

BLUEPRINT

Master of Biology

Faculty of Science



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Mission

The programme is dedicated to top quality education in Biology based on knowledge-driven research. The Master of Biology offers a thorough training in the theory and techniques of fundamental and applied biological research. It emphasises problem-solving, independent thinking and communication. The programme nurtures and objectifies the societal debate on current topics related to Biology with substantiated arguments.

Part 1: profile and vision

Spearheads

- In-depth specialization in the tracks 'Ecology, Evolution and Conservation Biology' and 'Molecular Biology and Physiology' with the possibility to follow advanced courses in both tracks.
- Specific training preparing for a professional career in research or industry.
- Special attention for sustainability and critical reflection on the role of Biology in society.

Educational vision

The programme provides a contemporary and internationally competitive educational curriculum. The content of that curriculum is based on high-level scientific research in both tracks of the master of Biology. The pedagogical methods are based on the latest research in educational innovation and (science) education. The programme provides a solid training in computational skills and advanced statistical methods relevant to Biology. It offers the students the option to further specialize in a specific biological discipline, combine courses from different disciplines, and broaden their knowledge through university-wide elective courses.

The programme aims to activate students to take responsibility for their learning process through appropriate preparation, feedback, and constructive interactions during contact moments with lecturers, teaching assistants and other students. The programme therefore puts emphasis on activating work forms such as work and practical sessions, excursions and internships, and their integration with contemporary, activating teaching forms during the lectures. Core activities stimulated by the programme are critical and comparative analysis and integration of knowledge and insight.

The programme stimulates the development of the 'disciplinary future self' of the students by emphasizing the relevance of Biology when addressing key contemporary challenges and specifying future employment possibilities for biologists. The programme pays particular attention to sustainability and scientific integrity, collaboration and communication, aspects that form an integral part of the students' personal development.

Target audience and influx

The programme targets students with a strong scientific background in Biology (at the bachelor level), and a solid basic knowledge of the related exact sciences. Limited gaps in the students' background can be corrected by taking up remediation courses for up to 18 ECTS.

Future students should have a curious, investigative attitude and an open innovative mind. They are motivated to build a sustainable future and share their enthusiasm for science with others. The targeted incoming students have to possess the capacity for abstract reasoning, well-developed observational abilities, and practical skills for accurate experimental work, and must provide evidence of English proficiency.

The programme informs incoming students through the programme-specific websites of the Faculty of Science, brochures, and several yearly information moments.

Goals and learning objectives

In the master of Biology, the knowledge and skills in Biology acquired during the bachelor programme are further deepened and extended. More specifically, the students are thoroughly trained in one area of specialization (track), which is still situated in a broad scientific and societal context. The students learn to design and carry out a scientific study within a multidisciplinary team, to draw conclusions, and to communicate about it. The students are capable of doing this in compliance with the highest scientific and ethical standards. Furthermore, the students learn to critically and creatively deepen and update their knowledge and skills, and acquire a lifelong learning attitude.

[Objectives Master of Biology](#)

Substantive choices and level

The programme has opted for a limited but important common core and a large specialization part in one of the two broad biological disciplines: 'Ecology, Evolution and Conservation biology' and 'Molecular biology and Physiology'. Given the multidisciplinary nature of Biology, the programme facilitates taking courses of both disciplines.

Specific for Biology is its relevance for and investigation and explanation of biological phenomena at different levels of organisation, from molecules to ecosystems. The related discipline Biochemistry and Biotechnology more specifically considers molecular-chemical phenomena and their biotechnological applications, with special emphasis on developing new technology. Related studies in other faculties are the Bio-engineering sciences, that focus on applications in industry and agriculture, and the Biomedical sciences, that more specifically focus on applications in the human health sector. The master of Biology programme is typically directed more towards fundamental knowledge and insights.

Organization and didactical teams

The programme is the responsibility of the POC (Permanent Education Committee), presided by the programme director. The pedagogical tasks in the master of Biology are carried out by didactical teams of lecturers and teaching assistants. These didactical teams are responsible for guiding the students through the content of a certain course, but also for study progress and psychosocial mentoring. In these teams, everyone can contribute to the pedagogical process from their own strength and expertise and with respect and openness for each other. The department of Biology ensures a balanced allocation of tasks within and among the didactical teams with respect to other responsibilities (in research and service delivery). Communication and transparency are essential to accomplish this.

