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Organization of teaching and learning in the Division of Biology

A guide for professors, senior assistants and postdocs new to the
Swiss university system and/or to the University of Zurich



**Universität
Zürich** ^{UZH}

Division of Biology / Fachbereich Biologie

Organization of teaching and learning in the Division of Biology

**A guide for professors, senior assistants and postdocs new to the
Swiss university system and/or to the University of Zurich**

Academic Support Office (ASO)

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Institutes of the Division of Biology and their role in teaching and learning

Presently, the Division of Biology is composed of ten institutes:

1. Anthropological Institute and Museum
2. Institute of Plant Biology
3. Institute of Systematic Botany and Botanical Gardens
4. Institute of Molecular Life Sciences
5. Paleontological Institute and Museum
6. Institute of Evolutionary Biology and Environmental Science (and Zoological Museum)
7. Institute of Biochemistry
(also belonging to the Division of Chemistry and the Faculty of Medicine)
8. Institute of Physiology
(also belonging to the Faculty of Medicine)
9. Institute for Molecular Cancer Research
(also belonging to the Faculty of Medicine)
10. Institute of Medical Virology
(also belonging to the Faculty of Medicine)

The great majority of human and financial resources within the Division of Biology is distributed by the MNF directly to the institutes. The institutes reflect specializations of the Division into fields of research. The directors of the institutes do not have a formal role in the management of teaching and learning, nor in the development and quality assurance of the curricula. The institutes co-ordinate aspects of teaching and learning in the biology degree programs via interactions within the Educational Board and with the Academic Support Office. While some institutes are still responsible for particular courses in biology, an increasing fraction of the modules offered result from interdisciplinary efforts with participants from different institutes. During the Master's degree, especially for the Master's thesis, students are more closely linked to the institutes than at other times in the basic and advanced studies curricula.



**Welcome from the Head of the
Academic Support Office,
Division of Biology,
PD Dr. Karin Isler**

To all new biology professors, postdoctoral fellows and research scientists

As a new member of the Division of Biology, I welcome you to the University of Zurich. Although this appointment has certainly been made first and foremost because of a promising research project or an already impressive research record, you may soon be involved in teaching modules of the biology curriculum. For those of you coming from another Swiss university or from another national university system, it is important to get some background about how the curriculum is organized here, in order to help you when planning and preparing your teaching activities.

The Academic Support Office of the Division of Biology has therefore compiled this guide. You will find relevant details, e.g. about our Bachelor and Master programs, about the Swiss educational system and entry conditions for students to the University of Zurich, about credit points and examinations and also about the structures in place in the Faculty of Science and Division of Biology that govern and support the teaching and learning context. In the appendices you will find some additional documents that are relevant to the planning and submission of new modules.

The **Academic Support Office** (*Studienkoordination*) is your **main point of contact** for support about any issues concerning teaching and learning in the Division. Please do not hesitate to approach us if you have any questions.

PD Dr. Karin Isler
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Studying biology at the University of Zurich



«[The curriculum] covers the field of biology very comprehensively from molecules to ecosystems, which is rarely found in any university in the world»

Comment made about strengths of the biology curriculum from one of our teachers in the teaching staff survey (Dec.09 - Feb.10).

Key facts

- ❖ The academic year is divided into **two semesters**: Fall semester (*Herbstsemester HS*) and Spring semester (*Frühjahrssemester FS*). Both are **14 weeks** in duration.
- ❖ The BSc and MSc programs in biology are organized in **modules**, each module being allocated a **specific number of credit points** in accordance with the concept of ECTS points (= European Credit Transfer System).
- ❖ A **module** is a "self-contained, formally structured learning experience" defined by form, learning activities, assessment and allocated a specific number of **credit points**.
- ❖ **One credit point** represents **30 hours of student workload**, i.e. sum of hours a student is expected to spend in the classroom plus self-study time, including assignments and preparation for exams.
- ❖ Each module has a **module leader** who coordinates the learning outcomes, content, organization and assessment of the module. New faculty is invited to also **initiate new modules** (See Appendix 7.2: Template for submission of a new module and Appendix 7.3: Checklist for planning a new module).
- ❖ The **BSc program** in biology starts with two years¹ of a thorough **basic studies curriculum** (*Grundstudium*) and ends with a third year of **advanced studies** (*Fachstudium*) that is research-based. Total credit points for a BSc degree = 180.
- ❖ There are a total of **16 MSc programs**. Each specific Master's program includes a **set of modules** from the **advanced studies curriculum**. A large part of the Master's degree is dedicated to **independent research** on a Master's thesis. Total credit points for an MSc degree = 90.
- ❖ At the beginning of the MSc program each student completes a **learning agreement** with the supervisor of their Master's thesis and the coordinator of their chosen Master's program (see Appendix 7.4).
- ❖ The **Academic Support Office** (*Studienkoordination*) offers support for all teaching staff in the Division of Biology (see Section 4.3). Questions about any aspect concerning teaching – from where to get keys, about infrastructure, to offering new modules – should be addressed directly to this office. studienkoordination.biologie@uzh.ch Tel: 044 635 4862 / 63
- ❖ The University of Zurich has a central service for **support in university teaching and learning**, consultancies, coaching, à la carte courses, classroom observations or course program. Contact the Center for University Teaching and Learning (*Hochschuldidaktik*): www.hochschuldidaktik.uzh.ch/index_en.html

All references to the duration of the various parts of the biology curriculum assume full-time study.
Note: approximately 25% of biology students follow the degree course as part-time students.

1 Information about the degree programs

1.1 Background

International teaching staff with strong research reputations

The teaching staffs of the Division of Biology are members of a group of **internationally renowned researchers**, whose research foci cover wide fields from molecules to ecosystems. In the block courses of the advanced studies curriculum, students usually work alongside experienced researchers as junior members of the respective research group, and thereby can engage intensively with the specific research field. The fact that the biology block courses at UZH are compatible with those of ETH Zurich, which is also very strong in biology research, allows for a successful and reciprocal cooperation in teaching the BSc programs at both institutions. Moreover, an increasing number of research groups of the medical faculty and the university hospital (USZ) participate in modules offered in the advanced studies curriculum.

Close ties with ETH Zurich and the University Hospital Zurich

Holistic BSc program

The present-day structure of the BSc and MSc programs is the result of a **complete revision of the curriculum** (Bologna process), initiated in 2001 and completed in 2004, of which the Division of Biology is particularly proud. During this process, teaching and learning was detached from the individual institutes and offered on the level of the overall division, i.e. no longer is the curriculum delineated by the borders of institutes e.g. "Zoology" or "Botany" but it is organized holistically in terms of "Biology". In addition to the redesign of the curriculum, credit points in alignment with the concept of ECTS points (= European Credit Transfer System) together with the ECTS recommendation of **30 hours workload per credit point** were assigned to all modules. The workload is the sum of hours presence in the classroom and self-study time, including preparation for exams.

