

Curriculum for the Master's Degree Program in Ecology and Evolution

Curriculum 2018

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In its gathering on 23.01.2018 the Senate of the Paris Lodron University of Salzburg formally approved the curriculum for the master's degree programme in Ecology and Evolution finalised by the Curriculum Committee of Biology at the University of Salzburg in its meeting on 14.11.2017 in the version that follows.

The legal basis for the curriculum is the 2002 Federal Act on the Organisation of Universities and their Studies (Universities Act 2002 – UG), Federal Law Gazette No. 120/2002, and the section of the Statutes of the University of Salzburg pertaining to university studies.

§ 1 General Provisions

- (1) The number of ECTS points necessary to complete a degree in the master's programme in Ecology and Evolution is 120. This corresponds to four semesters of study.
- (2) Graduates of the master's programme in Ecology and Evolution hold a Master of Science degree (abbreviated MSc).
- (3) In order to be admitted to the master's programme in Ecology and Evolution, students must hold a bachelor's degree (or comparable degree) in an equivalent or related field from an accredited Austrian or foreign institute of higher education (cf. UG2002 §64 para. 5).
- (4) If a student's bachelor's (or comparable) degree is not deemed equivalent to an acceptable extent, the student may be required to complete additional work worth up to 45 ECTS points; these requirements must be satisfied by the end of the master's programme. Only the Rectorate or a member of staff at the University of Salzburg designated by the Rectorate is authorized to decide on equivalency.
- (5) All graduation requirements to be fulfilled by students have been assigned ECTS points. One ECTS point equals 25 hours of study, which corresponds to the average number of hours required to achieve the expected learning objectives. An academic year consists of 1500 hours, corresponding to 60 ECTS points.
- (6) Students with disabilities and/or chronic illnesses will not be subject to any form of discrimination in their studies. The University is committed to the basic principles laid out in the UN Convention on the Rights of Persons with Disabilities and Austrian non-discrimination laws as well as the policy of positive action.
- (7) The master's programme in Ecology and Evolution is offered exclusively in English. If necessary, admission to the master's programme will be regulated through an admission process.

§ 2 Overview of the degree programme and professional skills

(1) Overview of the degree programme

Global change affects all ecosystems on Earth. For example, human-induced climate and environmental change has been made responsible for a decrease in biodiversity and an increase in natural resource limitation. The scientific disciplines of ecology and evolutionary biology focus research on the units, structures, functions and changes within our biotic environment. A deep and scientifically based understanding of ecological and evolutionary processes is a prerequisite for the conservation, protection and sustainable use of biodiversity and natural resources. This includes understanding the interactions of organisms with each other and the environment, as well as the adaptive differentiation of species, populations and individuals in terms of their genetic characteristics, ecology, morphology, physiology, and developmental and reproductive biology at various spatial and temporal scales.

The Master curriculum Ecology and Evolution provides a thorough, forward-looking, and high-quality education in these areas. It is characterized by an integrative, experimental, interdisciplinary and internationally competitive approach to education and research.

(2) Professional skills and competences (Learning Outcomes)

The successful candidates of the Master Ecology and Evolution will be familiar with basic concepts and theories of ecology and evolutionary biology. Their knowledge, expertise and competences are compatible with state-of-the-art research in organismic biology and will serve as a solid base for future

innovative strategies to design and conduct research projects and solve relevant problems in basic and applied research.

Students will be familiar with approaches to scientific questions and solutions in the field of community ecology, ecophysiology, behavioural biology, phylogenetics, biogeography, systematics, taxonomy, molecular ecology and evolutionary biology, evolutionary developmental biology, conservation biology and biotechnology. They will be able to design novel research projects at the interface of ecology/evolution and zoology/botany, interpret available knowledge in the light of new theories and critically evaluate existing research results.

Graduates will be able to employ and adapt specialized methodological and analytical approaches to new research questions to increase our knowledge in individual disciplines and in interdisciplinary science. The methodological/analytical spectrum includes experimental field and laboratory work, molecular techniques, chemical/analytical techniques, modern microscopy and multivariate statistics. They will have fundamental knowledge and competences in basic science and will be able to transfer this skill set to research and development in general. Furthermore, they will be able to interpret, present (orally and in writing) and critically evaluate their innovative research results.

Graduates will understand the relevance of ecological and evolutionary research for human society and economics, will be able to apply the central elements of modern ecology and evolutionary biology to interdisciplinary questions, and they will be able to contribute to finding solutions towards a sustainable use of resources relevant for our society.

