Biology

Degree conferred
Master of Science in Biology

Options
Four options available:
- Biochemistry
- Ecology and Evolution
- Animal Molecular Life Sciences
- Plant and Microbial Sciences

Languages of study
Study in English

Commencement of studies
Commencement of studies in the Autumn Semester (September) or in the Spring Semester (February)

Access to further studies
This master programme qualifies students also for the doctoral programme Medical Sciences

The Department of Biology of the Faculty of Science offers a multidisciplinary master programme with four different orientations: Biochemistry, Ecology and Evolution, Animal Molecular Life Sciences and Plant and Microbial Sciences. An agreement with the Universities of Bern and Neuchâtel allows students to take elective courses in both institutions as well. Master's students are integrated in research teams and have the opportunity to experience all aspects of the daily life of a research scientist, gaining extensive experience in academic research. They will also have the possibility to participate in teaching practical courses and other assisting activities.

Profile of the study programme

The study of biology opens the doors to a fascinating world, from the biomolecules to the functioning of ecosystems. The University of Fribourg offers a multidisciplinary study programme leading to the degree of Master of Science in Biology, placing a special emphasis on the development of students' scientific capabilities, such as independent thinking, problem-solving skills, critical evaluation of data, oral and written communication skills, and the ability to work in a team. English is the main language for all activities, but students can choose to take their exams in English, French or German.

As a master's student, you will deepen your knowledge of modern biological sciences and acquire techniques needed in basic research as well as in practical applications. An agreement with the Universities of Bern and Neuchâtel (Framework Convention BENEFRI) allows you to take elective courses in these Institutions and have them credited for the study programme in Fribourg. The courses, obligatory and elective, are accompanied by discussions, presentations by students and project writing exercises. As a master's student you are integrated in one of the research teams and have the opportunity to experience all aspects of the daily life of a research scientist, gaining extensive experience in academic research, learning to plan, carry out, analyse and presenting research. You will also have the possibility to participate in teaching practical courses and other assisting activities for which you are paid by the hour.

The Department of Biology of the Faculty of Science offers four different orientations for the Master of Science in Biology:

1. **Biochemistry**
   - The orientation Biochemistry, puts special emphasis on biomolecules regulating the internal clock, food sensing and growth control, lipid metabolism, ribosome biogenesis, membrane lipids and carbohydrates. The organisms studied are the mouse and the unicellular eukaryotic fungus *Saccharomyces cerevisiae* (Baker's yeast). Both allow a fascinating and detailed study of gene function and regulation of homeostasis.

2. **Ecology and Evolution**
   - This orientation promotes higher education and research in organismic biology, in particular in ecology and evolution. Current research interests of members of the unit include food web structure, conservation biology, invasive species, agro-ecology, host-parasite interactions, life-history evolution, inbreeding depression, evolution in fragmented habitats, and population genetics. The organisms investigated are whole food webs, water fleas (*Daphnia*), horse chestnut leaf miner (*Cameraria*), as well as plants: spotted knapweed (*Centaurea stoebe*), groundsel (*Senecio*), false hellebore (*Veratrum*), dock (*Rumex*), poplar (*Populus*) and their natural enemies.

3. **Animal Molecular Life Sciences**
   - This orientation is centred on the mechanisms that govern animal development in the following animal model systems: The fruit fly *Drosophila melanogaster*, the nematode *Caenorhabditis elegans*, the zebra fish *Danio rerio* and the mouse. Research groups investigate molecular aspects of regeneration, cell differentiation, neuronal outgrowth and connectivity, behaviour, chemoreceptors, and aging. The tools employed are molecular genetics, molecular biology, protein analysis, microscopy and imaging, behavioural analysis and many more.

4. **Plant and Microbial Sciences**
   - This orientation emphasises the cellular and molecular aspects of pathogenic and symbiotic plant-microbe interactions. The research groups focus on aspects ranging from the recognition of microbes by the plants, initiation of defences, metabolic and hormonal adjustments, and interference of the microbe with the host defences. A gamut of modern tools are used in the areas of molecular biology, reverse genetics, imaging and biochemistry. The training
both in practical and theoretical areas will prepare the
students for the challenge of the professional world.

Academic and professional openings
Graduates find job opportunities for example as researchers in
biotech companies, or in laboratories for quality control
(pharmaceutical or agroalimentary industry), as environmental
research consultant, biosafety officer or scientific collaborator at
various offices and departments of the Swiss Confederation, sales
representative for biotech companies, college teachers and many
other jobs in fields as diverse as crop protection, animal and human
health, or in areas linked to the environment. In short, with a
master's degree in Biology, you can apply for positions that require
a solid knowledge in biology, the ability to communicate and to view
science under a critical angle, and some practical experience and
skills. The master's degree also paves the way to doctoral studies
(Ph.D.). During their Ph.D., students learn how to conduct
independent research. During the period of 3-4 years, the Ph.D.
student receives a salary and is exposed to the international
research community through meetings and publications. Doctoral
studies followed by a postdoctoral experience represent the typical
way to access academic positions as well as positions in the upper
management of industry in Switzerland and abroad.

Studies organisation

Structure of studies
90 ECTS credits, 3 semesters

Curriculum
http://studies.unifr.ch/go/xZPll
http://studies.unifr.ch/go/z3FE1

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
keeping 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 fulfill
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.

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

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