European compatibility

Curriculum keeps pace with latest developments and trends in biology

The resulting modular structure has many advantages, e.g. wide choice for students and students, who if they so wish, can study part-time more easily. In designing the new curricula, special attention was given to academic teaching and learning in general, but also to the dramatic scientific progress in biology in recent years and to the anticipated future developments of the subject. For instance, the most recently added MSc program "Quantitative Biology and Systems Biology" reflects the important current trend towards more quantitative, comprehensive and interdisciplinary approaches to biology. Further details of the design, structure and content of the BSc and MSc programs can be found in Sections 2 and 3.

Services of the Academic Support Office (see Section 4.3)

The **Academic Support Office**, established at the same time as this curriculum reform, was instrumental in coordinating and implementing the Bologna process. Today this unit of the division provides core services for teaching and learning in biology, and is responsible for curriculum development, administration, organization, support and quality assurance.

Attractive programs for students

The BSc and MSc programs give the students an **excellent education**, with the Master's programs preparing them for scientific research and an academic career. The curricula are challenging and demanding for the students, and the modules are time-intensive, especially for the approximately 230 students starting the Bachelor's program each year.

1.2 Swiss educational system: entry route to the University of Zurich

Over 90% of the students who come to the University of Zurich to study a Bachelor's degree in biology have first attended a Swiss grammar school (*Gymnasium*). These schools have selective intake directly from primary school or after two years at secondary school (*Sekundarschule*). Selection is based on prior grades at the school of origin and the results of an entrance exam. Once accepted to grammar school, the students have to first pass an initial trial semester (*Probezeit*) and then maintain a minimal grade point average each semester to stay at the school. In the final year, students sit final exams, the outcome of which gives them a school-leaving certificate (*Matura*). The exams are set by the subject teachers at the school, and a system of external examiners is in place to assure quality between the schools in the same Swiss canton.

Relevant for entrance into university is the fact that any student passing the *Matura* can enter any Swiss university to study any subject they choose (Exception: there is a *numerus clausus* for studying medicine at the German-speaking universities). In other words, the university has no control over student intake, neither in terms of numbers nor quality. There is no guarantee that students all have the same background in biology, chemistry, mathematics or physics, nor have they necessarily reached the same standard at their grammar school.

Semester fees at the university of Zurich are relatively low compared to UK or US: CHF 770.- per semester, CHF 1,270.- per semester for foreign bachelor students, CHF 870.- for foreign master students. Monthly living costs for a student in Zurich are estimated at CHF 2,000.-. For approximately 85% of our students, financial support comes primarily from parents or other relatives, together with income from part-time jobs either during the semester or especially in the semester breaks (36% and 58% respectively). 15% of all students manage to acquire a grant, presumably from their home canton. (The grant system in Switzerland is a complicated federalist system and is particularly heterogeneous). Although the majority of our students study biology full-time, there is still a considerable fraction (23%) who are part-time students.

Entry route to UZH

Background knowledge of students

Semester fees for students

Part-time students

2 BSc degree

The Division of Biology offers one degree at the bachelor level: BSc UZH. The Bachelor's degree is awarded to students who have a broad view of modern biology, including first exposure to research. Details of the qualification descriptors for the BSc degree can be found in Appendix 7.1.

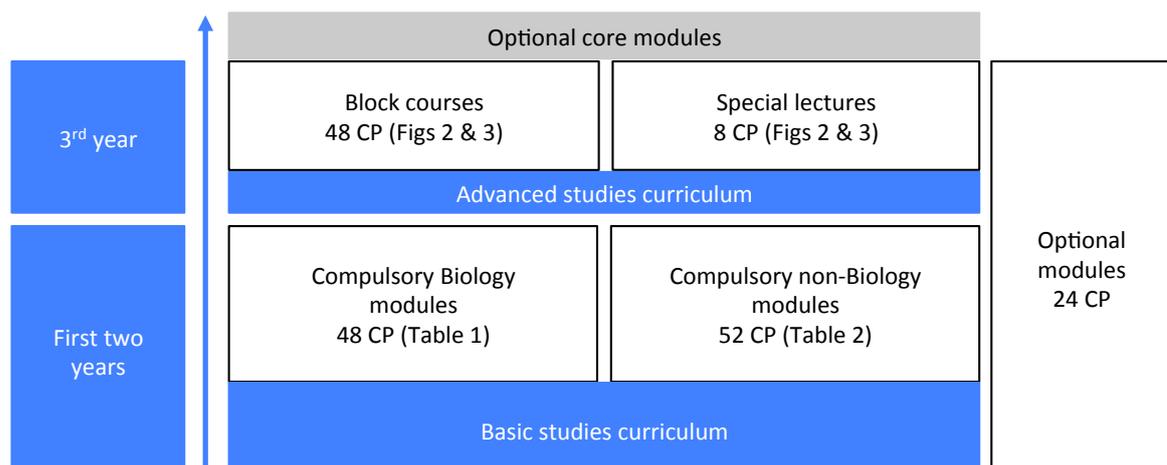


Fig 1. Overall structure of the BSc program

2.1 Details of the basic studies curriculum

Undergraduate students first do a two-year course of study designed to provide a broad and balanced view of biology (See Fig. 1). This is called the “*Grundstudium*” or “**basic studies curriculum**”. There are a total of twelve compulsory biology modules (Table 1), all including lectures and practicals.

Table 1: Compulsory biology modules of the basic studies curriculum

Module	Year of study/semester	Credit points	Title of the module
BIO 111	1/1	6	Molecular and classical genetics
BIO 112	1/1	3	Cell biology
BIO 113	1/1	3	Evolution
BIO 121	1/2	6	Biodiversity: non-vertebrates and vertebrates
BIO 122	1/2	3	Behavior and hormone physiology
BIO 123	1/2	3	Evolution and biodiversity: plants
BIO 131	2/3	6	Form and function of plants
BIO 132	2/3	3	Molecular biology and microbiology
BIO 133	2/3	3	Anthropology
BIO 141	2/4	6	Ecology and biodiversity
BIO 142	2/4	3	Developmental biology
BIO 143	2/4	3	Neurobiology
TOTAL CP		48	

Students must take additional modules in chemistry, mathematics, physics and biochemistry (Table 2). Some of these modules include practicals or exercise classes; chemistry and biochemistry have accompanying additional practical modules.

Table 2: Compulsory non-biology modules of the basic studies curriculum

Module	Year of study/semester	Credit points	Title of the module
CHE 170	1/1	4	General and inorganic chemistry for biologists (lecture)
CHE 171	1/1	4	Practical in general and inorganic chemistry for biologists
MAT 182	1/1	6	Calculus for natural scientists, including exercise classes
CHE 172	1/2	4	Organic chemistry for biologists (lecture)
CHE 173	1/2	4	Practical in organic chemistry for biologists
MAT 183	1/2	6	Probability and Statistics for natural scientists, including exercise classes
BCH 210	2/3	4	Biochemistry I (lecture)
BCH 204	2/3	2	Practical in biochemistry for biologists, Part I
PHY 117	2/3	6	Physics I for students of biology and chemistry, lecture with practical
BCH 220	2/4	4	Biochemistry II (lecture)
BCH 205	2/4	2	Practical in biochemistry for biologists, Part II
PHY 127	2/4	6	Physics II for students of biology and chemistry, lecture with practical
TOTAL CP		52	

In addition, students take a few optional modules (*Wahlmodule*) up to a total of 24 credit points (CP). The special feature of these optional modules is that they can be chosen from any subject area of the University of Zurich or ETH, although some are specifically recommended for students of biology. The 24 credit points can be acquired at any time during the BSc program, not necessarily during the basic studies curriculum.

