. The students taking this option will need to complement the 90 ECTS credits with 30 ECTS credits from another programme (second teaching subject).

Career prospects
Graduates of this programme will be well prepared for careers inside and outside academia, e.g., in university research and higher education, teaching, agroindustry, federal research institutes and offices (including institution such as Agroscope, FIBL, HAFL, HEPIA, BAFU, BLW, WSL), cantonal offices, private foundations or small-scale businesses. The master's degree in Environmental Biology also paves the way to doctoral studies (PhD) in this subject area (depending on the institution additional requirements might apply).

Studies organisation

Structure of studies

120 ECTS credits, 4 semesters
or
90 ECTS credits, 3 semesters (option «Teaching»)

Curriculum

http://studies.unifr.ch/go/vBvMa

Comments

The master programme **Molecular Life and Health Sciences** is also offered by the Department of Biology.

Admission

Master's degree programmes are built on the knowledge and abilities that were acquired when obtaining a bachelor's degree.

Holders of a bachelor's degree awarded by a Swiss university are admitted to a master's degree programme without any preconditions if they have earned 60 or 90 ECTS credits – depending on the chosen master's degree programme – within the corresponding discipline. However, additional requirements can be required. The same applies to holders of a bachelor's degree awarded by a foreign university, provided that the bachelor's degree is recognised and considered equivalent by the University of Fribourg.

Holders of a bachelor's degree awarded by a Swiss or a foreign university, provided that the bachelor's degree is recognised and considered equivalent by the University of Fribourg, who do not fulfil this condition can be admitted to a master's degree programme with preconditions (which must be successfully completed before starting the master's degree programme) and/or additional requirements (which can be completed during the master's degree programme). The preconditions and/or additional requirements may not exceed 60 ECTS credits in total. The same applies to holders of a bachelor's degree awarded by a Swiss university of applied sciences, according to existing agreements.

The respective conditions of admission for each master's degree programme are reserved.
The master programme in Environmental Biology is accessible to students who have completed their Bachelor of Science in Biology. Students who have completed their Bachelor of Science in Biochemistry are also eligible provided they have chosen the necessary courses in their BSc curriculum.

Alternatives

Also offered as a minor study programme (30 ECTS credits) as part of the Diplôme d'Enseignement pour les Ecoles de Maturité (DEEM)/Lehrdiplom für Maturitätsschulen (LDM).

Contact

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