(3) Importance and relevance of the degree for society, the scientific community and the labour market

A thorough ecological and evolutionary education is of highest scientific and societal relevance and offers a broad range of professional opportunities to graduates:

- Research and teaching at universities and other educational institutions.
- Employment in zoos, botanical gardens, museums, natural history collections, management of National Parks and other protected areas.
- Contributions to the private and/or public-administrative sector, participation in political, economical and societal decision-making processes, e.g. in agencies dealing with nature and environmental protection, landscape conservation and energy supply (such as documentation and management of biodiversity, management of sustainability and resources, climate change research).
- Applied research, development and consulting in the pharmaceutical/medical sector, environmental chemistry, food-technology and –industry, agriculture, gene technology, biotechnology, etc.
- Botanical and zoological forensics.
- Employment in media, scientific journalism, and publishing sectors.

§ 3 Structure of the programme

The master's programme in Ecology and Evolution comprises 7 modules with a total number of 84 ECTS points. In addition, there are 6 ECTS points assigned for elective courses. The master's thesis is worth 28 ECTS points, the final exam 2 ECTS points.

	ECTS
Module 01 (MEE1): Theoretical Basis in Ecology and Evolutionary Biology	12
Module 02 (MEE2): Evolutionary Biology and Biodiversity	12
Module 03 (MEE3): Ecology	12
Module bundle 01 (WMEE1): Excursions and field courses	6
Module bundle 02 (WMEE2): Advanced topics in Evolutionary Biology	18
Module bundle 03 (WMEE3): Advanced topics in Ecology	18
Module bundle 04 (WMEE4): Special competencies and internship	6
Elective Courses and free subjects	6
Master thesis incl. Master seminar	28
Final Exam	2
Sum	120

§ 4 Course Types

The programme consists of the following course types:

Lecture (VO) provides an overview of a subject or one of its subareas and its theoretical approaches and presents different teachings and methods. The contents are mainly presented in lecture style. Attendance is not mandatory but highly recommended.

Course (UE) serves the acquisition, testing and optimization of practical skills and knowledge in the field of study or one of its sub-areas. Attendance is mandatory.

Lecture with course (VU) combines the theoretical introduction into a sub-area with teaching of practical skills with emphasis on the theoretical introduction. Attendance is not mandatory.

Course with lecture (UV) combines the theoretical introduction into a sub-area with teaching of practical skills with emphasis on the exercise character. Attendance is mandatory.

Excursion / field course (EX) serves the acquisition of knowledge and practical skills outside the lab in the field. Attendance is mandatory.

Seminar (SE) is a scientific continuative course. It serves the acquisition of advanced expertise as well as the discussion and reflection of scientific topics based on active participation of the students. Attendance is mandatory. The focus of each seminar will be given in the course description (e.g. supervision seminar, empirical seminar, project seminar, interdisciplinary seminar,...).

Practical Course / Internship (PR) intending the application of learned knowledge, methods and skills. Attendance is mandatory. MME Master motivates practical courses and internships that focus on training in practical and methodological aspects of the disciplines of ecology, biodiversity research, and evolutionary biology (basic and applied topics) and develop disciplinary as well as interdisciplinary research competencies

§ 5 Required courses and study plan

The following table contains a list of modules and courses in the master's programme in Ecology and Evolution. The division into semesters serves as a recommendation designed to ensure that the order in which the courses are taken builds on knowledge acquired successively and that the workload of 60 ECTS points in an academic year is not exceeded. Modules and courses can be taken in a different order.

Master's degree programme in *Ecology and Evolution*

Module/Course	SHrs	Type	ECTS	Semester with ECTS			
				I	II	III	IV
MEE1 - Module 01 Theoretical Basis in Ecology and Evolutionary Biology							
Theoretical Ecology	2	VU	3	3			
Evolutionary Theory, Biosystematics and Biogeography	2	VU	3	3			
Seminar Biodiversity and Evolutionary Research	1	SE	1		1		
Experimental Design and Advanced Statistics	2	UV	3		3		
Geographical Information Systems and Spatial Models	2	UV	2		2		
Subtotal for Module 01	9		12	6	6		
MEE2 - Module 02 Evolutionary Biology and Biodiversity							
Biodiversity and Evolution of Plants	4	UV	6		6		
Biodiversity and Evolution of Animals	4	UV	6	6			
Subtotal Modul 02	8		12	6	6		
MEE3 - Module 03 Ecology							
Experimental Ecology of Plants	4	UV	6		6		
Experimental Ecology of Animals	4	UV	6	6			
Subtotal Modul 03	8		12	6	6		
Total for Compulsory Modules Pflichtmodule	26		36	18	18	0	0

WMEE1 - Module Bundle 01 Excursions and Field Courses (bundled elective module)

6 ECTS can be elected from the following topics:

Ecology and Biodiversity of temperate environments, Ecology and Biodiversity of non-temperate environments	à 6	EX	à 6		6		
						6	
Subtotal for Module Bundle 01	6		6		6	6	

WMEE2 - Module Bundle 02 Advanced topics in Evolutionary Biology (bundled elective module)