2.2 Exams of the basic studies curriculum

Examinations take place 3-4 weeks after the end of each semester. The duration is related to the number of credit points: 20-minute exam for each credit point, meaning a 2-hour exam for a 6 CP module. All the exams in this curriculum are **written papers**, usually consisting of a mixture of multiple-choice and short essay-type questions. Some modules, e.g. BIO 111, include two exams during the semester; one at “mid-term” and one near the end of the semester; these together count 50% of the final mark. In terms of student learning, this is an exemplary structure since first-semester students find out early on where they stand, and can make corrective adjustments.

Students who fail the exams are allowed to see their marked exam paper and discuss the results with the teacher responsible for the module. They can re-sit once and if they fail a second time, they are barred from studying biology at any university in Switzerland.

Exams take place 3-4 weeks after end of semester

Mid-term exams in some modules

Students can repeat an exam once if they fail

2.3 Details of the advanced studies curriculum

In the third year of the BSc, students start the “**advanced studies curriculum**” or “*Fachstudium*”, designed to give them a choice of modules and enabling them to follow certain topics in depth. The advanced studies part of the curriculum has its focus on **researched-based teaching and learning** and is organized as **block courses** lasting 3.5 or 7 weeks and running each week from Tuesday midday to Friday evening (i.e. a 3.5-week block course is equivalent to 11-12 working days). In addition there are also special lecture courses that are organized on a semester basis, all day Monday and Tuesday mornings (see Fig. 3). Students are expected to do a **minimum of four block courses per semester** (see Fig. 2) but they have choice which to take; such modules are termed “optional core modules” or “*Wahlpflichtmodule*”. Some of the special lecture courses are prerequisites or strongly recommended for certain block courses.

Since the advanced studies curriculum is also part of the Master’s program, the group of students attending block courses and special lectures will often consist of a **mixture of bachelor and master students**. A few block courses are open exclusively to master students.

The guiding principle of research-based teaching and learning in the advanced studies curriculum means that the students gain first-hand experience of specific research fields of the Division of Biology. **New professors and new senior researchers are invited to offer block courses or special lectures in their field**: approximately 4-5 new modules are developed per year, and others may be dropped for various reasons. In this way, the important developments in the field of biology are continually introduced into this part of the curriculum. The **study guide** (*Wegleitung*) provides short descriptions of the modules currently offered (some descriptions are in English). Copies of the study guide can be obtained from the Academic Support Office or downloaded from www.biologie.uzh.ch. Bachelor students in the advanced studies can also attend block courses at ETH since these run concurrently to the block courses offered in biology at UZH.

A small number of modules, particularly those with integrated field work or excursions, take place during the semester breaks. In addition, bachelor students can attend a **research internship** (*Forschungspraktikum*) during the semester breaks: a maximum of 12 CP are recognized for the Bachelor’s degree from these internships. Research internships vary in length (4-12 weeks) and CP (4-12 CP, according to duration). Research internships are usually initiated by the student who asks a particular faculty member to carry out a research project in their group. Staff members eager to offer a research internship are free to advertise it.

For the advanced studies curriculum, the exams usually take place within the duration of each module; some exams of the special lecture modules take place one week after the semester has finished. Each teacher responsible for a module decides on the form and timing of the examination. Some choose written exams, others oral exams, and some count student work during a block course towards the final grade e.g. presentations of the research proposal, or the research results, literature studies, or poster presentations.

After one year of “*Fachstudium*” students receive their BSc in biology if they have the minimum number of **180 credit points**. Figure 2 shows the distribution of the credit points amongst the various types of modules.

Choice of modules

Research-based teaching and learning

Block courses and special lectures

Bachelor and master students taught together

New courses by new teaching staff

Descriptions of current courses in biology’s study guide

Modules in the semester breaks

Research staff can advertise research internships

Exams of the advanced studies curriculum vary in form

BSc awarded after 180 credit points

(CP = ECTS points; L = lectures; E = exercise class; P = practicals; HS = autumn semester; FS = spring semester)

