Biology

Degree conferred
Bachelor of Science in Biology

Options
This study programme offers various orientations to choose from.

Languages of study
Study in two languages, in French and German

Commencement of studies
Commencement of studies only in the Autumn Semester (September)

Access to further studies
Master

The study of biology imparts knowledge of the fundamental processes on which life – from the simplest bacteria to the human being – is based. This includes development and behaviour of organisms, as well as their interaction with the environment. During the first academic year, students acquire the necessary basic knowledge (general biology, organism biology, chemistry, mathematics, physics). During the second and third years, a choice of specialisation is made, depending on the interest of the student («Biology of Organisms, Evolution and Ecology» or «Molecular Biology, Biochemistry, Genetics and Cell Biology»). The two orientations are, however not necessarily separated: They can in part be combined with each other and many lectures and much practical training are common to both. In addition to lectures, the study programme contains exercises, practical training and seminars, as well as writing a Bachelor’s thesis in a research unit.

Profile of the study programme
The study programme in biology opens the door to a fascinating world. It imparts knowledge of the basic processes underlying the life of the simplest bacterial cell to the human being. Biology deals with the smallest molecular structures, such as genetic material or proteins, as well as with the architecture of entire cells and tissues that contribute to the development of complex organisms. In addition to the analysis of the structure, function and interaction of macromolecules, such as molecular networks and cellular interactions, the development and behaviour of organisms and their interactions with the environment are also studied. Biological research provides the foundations for genetics, molecular biology, cell biology, microbiology, biotechnology, evolutionary biology and environmental sciences. In the medical area, biological research imparts essential knowledge about the structure and functioning of the human body, based on which medicine can determine the causes and effects of illnesses and develop suitable therapies. With the help of biological knowledge, pharmaceutics can in turn produce indispensable drugs, such as insulin or antibiotics, from genetically altered microorganisms instead of from their natural biological source. The production of such drugs is more economical and much more effective. When it comes to farming, crops are equipped with resistance factors against pests and are made less sensitive to drought or a lack of nutrients. In addition, optimal conditions can be determined for the sustainable use of natural resources.

Fribourg profile
The first academic year is the same for all students and constitutes the scientific foundation for the higher semesters. It imparts the necessary and indispensable scientific basic knowledge for the study of biology, the so-called propaedeutic subjects (general biology, organism biology, chemistry, mathematics and physics). During the second and third years, depending on the student's interests, a specialisation in Biology I (organism biology, evolution and ecology) or Biology II (molecular biology, biochemistry, genetics and cell biology) is chosen. Both orientations are, however, not entirely independent of each other, because many lectures and practical courses are common to both. They can also in part be combined with each other.

Whether the orientation Biology I or Biology II is chosen, the Bachelor's programme consists of the major subject, plus one or two selectable additional subjects. The major subject includes the propaedeutic subjects as well as many lectures, exercises, practical courses, seminars and a Bachelor's thesis in a research unit. The courses in biology are held in German and French.

Biology I
Ecology consists of the study of living organism and their interplay with their biotic environment – the other living organisms – and the biologically dead environment. The understanding of this interrelationship is seen solely within the context of evolutionary theory. These two aspects are thus closely linked to each other. The areas of ecology and evolution are encompassing and varied, ranging from the study of micro-organisms to the study of natural ecosystems, from the dynamics of populations to the understanding of the processes of species creation. Because of the global changes that are due to human activities, ecology has become a main issue in society. The protection of biological diversity, the study of biodiversity and the functioning of ecosystems are very active areas of research. Due to its diversity, the study of ecology and evolution calls for a solid basis in general and molecular biology, genetics, and knowledge of species, but also in chemistry, physics and especially mathematics and statistics. This orientation covers different areas, whereby theoretical lectures, laboratory courses, and field work are offered.

Biology II
The lectures in this orientation course are strongly focused on research projects within the field of zoology and plant biology conducted in molecular biology on animal and plant model systems (C. elegans, Drosophila, zebrafish, mouse, Arabidopsis and Petunia). In addition to the conventional strategies in molecular biology, biochemistry, genetics and cell biology, the spectrum of experimental methods also encompasses other modern techniques, such as fluorescence and confocal microscopy, «high throughput»
DNA sequencing and analysis of results with bioinformatic methods, purification and analysis of protein complexes and mass spectroscopy, PCR and the production of transgenic microorganisms, plants or animals.

**Professional openings**
The biology studies at the University of Fribourg are thus suited for students who later wish to offer a broad range of skills on the job market in the areas of molecular and organismic biology.

**Studies organisation**

**Structure of studies**
120 ECTS credits + 60 ECTS credits in one or two minor study programmes freely chosen, 6 semesters

**Curriculum**
http://studies.unifr.ch/go/mjY5 (French)
http://studies.unifr.ch/go/0fTFn (German)

**Admission**
The following **Swiss school-leaving certificates** grant admission to Bachelor programmes at the University of Fribourg:

- Swiss academic Maturity Certificate
- Swiss vocational or specialised Baccalaureate in conjunction with the supplementary exam certificate from the Swiss Maturity Commission
- Bachelor Degree from a Swiss university, from an accredited Swiss university of applied sciences (HES/FH) or from a Swiss university of teacher education (HEP/PH)

A **complete list of all further recognized Swiss school-leaving certificates** is to be found on the webpages of swissuniversities (in French and German only): http://studies.unifr.ch/go/en-admission-swisscertificates

**Foreign upper secondary school-leaving certificates** are recognised only if they correspond substantially to the Swiss Maturity Certificate. They must qualify as general education. Foreign school-leaving certificates are considered to be general education if the last three years of schooling include at least six general education subjects, independent from each other, in accordance with the following list:

1. First language (native language)
2. Second language
3. Mathematics
4. Natural sciences (biology, chemistry or physics)
5. Humanities and social sciences (geography, history or economics/law)
6. Elective (an additional language or an additional subject from category 4 or 5)

The general **admission requirements** to the Bachelor programmes at the University of Fribourg for holders of foreign school-leaving certificates as well as the admission requirements for individual countries are to be found on the webpages of swissuniversities: http://studies.unifr.ch/go/en-admission-country-list

In addition, foreign candidates must present **proof of sufficient language skills in French or German**.

The assessment of foreign school-leaving certificates is based on the «CRUS Recommendations for the Assessment of Foreign Upper Secondary School-Leaving Certificates, 7 September 2007» (http://studies.unifr.ch/go/crus07en). The admission requirements are valid for the respective academic year. The Rectorat of the University of Fribourg reserves the right to change these requirements at any time.

**Alternatives**
Also offered as a minor study programme (60/30 ECTS credits).

**Contact**
Faculty of Science and Medicine
Department of Biology
Dr Alessandro Puoti
bio-scimed@unifr.ch
http://studies.unifr.ch/go/en-biology