Alumni, professional field and community

The master of Biology involves the alumni and the professional field in the development and evaluation of the curriculum. On the one hand, this occurs through *ad hoc* consultation moments with delegates of both groups during important program reforms. In this context, the 'fellows of the Faculty' are important contact persons. On the other hand, this occurs in a more structural way through their involvement in the COBRA quality assurance cycle.

Themes of societal relevance with links to Biology are systematically integrated in the master courses as subject of specific lectures and discussion sessions.

Part 2: Realisation of profile and vision

Structure and educational curriculum

The **structure** of the programme ensures that focus is on acquiring in-depth knowledge, insight and skills in one of the biology **tracks**. A **Common core** guarantees the development of software programming skills and the ability to perform advanced statistical analyses. Throughout the programme there is attention for the development of the disciplinary identity and societal relevance. In the common core this is extensively addressed in the 'Biology and Society' course with explicit reflection on societal issues around biological themes and targeted information for students about the professional field. Within the **Elective courses** part, the students can further deepen their knowledge in the chosen track or acquire in-depth knowledge in the other track, remediate important background gaps, specialize in entrepreneurship, or broaden their knowledge and skills in 'Science, Education and Society' or courses from other faculties. The **Master's thesis** allows the students to integrate their advanced knowledge, insights and skills obtained in the various courses and disciplines in a multidisciplinary context and to independently develop their skills in fundamental scientific research.

In the master programme and especially in the master's thesis, the different learning trajectories started in the bachelor programme reach their finalisation. Within the trajectory 'Information skills', the programme aims at the stepwise development of the skills to critically evaluate, interpret and

communicate to the public information from scientific literature and research. Special attention is paid to scientific integrity: students learn to deal with research findings, texts and other sources of information in an appropriate way, and to respectfully treat living plants and animals. This learning trajectory is further deepened in various courses with critical discussion of recent scientific publications and culminates in the master's thesis. The learning trajectory 'Scientific English' aims at the ability to also apply this in an international context. During the master programme this is realized by courses taught in English and by the master's thesis being written and orally defended in English. In the learning trajectory 'Sustainability', the students get further knowledge and insights in diverse sustainability topics in a biological and broader societal context. In the learning trajectory 'Safety, health and environment', the students are trained to execute their tasks in a professional and safe way with attention for health and environment, and to make a risk assessment during the master's thesis. Finally, the trajectory on 'Research skills' culminates in the writing and oral defense of a master's thesis.

Learning environment and didactical methods

The programme guides the students in their development to independent and critical scientists. An important aspect in this context is the creation of a stimulating, activating learning environment where students can take responsibility for their own learning process. The programme stimulates implementation of different work forms to activate the students throughout the semester. The programme expects the students to adequately prepare work forms such as lectures, exercises, practical sessions, and excursions. The lecturers are expected to implement these work forms in an activating way, for example using self-study, flipped class rooms, digital voting systems, and project work. By tuning the guidance and feedback (in terms of content and level) to the learning process of the students, their intrinsic motivation and responsibility and control over their own learning process will increase. Activating students requires a safe learning environment. This asks for a gradual buildup of (inter)activity and room for mistakes and learning from them.

Evaluation

The evaluation policy of the master of Biology is in the first place targeted at examining to what extent the students have reached the aims of the individual courses and by extension the objectives of the master programme. Points of attention are clear communication, and reliability and validity of the exams with explicit thresholds and correction keys. The programme monitors that there is sufficient variation in test forms and that these effectively target the pre-established aims and objectives. By implementing interim evaluations for some courses, the students are activated timely and at the same time receive feedback on their own progress to allow remediation.

In the master programme, the emphasis is placed on both a thorough understanding and the application of the acquired knowledge and insight. Given the variety of competences in the objectives, the programme applies a diversity of summative evaluation forms. The most common test form is the oral exam with written preparation. This evaluation form allows both critical and guiding interactions, and hence also serves as a moment of feedback. In addition, the programme stimulates permanent evaluation, for example by paper assignments and project work.