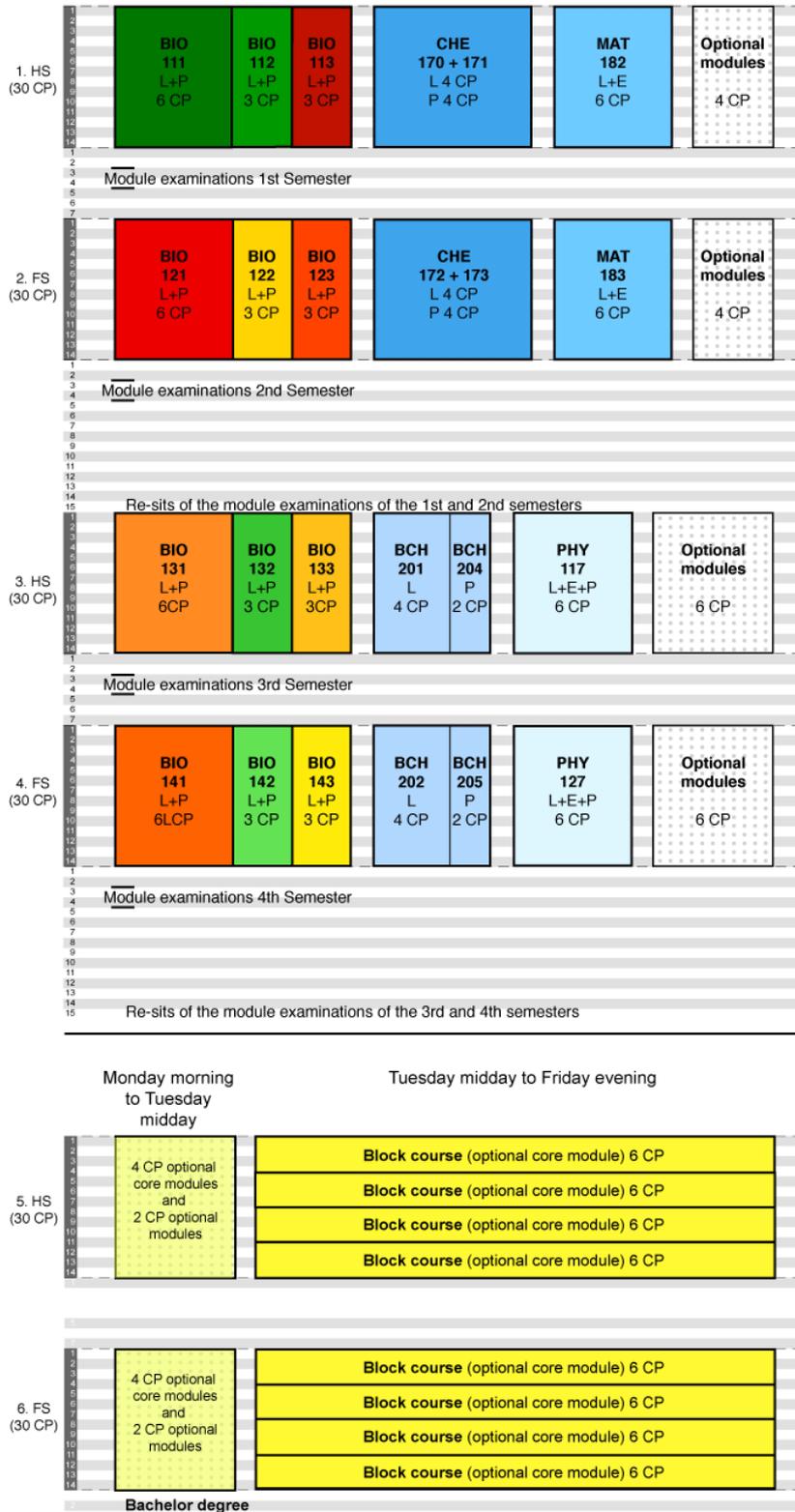


Fig. 2. Detailed structure of the BSc program: two years “Grundstudium” and one year “Fachstudium”

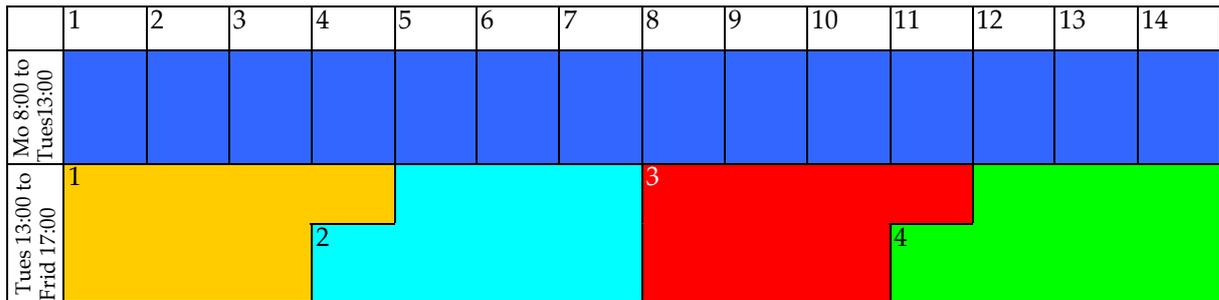


Fig. 3. Temporal organization of block courses and lectures during the advanced studies curriculum (*Fachstudium*) over the 14 weeks of a semester

A list of all modules offered in the advanced studies curriculum (special lectures and block courses) in the fall and spring semesters can be accessed via

<http://www.biologie.uzh.ch/Studium/Bachelorstudium/AdvancedStudies/FallSemester/BlockCourses.html>

<http://www.biologie.uzh.ch/Studium/Bachelorstudium/AdvancedStudies/FallSemester/SpecialLectures.html>

<http://www.biologie.uzh.ch/Studium/Bachelorstudium/AdvancedStudies/SpringSemester/BlockCourses.html>

<http://www.biologie.uzh.ch/Studium/Bachelorstudium/AdvancedStudies/SpringSemester/SpecialLectures.html>

2.4 Zurich Biology Undergraduate Summer School (BUSS)

Several faculty members of the Division of Biology participate in the Zurich Biology Undergraduate Summer School (BUSS). BUSS gives **undergraduate students** in the life sciences the chance to perform a **significant research project** in one of the participating laboratories of University of Zurich or ETH Zurich. Thanks to the intense curriculum of the BUSS, participating students not only become familiar with laboratory methods and theoretical principles, but also gain skills in scientific reasoning and scientific communication. BUSS is taught in English. Participation is open to all students during their **Bachelor studies**. The program covers travel expenses and housing costs of international participants. Duration: 9 weeks.

New teaching staff can get involved in BUSS by contacting the coordinator (see website):

www.biologie.uzh.ch/Studium/Bachelorstudium/GrundstudiumBiologie/UndergraduateSummerSchool.html

3 MSc degree

Master students acquire scientific skills at a high academic level. The MSc degree is a qualification for academic-biological professions; it qualifies students to start independent research work within the context of a doctoral degree, and provides the essential (minimal) scholarly foundation for starting the postgraduate diploma in teacher education (*Lehrdiplom für Maturitätsschulen*). Details of the qualification descriptors for the MSc degree can be found in Appendix 7.1.

3.1 MSc programs

16 different Master's programs

There are 16 specific programs at the Master's level in Biology

1. Anthropology
2. Behavioral Sciences
3. Cancer Biology
4. Developmental Biology
5. Ecology
6. Genetics
7. Human Biology
8. Immunology
9. Microbiology
10. Molecular and Cellular Biology
11. Neurosciences
12. Paleontology
13. Plant Sciences
14. Quantitative Biology and Systems Biology
15. Systematics and Evolution
16. Virology

Designated coordinator for each program

Each Master's program is led by a Master coordinator. The current coordinator for each program and relevant details about the program can be found under:

www.biologie.uzh.ch/Studium/Masterstudium/MasterStudies.html

by following the link to the respective Master's program.

Consecutive Master's

All these Master's programs are so-called "consecutive Master's": students with a BSc in biology from a Swiss university have entry. Upon completing a Master's program, students are awarded the degree: Master of Science in Biology, XX where XX is the name of the specific Master's program, e.g. Master of Science in Biology, Anthropology

Apart from the consecutive MSc programs listed above, students with a BSc UZH in biology can also apply to the following Master's programs² of the UZH:

Specialized Master's programs

1. Biochemistry (consecutive Master): MSc in Biochemistry
2. Biostatistics (specialized Master): MSc in Biostatistics
3. Computational Biology & Bioinformatics (specialized Master): MSc in Computational Biology and Bioinformatics
4. Environmental Sciences (specialized Master): MSc in Environmental Sciences
5. Life Sciences (specialized Master: fast-track)
6. Medical Biology (specialized Master): MSc in Medical Biology

Specific set of modules for each Master's program

Each specific Master's program includes a set of modules from the advanced studies curriculum that are either compulsory or strongly recommended (optional core modules) and cover 16 CP (Fig. 4). Additional CP can be earned by attending optional modules chosen from the range of courses offered by UZH and ETHZ. The temporal organization of block courses and lectures during the first semester of the Master's degree is the same as described above for the advanced studies curriculum (Fig. 3).

² Sometimes a student will have to complete additional modules to be accepted in a specialized Master. All specialized Masters practice selective intake based on written applications and an interview.