Students have to complete 18 ECTS (UV/PR) from the following topics:

evolutionary biology: evolutionary developmental biology, morphology, applied evolutionary biology, biotechnology, coevolution, biosystematics, taxonomy, biogeography, population genetics, and genomics	à 4	UV/PR	à 6	6			
					6		
						6	
Subtotal for Module Bundle 02	12		18	6	6	6	

WMEE3 - Module Bundle 03 Advanced topics in Ecology (bundled elective module)

Students have to complete 18 ECTS (UV/PR) from the following topics:

behavioral ecology and biology, neurobiology, applied ecology, conservation biology, environmental analytics, ecophysiology, ecotoxicology, community ecology, population ecology	à 4	UV/ PR	à 6	6			
					6		
						6	
Subtotal for Module Bundle 03	12		18	6	6	6	

WMEE4 – Elective Module 04 Special competencies and internship (elective module)

Students have to complete 6 ECTS from the following options:

External Internship [see §9] (PR)							
Research Lab (PR) in the framework of a research project							
Summer Schools in ecology, biodiversity research, evolutionary biology, sustainability							
Courses (VO, VU, UE, UV, KO, EX, SE) of other disciplines in complementary to the prioritization in Module Bundles 2 & 3							
Subtotal for Elective Module 04	0-6		6			6	

Total Module Bundle 01-04	30-36		48	12	12	24	0
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(3) Free Elective Courses			6			6	
(4) Master's Thesis			28				28
Masterseminar	1	SE	1				1
Master Thesis			27				27
(6) Master's Exam			2				2
Sum Total	56-62		120	30	30	30	30

§ 6 Elective module catalogues and/or bundled elective modules

- (1) The Master's degree in Ecology and Evolution includes four bundled elective modules. According to ECTS credits in §5 students have to select one or more courses of each of these four modules. Module bundle WMEE1 (Excursions and field courses) facilitates interdisciplinary skills in taxonomic knowledge of species diversity and ecology as well as anthropogenic impact on various ecosystems. An excursion to a non-temperate region is encouraged. Module bundles WMEE2 & WMEE3 (special topics in evolutionary biology and ecology) allow for a detailed knowledge in ecology, biodiversity research and evolutionary biology. Additional competences are developed in Elective Module WMEE4 (special competencies and internship), e.g., by completing an internship, research lab work, other complementary courses or Summer Schools.
- (2) Module bundle 1: Students have to complete 6 ECTS. It is recommended to make excursions to different ecosystems, e.g., tropical, marine, alpine habitats. Courses offered may vary yearly.

- (3) Module bundle 2: Students have to complete 18 ECTS (UV/PR) from the following topics in evolutionary biology: evolutionary developmental biology, morphology, applied evolutionary biology, biotechnology, coevolution, biosystematics, taxonomy, biogeography, population genetics, and genomics. Up to 6 ECTS may be completed as a research lab (PR). Courses offered may vary yearly.
- (4) Module bundle 3: Students have to complete 18 ECTS (UV/PR) from the following topics in ecology: behavioral ecology and biology, neurobiology, applied ecology, conservation biology, environmental analytics, ecophysiology, ecotoxicology, community ecology, population ecology. Up to 6 ECTS may be completed as a research lab (PR). Courses offered may vary yearly.
- (5) Elective Module 4: Students have to complete 6 ECTS (VO, VU, UE, UV, KO, EX, SE, and PR). This module allows the application of theoretically acquired knowledge and skills (see §9) or an extension of disciplinary or interdisciplinary competences in addition to the main focus of the study.

§ 7 Elective courses

- (1) In the master's programme in Ecology and Evolution, students are to complete elective courses totaling 6 ECTS points. These elective courses are designed to further the acquisition of additional professional skills and strengthen individual areas of focus within a student's course of study. They can be completed at any accredited postsecondary institution.

§ 8 Master's thesis

- (1) The master's thesis serves to demonstrate that students have acquired the ability to perform independent academic research in the areas of ecology, biodiversity research and evolutionary biology according to current academic research methods and standards.
- (2) The topic of the master's thesis should be chosen in such a way that it is reasonable and appropriate for completion of the thesis within six months (cf. UG2002 §81 para. 2).
- (3) The topic of the master's thesis must be taken from a module in the master's curriculum. The student may suggest a topic or choose from a number of topics provided by one of the available thesis advisors.
- (4) It is to be noted that both the student's work on the topic and advisor's work with the student are governed by Austrian copyright law, Federal Law Gazette No. 111/1936 (cf. UG2002 §80 para. 2).
- (5) The student selects two qualified supervisors (supervisor and co-supervisor) for the master thesis. With approval of the Dean, the co-supervisor might be from another research institution. Supervisors provide two separate or one corporate written report.
- (6) Along with the Master thesis students have to attend a Master seminar (1 ECTS).