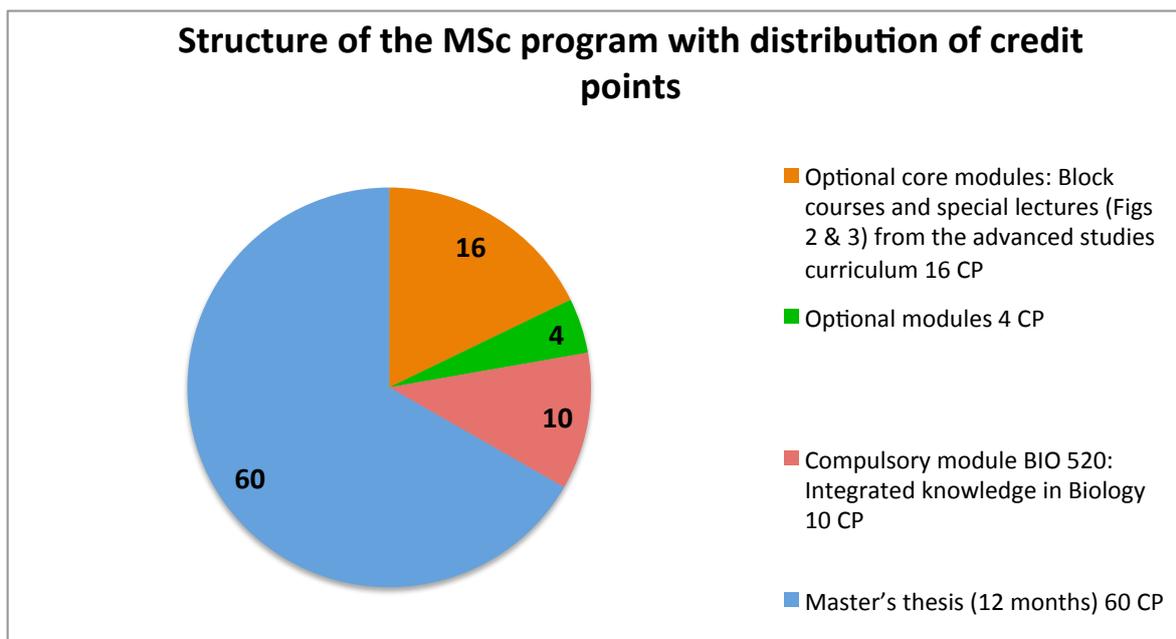


Fig. 4 Overall structure of the MSc program in one of the 16 fields of study.

There is no compulsory sequence for the elements in the program. This is defined on an individual basis in the learning agreement (see below).

3.2 Master's learning agreement

Prior to starting on their Master's degree, students have to set up a written agreement, termed **learning agreement** (see Appendix 7.4). This is developed with and signed by the **supervisor of their Master's thesis and the coordinator for their chosen Master's program**, setting out their full program of studies (modules to be taken, start and end of the Master's thesis, short description of the Master's thesis). This learning agreement must also be signed by the student and the Head of the Academic Support Office for biology and is binding.

**Learning agreement
Appendix 7.4**

The Dean's Office will only issue Master's degrees if the courses and modules listed in the learning agreement have been completed. The learning agreement is one important element in the quality assurance of the Master's degree. It assures that the educational program is carefully planned and optimized for each individual student.

**Learning agreement
is an element of
quality assurance**

3.3 Workload and credit points

Note: these guidelines are also valid for BSc modules.

At the University of Zurich, **one credit point (CP) is equivalent to a workload of 30 hours**, in line with the concept of ECTS points. The credit point allocation is based on an approximate 1:1 ratio between contact time (in-class) and self-study time (out-of-class). For example, a one-hour lecture for the whole semester is allocated 1 CP (14 hours contact time and 16 hours for self-study and exam preparation). For more complex modules, such as a block course, the ratio of in-class hours to out-of-class hours is also approximately 1:1: in a block course of 3.5 weeks, students spend on average 11.5 days in the classroom or laboratory (= 92 hours), giving 88 hours self-study time for the allocated 6 CP (180 hours total). The design of an individual module within these guidelines is then the responsibility of the module leader.

**Student workload
per credit point**

**Workload
calculation: contact
time plus self-study**

3.4 Master's thesis

Variations for completing the Master's thesis

All students undertake an individual research project within the field of their chosen Master. The duration of the Master's thesis can vary according to the following options:

- A 12-month Master's thesis (60 CP). Most students choose this path.
- One small project of 3 months' duration (15 CP), followed by a 9-month Master's thesis (45 CP).
- Two small projects each of three months in duration (each 15 CP), followed by a 6-month Master's thesis (30 CP).

The Master's thesis also is a module and as such, includes assessment / examination of the thesis (see definition of "module" in the key facts). This examination is therefore not to be moved into the module BIO 520.

3.5 Module BIO 520

A self-study, compulsory module

In the Master's curriculum there is **one compulsory module BIO 520**: "Integrated knowledge in Biology". This module is essentially a self-study module comprising of a total of 300 study hours (= 10 CP) allowing students to acquire a comprehensive overview, in particular in the chosen field of specialization. As a result of the Bologna process, most programs of higher education no longer provide much opportunity for recognizing interconnections between the subjects presented in the distinct modules; the exams to assess learning are closely linked to the specific module and usually take place at the end of the module. BIO 520 is intended to restore an opportunity for synopsis. It's learning outcomes are defined as follows:

Opportunity for integration of knowledge and synopsis

By the end of this module students should be able to

- demonstrate their understanding and command of relevant biological facts, methods and concepts.
- identify and explain interrelationships between the various facts, methods and concepts.
- summarize and critically review scientific literature efficiently and effectively.

The module can be taken before, during or after the Master's thesis. The supervisor of the Master's thesis designs and assesses BIO 520 **together with the Master coordinator of the respective program**.

MSc awarded after 90 credit points

The Master's degree thereby requires a student to complete **a total of 90 CP**. (16 + 4 + 60 + 10).

3.6 Fast-track Master

Students are funded by the potential supervisor of the doctorate

This international Master/PhD program of the University of Zurich is open to outstanding students who wish to obtain a PhD degree in the life sciences. Applicants must hold a Bachelor's degree in biology or biochemistry (possibly also in bioinformatics or applied mathematics). The program covers the entire spectrum of the Life Sciences and offers a comprehensive and challenging education in a broad range of research fields. All courses are taught in English. Financial support is provided in accordance with the guidelines of the Swiss National Science Foundation for PhD student salaries (around CHF 40,000 per year).

Students in the fast-track Master's program in life sciences will follow the curriculum in the biology or biochemistry Master's program that best suits their scientific interests.

After successfully completing the Master's program, students may enter one of the PhD programs at the Life Science Zurich Graduate School. Students can integrate the results obtained during the Master's thesis into their doctoral thesis, effectively shortening the duration of their PhD studies by about one year.

3.7 Modules offered by ETH Zurich at Master’s level

Despite the efforts to coordinate the timetables of the two universities, for students at the Master’s level this is not particularly easy. Whilst biology at the UZH maintains the same timetable of block-courses and special lectures throughout the whole advanced studies curriculum, thereby affecting the timetable of the BSc and MSc programs, ETH replaced the system of block courses at the Master’s level to one with 12-week research projects. However, the “concept courses” at ETH still remain open to UZH Master students, since they take place on Mondays and Tuesdays.

Coordination of UZH-ETH modules is more difficult at Master’s level

3.8 Quality control: grading of examinations and supervision of Master’s theses

The Division of Biology does not have any formal guidelines in place for grading examinations neither at BSc nor at MSc level, assessing a Master’s thesis, nor for supervising a Master’s thesis. Such issues are discussed at the meetings of the various committees responsible for the various parts of the curriculum (Fig. 4). The roles of these committees are briefly described in Section 4.4.

No formal guidelines for grading examinations

The Master’s curriculum committee, for example, discusses criteria for judging a student’s performance at the Master’s level. In fact, this committee recently decided there was no need to formalize criteria for assessing the Master’s thesis. Master coordinators have the overall responsibility for the quality of their programs, including the quality of supervision. The Head of the Academic Support Office looks at all the submitted Master’s theses to stay in touch with the range and complexity of the research projects. He also checks all learning agreements that have to be completed at the start of the Master’s degree course and signed by the respective Master’s coordinator.

Master coordinators are responsible for quality assurance in their programs

4 Organization of teaching and learning

4.1 Structures within the Division of Biology

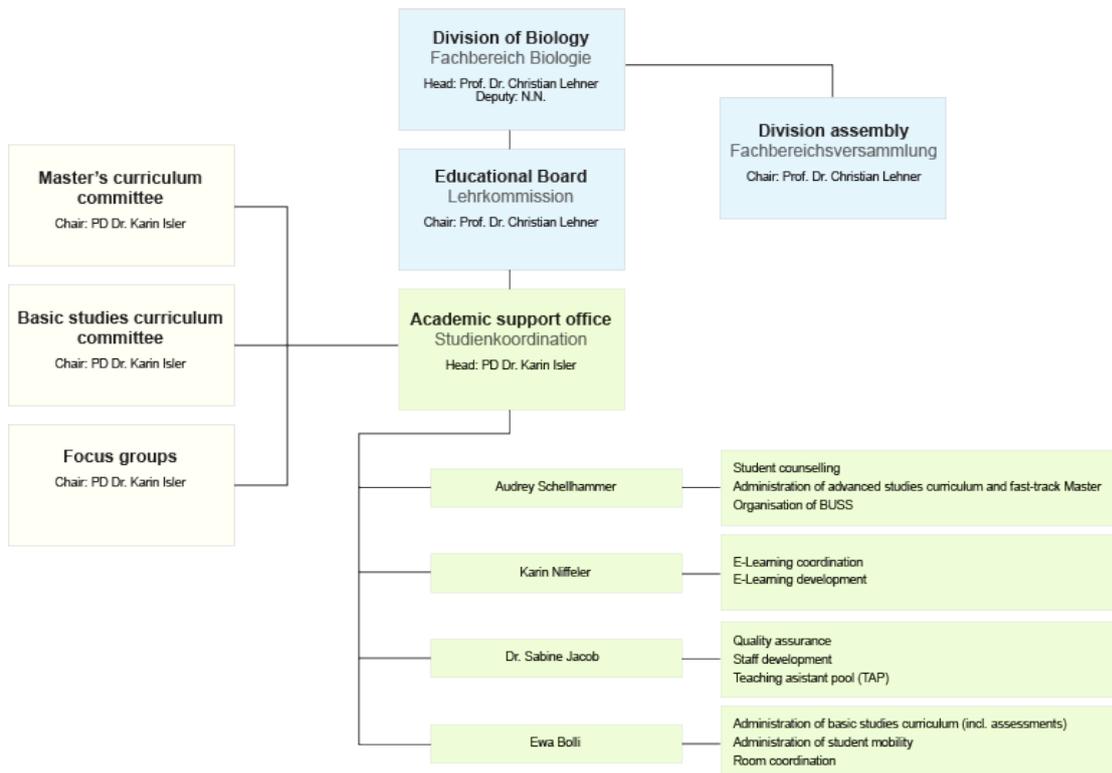


Fig. 5 Management of teaching and learning in the Division of Biology (Sept. 2014)

4.2 Educational Board and Division Council

Matters of teaching and learning in biology are discussed at meetings of the Educational Board (*Lehrkommission*) that are prepared and led by the Head of Division (*Vorsitzender des Fachbereichs*) (see Fig. 5). The Division Council elects the Head of Division for a two-year term. The Division Council meets once per semester and the Educational Board twice. Topics concerning teaching and learning in biology are discussed in close collaboration with the Academic Support Office (see below). The responsibilities of these two main bodies of the Division have been defined in a set of organizational regulations (*Organisationsreglement*), that can be accessed from www.biologie.uzh.ch/FachbereichBiologie/FachbereichBiologieOrganisationsreglement.pdf (in German). With the establishment of an Educational Board in 2012, the Division has implemented an important and legal body for decision-making within the teaching and learning context. The Board is also responsible for appointing the Head of the Academic Support Office.

4.3 Academic Support Office (*Studienkoordination*)

The Division of Biology is the largest division within the Faculty of Science in terms of its size and complexity. The Academic Support Office (ASO) plays a central role in the management and coordination of the teaching and learning. Its main work covers the following:

- **Curriculum development:** review of existing modules and structures; approval of any new modules, together with their integration into the curriculum. Contact: karin.isler@biol.uzh.ch
- Support for teaching staff in developing and/or using **virtual learning environments**, especially the application of the learning management system **OLAT** (on-line learning and teaching) so that both students and teachers are able to use it easily and – if they wish – develop new applications. Contact: karin.niffeler@biol.uzh.ch
- **Student counseling:** individual counseling for all biology students with specific problems affecting their studies. Contact: audrey.schellhammer@biol.uzh.ch
- Coordination of the teaching and learning with the research activities of the Division (**block courses**) and ensuring the smooth running of the courses (organization, administration). Contact: audrey.schellhammer@biol.uzh.ch
- Monitoring Master's learning agreements. Contact: audrey.schellhammer@biol.uzh.ch
- Coordination and administration of the Biology Undergraduate Summer School BUSS. Contact: audrey.schellhammer@biol.uzh.ch
- **Quality assurance of teaching and learning:** application of the Bologna guidelines at all levels (especially Bachelor and Master); analysis of module-specific problems and their solutions; support for teaching staff in the area of quality assurance of individual courses; Contact: sabine.jacob@biol.uzh.ch
- Collection and quality control of teaching activity plans of PhD students. Contact: sabine.jacob@biol.uzh.ch
- **Teaching Assistant Pool TAP.** Since MNF introduced the requirement that all PhD students should teach a minimum of 100 hours (up to a maximum of 420 hours), the ASO has set up a pool for teaching assistants who do not get enough teaching opportunities to reach 100 hours. **Module leaders** looking for **additional teaching assistants** can access the pool. Contact: sabine.jacob@biol.uzh.ch
- Administration of the **basic studies curriculum**, including organization, room reservations and logistics of exams. Contact: ewa.bolli@biol.uzh.ch
- **Student mobility** and international relations. Contact: ewa.bolli@biol.uzh.ch
- Coordination of the curricula with ETH Zurich. Contact: karin.isler@biol.uzh.ch
- Maintaining strong networks with the grammar schools in Switzerland (*Gymnasien*) Contact: karin.isler@biol.uzh.ch
- In addition to every-day work, the ASO is responsible for, or is involved with, specific events and publications to help students and future students make informed decisions and become acquainted with requirements of the programs (e.g. UZH / MNF Information days, study guide (*Wegleitung*), website www.biologie.uzh.ch).