§ 9 Internship

A: Recommended internship:

It is recommended that, as part of Elective Module 4 (WMEE4), students complete a practical internship of 6 ECTS points. The internship must have a reasonable connection to the programme and must be approved by the responsible body before the internship is scheduled to begin.

As part of their practical internships, students can gain the following qualifications (among others):

- ability to put the theoretical knowledge acquired in the field of study into practice in a professional context
- acquaintance with different scenarios in which theoretical concepts can be used
- acquisition of soft skills such as teamwork, communication skills, planning and organizational skills in a professional context
- assessment of economic and socio-political conditions for new methods and technologies in ecology and evolutionary biology
- job-specific network formation and project management

§ 10 Study abroad

Students in the master's programme in Ecology and Evolution are encouraged to spend a semester of study abroad. This semester abroad should ideally be scheduled in the third semester of study. Course transfers for the courses completed at the university abroad will be granted by the responsible body. Documents needed for the assessment of transfer courses are to be provided by the student.

Steps will be taken to ensure that the semester abroad can be completed without causing a delay in a student's course of study when the following conditions are met:

- at least 30 ECTS credits are earned in each semester of study abroad
- the content of the courses completed during the period of study abroad is not identical to courses already completed at the University of Salzburg
- confirmation by formal written notification before beginning the study abroad period. This notification should include which courses and/or exams are planned to be taken abroad and will be transferable to the University of Salzburg

In addition to subject-related knowledge and skills, students will acquire the following qualifications by studying abroad:

- acquisition and consolidation of subject-related knowledge in a foreign language
- acquisition and consolidation of general foreign-language skills (comprehension, conversation, etc.)
- acquisition and consolidation of general organisational skills through independent planning and mastering the of their academic life in international administrative settings and university structures as well as their daily challenges of student life abroad
- becoming acquainted with international student exchange programmes and broadening their personal perspectives in the own field of study
- acquisition and consolidation of intercultural communication skills

Students with disabilities and/or chronic illnesses will be assisted in their search for a study opportunity and in planning for their semester abroad by the Office of the Rectorate for Disability & Diversity.

§ 11 Allocation of places in courses with a limited number of participants

- (1) (The maximum number of participants in the master's programme in Ecology and Evolution for the following course types is limited as follows:

Lectures (VO)	no limit
UV, VU, UE, EX, SE, KO	15*

*in case of security issues or limited availability of resources in labs and research

stations the number of participants can be restricted exceptionally to 10

- (2) Should courses with a restricted number of participants be oversubscribed, priority of enrolment will be given to students for whom the course is part of the curriculum.
- (3) Students in the master's programme in Ecology and Evolution will be given places in courses based on the following criteria in the order listed below:

- a student was on the waiting list in the course in the previous academic year
- a student has completed a greater number of courses and/or exams (sum of earned ECTS points)
- a student has completed more positive exams
- a student has completed a greater number of semesters in the programme of study
- grade point average weighted according to ECTS points
- random selection

Available places will be allocated to students from other programmes using the same criteria in the same order.

- (4) For students participating in international exchange programmes, additional places constituting at least ten percent of the maximum number of participants in each course will be made available. These places will be allocated randomly.

§ 12 Examination regulations

- (1) In modules consisting of more than one course, the courses are examined separately (*nicht-prüfungsimmanente* courses by a single exam, *prüfungsimmanente* courses by several written or oral examinations)
- (2) The determination of the overall grade of a module has to be in accordance with §19 Abs. 3 of the statutes.
- (3) For students with disabilities and/or chronic illnesses personalized examination procedures will be arranged in cooperation with the Office of the Rectorate for Disability & Diversity.

§ 13 Master's examination [by examining committee]

- (1) The master's programme in Ecology and Evolution concludes with a master's examination worth 2 ECTS credits and is held by an examining committee.
- (2) Students must have successfully completed all of the required courses and the master's thesis in order to be eligible to take the master's examination.
- (3) The master's examination by an examining committee tests two examination subjects suggested by the candidate chosen from the modules of the curriculum.

§ 14 Effective date

The curriculum comes into force 1. October 2018

§ 15 Transitional provisions

- (1) Students enrolled in the curriculum for the master's programme of study in Biology at the Paris Lodron University of Salzburg (Version 2016, Mitteilungsblatt – Sondernummer 197 vom 26.06.2016) when this curriculum comes into force have to complete the programme in which they are enrolled until 30.09.2020.
- (2) Students subject to a different curriculum may during any period of registration decide to change into this curriculum. An irrevocable written declaration is to be submitted to the Office of Admissions (Serviceeinrichtung Studium), should a student wish to change curricula.

For detailed descriptions of modules and courses see plusonline (<https://online.uni-salzburg.at/>).