ASO Address:

Office 13-J-01

Winterthurerstr. 190, CH-8057 Zürich

Tel: 044 635 4862 / 63

studienkoordination.biologie@uzh.ch

4.4 Additional teaching and learning committees of the Division of Biology

There are various additional groups and committees involved in the management of teaching and learning in the Division of Biology (see Fig. 5).

Basic studies curriculum committee

At least once a semester, the leaders (or their representatives) of all biology modules in the basic studies curriculum meet with the Head of the ASO to discuss aspects of the basic studies curriculum. This committee has the responsibility to make decisions pertaining to:

- the structure of the curriculum
- implementation of the qualification descriptors for the BSc program
- the coordination of modules to ensure unnecessary redundancy and closure of any gaps
- the content or basic structure of a particular module as well as potential links between the modules
- the structure and sequencing of the modules
- the examination procedures for the basic studies curriculum

Master's curriculum committee

The coordinators of the various Master's programs also meet the Head of the ASO at least once per semester. Their work covers most of the issues already mentioned in connection with the parallel committee for the basic studies curriculum, but applied to the Master's programs. Each Master's coordinator is responsible for ensuring the quality of teaching and learning and supervision within their respective program.

Focus groups

The Head of the Academic Support Office has established a focus group system, consisting of **three separate focus groups**: one from each year of the basic studies curriculum and one from the advanced studies curriculum. This way the students' voices from all important cohorts of the student body can be systematically heard and fed into the quality assurance considerations for individual modules on the one hand, and curriculum development on the other.

4.5 Committees and offices of the Faculty of Science (MNF)

Various committees and offices in the Faculty of Science (MNF) have important roles in the development of the teaching and learning in the MNF. An overview can be found: www.mnf.uzh.ch/en/about-us/faculty/committees.html In addition, there are two important offices with whose staff the Division has close contacts concerning issues of teaching and learning:

Dean's Office (*Dekanat*)

This office is led by the Dean who is elected by members of the faculty for a two-year term. He is assisted by the Vice Dean and the Dean's Secretary who work together to prepare business for faculty meetings (such as changes to the framework and study regulations: *Rahmen-* and *Studienordnung*) and faculty appointments.

Office of the Dean of Studies (*Studiendekanat*)

This office is affiliated to the Dean's Office. The team at the Office of the Dean of Studies offers students advice on administrative matters, issues certificates and degrees and processes appeals. The Office of the Dean of Studies also decides on students' requests for recognition of credits and qualifications from other universities, institutions of higher education and other external bodies. In matters concerning study programs in biology it relies on recommendations by the Academic Support Office.

5 Useful web links

Within the Division of Biology, Faculty of Science and University of Zurich

- Website of the Division of Biology www.biologie.uzh.ch (in German for BSc, in English for MSc and doctoral studies)
- Website of the Faculty of Science www.mnf.uzh.ch (in German and English)
- Center for University Teaching and Learning: www.hochschuldidaktik.uzh.ch/index_en.html
- Course offerings in university teaching and learning (www.didactica.uzh.ch), consultancies, à la carte support, classroom observations (in German mostly and English), dossiers and information on various aspects of university pedagogy.
- Life Science Zurich Graduate School www.lifescience-graduateschool.ch with information about all the PhD programs for doctoral students in biology
- Career Services of the University of Zurich www.careerservices.uzh.ch with services for students, doctoral students, professors and post doc researchers (workshops, information/career events, personal consultancies e.g. cv checks) Most services in German.
- Graduate Campus www.grc.uzh.ch/index_en.html offers “Prospects and opportunities for doctoral candidates and postdoctoral researchers”.
- Transferable skills program for PhD students and postdoctoral researchers www.ueberfachliche-kompetenzen.uzh.ch/index_en.html Courses in German and English
- Office for Gender Equality www.gleichstellung.uzh.ch Information and programs in German (mostly) and English. Mentoring incl. funding opportunities for PhD students and post docs.

6 Glossary of common German terms

German	English
<i>Dekanat (MNF)</i>	Dean's Office (Faculty level)
<i>Fachbereich Biologie</i>	Division of Biology
<i>Fachstudium</i>	Advanced studies curriculum
<i>Frühjahrssemester FS</i>	Spring semester
<i>Grundstudium</i>	Basic studies curriculum
<i>Herbstsemester HS</i>	Autumn (Fall) semester
<i>Hochschuldidaktik</i>	Center for university teaching and learning
<i>Lehrkommission des Fachbereichs Biologie</i>	Educational board of the Division of Biology
<i>Masterarbeit</i>	Master's thesis
<i>Mathematisch-naturwissenschaftliche Fakultät MNF</i>	Faculty of Science
<i>Pflichtmodule</i>	Compulsory modules
<i>Studiendekanat (MNF)</i>	Office of the Dean of Studies (Faculty level)
<i>Studienkoordination Biologie</i>	Academic Support Office ASO, Biology
<i>Studienkoordinator</i>	Head of the ASO
<i>Vorsitzender des Fachbereichs</i>	Head of the Division of Biology
<i>Wahlmodule</i>	Optional modules
<i>Wahlpflichtmodule</i>	Optional core modules
<i>Wegleitung zum Studium der Biologie</i>	Study guide for biology degrees

7 Appendices

7.1 Qualification descriptors for Bachelor and Master degrees in Biology at UZH

7.2 Template for submission of a new module

Module leaders of new modules are required to complete this form and submit it to the Academic Support Office prior to publication of the module in the electronic course catalogue and in the study guide to the biology degree programs.

7.3 Checklist for planning a new module

7.4 Learning agreement for Master students

7.1 Qualification descriptors for BSc and MSc degrees in Biology

Bachelor of Science BSc in Biology

Students completing the Bachelor of Science in Biology should be able to ...

- recognise, describe and explain biological concepts and phenomena.
- apply their knowledge from a broad range of research areas of modern biology, as well as from the basic disciplines mathematics, physics, chemistry and biochemistry, in order to solve biological problems.
- formulate hypotheses and develop ways of testing them.
- use primary and secondary literature to review, extract, and summarize information in a constructively critical manner.
- conduct experiments under guidance, using laboratory / field equipment in a safe and effective manner.
- observe, identify, sample, collect and record data in the laboratory and the field with purpose and precision.
- analyse and interpret data with appropriate qualitative and quantitative techniques, including reflection on ethical issues.
- communicate results and ideas effectively in written and oral form in both German and English.
- work in small teams, and plan their time and prioritise work effectively to meet deadlines.

Master of Science MSc in Biology

Students completing the Master of Science in Biology should be able to ...

- describe and explain complex biological systems, especially – but not only – in the field of their chosen master.
- define the key concepts and methods used in the field of their chosen master, identify and explain interrelationships between them.
- extract, compile and critically analyze data from the literature, thereby outlining the state-of-the-art in a specific field.
- evaluate biological information, taking account of underlying scientific theories / concepts and practical aspects.
- identify the unsolved problems and key questions, that exist within a specific biological field.
- formulate a scientific hypothesis; design and conduct experiments / field investigations independently to test it.
- devise appropriate experimental strategies to tackle particular biological problems, including the use of appropriate positive and negative controls; critically assess the advantages and drawbacks of a specific strategy.
- acquire, analyze and interpret data from independent scientific investigations qualitatively and/or quantitatively.
- undertake field and/or laboratory investigations of living systems in a competent, responsible and autonomous manner, applying ethical considerations.
- communicate results concisely and effectively in both written and oral forms to a scientific audience (reports, oral presentations, posters).

7.2 Template for the submission of a new module³

<i>Module number:</i> BIO	Module title:
<i>Module leader</i>	<i>Title</i> <i>First name(s)</i> <i>Surname</i>
<i>Additional teachers</i>	<i>Title</i> <i>First name(s)</i> <i>Surname</i>
<i>Position in curriculum and type of module</i>	<input type="checkbox"/> Basic Studies: <input type="checkbox"/> <i>compulsory module</i> <input type="checkbox"/> <i>optional core</i> <i>Type of module (please cross one box only)</i> <input type="checkbox"/> <i>Lecture</i> <input type="checkbox"/> <i>Lecture with practical classes</i> <input type="checkbox"/> <i>Lecture with exercises</i> <input type="checkbox"/> <i>Lecture with practical classes and exercises</i> <input type="checkbox"/> <i>Practical course</i> <input type="checkbox"/> <i>Exercises</i> <input type="checkbox"/> <i>other:</i> <input type="checkbox"/> HS, time(s): <input type="checkbox"/> FS, time(s):
	<input type="checkbox"/> Advanced studies (optional core modules) <input type="checkbox"/> HS <input type="checkbox"/> FS <input type="checkbox"/> <i>Block course 3½ weeks</i> <input type="checkbox"/> <i>1st quarter of semester</i> <input type="checkbox"/> <i>Block course 7 weeks</i> <input type="checkbox"/> <i>2nd quarter of semester</i> <input type="checkbox"/> <i>3rd quarter of semester</i> <input type="checkbox"/> <i>4th quarter of semester</i>
	<input type="checkbox"/> <i>Special lecture Monday</i> <i>Time:</i> <input type="checkbox"/> <i>Special lecture Tuesday morning</i> <i>Time:</i> <i>Double-sessions (2 hours) have to start at even hours in the morning and at odd hours in the afternoon</i> <input type="checkbox"/> <i>other advanced studies module (e.g. in the semester break)</i> <i>Please specify (type, time):</i>

³ available from the Academic Support Office (*Studienkoordination*)

<i>The module will be offered:</i>		<input type="checkbox"/> every year <input type="checkbox"/> every two years <input type="checkbox"/> every three years <input type="checkbox"/> every four years	Credit points: Offered for the first time in Fall semester 20 Spring semester 20
Room preference	<i>For the lecture</i>	<i>For the practical (or exercises)</i>	
	<input type="checkbox"/> Module leader will reserve the room him/herself	<input type="checkbox"/> Module leader will reserve the room him/herself	
	<input type="checkbox"/> Reservation should be done by the central services	<input type="checkbox"/> Reservation should be done by the central services	
<i>Prerequisites for participation:</i>			<i>Maximum number of students:</i>
<i>Contents (Short description of max. 50 words)</i>			
<i>Learning outcomes:</i> (May be submitted on a separate sheet. Contact Dr. Sabine Jacob sabine.jacob@biol.uzh.ch for support or questions)			
<i>The module is part of the following Master program (valid only for modules in the advanced studies curriculum)</i>			
<input type="checkbox"/> Molecular and Cellular Biology <input type="checkbox"/> Developmental Biology <input type="checkbox"/> Genetics <input type="checkbox"/> Microbiology <input type="checkbox"/> Plant Sciences <input type="checkbox"/> Neurosciences <input type="checkbox"/> Quantitative Biology und Systems Biology		<input type="checkbox"/> Human Biology <input type="checkbox"/> Anthropology <input type="checkbox"/> Behavioral Sciences <input type="checkbox"/> Ecology <input type="checkbox"/> Systematics and Evolution <input type="checkbox"/> Paleontology	
Assessment	<i>The form and timing of the assessment is regulated and cannot be changed.</i>		
	<i>Modules of the advanced studies curriculum and optional modules of the basic or advanced studies curriculum:</i> a) <i>Form and duration of the assessment</i> b) <input type="checkbox"/> <i>graded (will be included in the grade point average)</i> <input type="checkbox"/> <i>ungraded (not included in the final grade)</i> c) <i>Timing of the assessment</i> <input type="checkbox"/> <i>continuous assessment, without a final exam</i> <input type="checkbox"/> <i>continuous assessment, with a final exam</i> <input type="checkbox"/> <i>final exam towards the end of the module</i>		
<i>Additional comments:</i>			

7.3 Checklist for planning a new module

(personal planning instrument)

<p>Conditions: credit points; student workload in hours; ratio of hours presence: self-study</p> <p>.....</p> <p>.....</p> <p>.....</p>
<p>Prerequisites: target group; degree course; semester; prior knowledge, skills and competences the students should bring with them.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
<p>Content: What topics and concepts are covered by this module?</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
<p>What are the learning outcomes(s) of this module? (ask for the guide "Writing learning outcomes for modules of the biology curriculum", available from the ASO)</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
<p>Forms and methods of assessment: continuous assessment; presentations (oral/poster); formal exams (oral, written) etc.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>

<p>Teaching and learning methods: overall plan of the module (week by week or day by day); choice of content; script and exercises; expectations of the students (preparation, involvement)</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
<p>Why should students attend this module? Why is this module relevant / important for them?</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>

7.4 Learning agreement for Master students

Access for the on-line
www.biologie.uzh.ch/Studium/Masterstudium/LearningAgreement.html

version:

MASTER'S THESIS:

Title of Master's thesis*:

Short description of thesis subject (please do not exceed 800 characters)*:

Start date:

End date*:

Approximate date of the assessment for BIO 520:

Thesis supervisor:

Title:

Last name*:

First name*:

Institute*:

Telephone:

E-mail*:

SIGNATURES:

The supervisor agrees to take responsibility for the thesis and to see it through all stages, from the initial planning to its completion.

Candidate

First name:

Last name:

Date:

Signed:

Supervisor of the Master's thesis

First name:

Last name:

Date:

Signed:

M.Sc. program coordinator

First name:

Last name:

Date:

Signed:

Head of the Academic Support Office

First name:

Last name:

Date:

Signed:

The signed learning agreement must be handed in to the Academic Support Office (Studienkoordination Biologie) Irchel Campus 13-J-01 and to the M.Sc. program coordinator at the beginning of the Master's program. Practical work for the Master's thesis may not be started before the Bachelor's diploma has been issued and presented to the M.Sc. program coordinator!