

Curriculum for the Master's Degree Program in Medical Biology

Curriculum 2016

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In its gathering on May 10th 2016 the Senate of the Paris Lodron University of Salzburg formally approved the curriculum for the master's degree programme in Medical Biology finalised by the curriculum committee of Biology at the University of Salzburg in its meeting on March 13th 2016 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 Medical Biology is 120. This corresponds to four semesters of study.
- (2) Graduates of the master's programme in Medical Biology hold a Master of Science degree (abbreviated MSc).
- (3) In order to be admitted to the master's programme in Medical Biology, students must hold a bachelor's 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 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 authorised to make a determination of 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 Medical Biology is offered exclusively in English. If necessary, the 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

Medical Biology is one of the leading sciences of the 21st century to address global challenges such as demographic and environmental changes and related diseases such as cancer, allergies, autoimmunity and infectious, cardiovascular, metabolic and degenerative diseases. A detailed understanding of the complex molecular genetics as well as cellular and physiological processes in human diseases, the identification of new diagnostic, prognostic and predictive biomarkers as well as the development and production of innovative drugs form the prerequisite for personalised, highly effective therapies and targeted preventive measures.

The master's programme in Medical Biology offers a future-oriented, high quality education in the area of biomedicine and health that connects basic and translational, clinical and pharmaceutical research.

(2) Professional skills and competences (Learning Outcomes)

Graduates of the master's programme in Medical Biology

- have knowledge of the molecular genetic and epigenetic etiology of different human diseases, especially those with high medical needs.
- have a comprehensive overview of standardized and future diagnostic methods and drug therapies in the sense of a personalized precision medicine.
- have well-founded knowledge of the molecular, cellular and physiological mechanisms that contribute to the development of immunological disorders such as allergies and autoimmune diseases, cancer, disorders of metabolic processes, pathological changes in the cardiovascular system as well as degenerative, regenerative and aging processes.
- are familiar with current developments in the field of nanomedicine.
- have advanced knowledge of the physiology, anatomy and histology of healthy and sick human individuals and are trained in professional handling of animal models for the study of human diseases.
- are able to investigate scientific biomedical issues with a broad spectrum of methods on a molecular, structural biological, cellular and organismic level.
- have profound knowledge in the field of molecular medical diagnostics and clinical chemistry and are able to scientifically depict, interpret and present research results.
- understand the social and socioeconomic relevance and dimension of biomedical research and are familiar with the basic processes and objectives of successful career development.

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

The enhanced education in the field of medical biology offers graduates of the master's programme in Medical Biology diverse career opportunities in private and public companies and institutions in the field of health and medicine.

Graduates of the master's programme in Medical Biology often pursue careers in the following fields:

- Research, development, production, analytics and distribution in the pharmaceutical industry and the biotech-sector
- Research and teaching in public research facilities and in the academic sector
- Research and development in the health and medical sector such as clinical facilities
- Collaboration in clinical studies
- Quality control in the pharmaceutical and biotechnological industry

§ 3 Structure of the programme

The master's programme in Medical Biology comprises 12 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 26 ECTS points, the final exam 4 ECTS points.

	ECTS
Module MBM 01: Advanced Molecular and Structural Biology	6
Module MBM 02: Advanced Cell Biology	6
Module MBM 03: Computational Biology in Biomedicine	6
Module MBM 04: Anatomy and Histology	6
Module MBM 05: Medical Physiology	6
Module MBM 06: Science Communication and Soft Skills	6
Module MBM 07: Molecular Mechanisms in Cancer	6
Module MBM 08: Nanomedicine and Nanobiology	6
Module MBM 09: Regenerative Biology and Ageing	6
Module MBM 10: Advanced Immunology and Allergology	6
Module MBM 11: Research Lab Training	12
Module MBM 12: Elective Modules	12
Elective courses and free subjects	6
Master thesis	26
Final Exam	4
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.

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.

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, ...).

§ 5 Required courses and study plan

The following table contains a list of modules and courses in the master's programme in Medical Biology. 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. If there are no prerequisites, modules and courses can however be taken in a different order in accordance with § 12.

Detailed descriptions of the modules including the knowledge, methods and skills to be acquired can be found in Annex I: Module descriptions

Master's degree program in Medical Biology							
Module/Course	SHrs.	Type	ECTS	Semester with ECTS			
				I	II	III	IV
(1) Compulsory Modules							
Module MBM 01: Advanced Molecular and Structural Biology							
Structure & Function of Proteins and Medical Applications	1	VO	1,5	1,5			
Advanced Structural & Molecular Applications in Medical Research	1	SE	1,5	1,5			
Lab Course on Chemical & Structural Biology:	2	UE	3	3			
Subtotal for Module MBM 01	4		6	6			
Module MBM 02: Advanced Cell Biology							
Advanced Cell Biology in Biomedicine	1	VO	1,5	1,5			
Advanced Methods in Cell Biology	2	UV	3	3			
Current Topics in Cell Biology and Applications in Biomedicine	1	SE	1,5	1,5			
Subtotal for Module MBM 02	4		6	6			
Module MBM 03: Computational Biology in Biomedicine							
Biomedical Data – From Molecules to Diseases	1	VO	1,5	1,5			
Hands-on Biomedical Data - Resources and Analysis Tools	3	UE	4,5	4,5			
Subtotal for Module MBM 03	4		6	6			
Module MBM 04: Anatomy and Histology							
Human and Mammalian Anatomy and Histology	1	VO	1,5	1,5			
Lab Course in Human and Mammalian Histology	3	UV	4,5	4,5			
Subtotal for Module MBM 04	4		6	6			
Module MBM 05: Medical Physiology							
Medical Physiology	2	VO	3	3			
Endocrinology and Neurobiology	1	VO	1,5	1,5			
Lab Course in Medical Physiology	1	UE	1,5	1,5			
Subtotal for Module MBM 05	4		6	6			

Module MBM 06: Science Communication and Soft Skills							
Good Laboratory Practice and Ethical Conduct	1	VO	1,5		1,5		
Scientific Writing and Presentation Skills	2	SE	3		3		
Job Applications and Interviews	1	SE	1,5		1,5		
Subtotal for Module MBM 06	4		6		6		

Module MBM 07: Molecular Mechanisms in Cancer							
Molecular Biology of Cancer	2	VO	3		3		
Oncogenic Signaling and (Epi)genetics of Cancer	2	UV	3		3		
Subtotal for Module MBM 07	4		6		6		

Module MBM 08: Nanomedicine and Nanobiology							
Nanomaterials – Risks and Medical Applications	1	VO	1,5		1,5		
Lab Course on Nanomaterials	2	UE	3		3		
Nanomaterial Applications	1	SE	1,5		1,5		
Subtotal for Module MBM 08	4		6		6		

Module MBM 09: Regenerative Biology and Ageing							
Introduction to Regenerative and Stem Cell Biology	2	VO	3		3		
Advanced Cell Culture, Tissue Engineering and Cellular Ageing	2	UE	3		3		
Subtotal for Module MBM 09	4		6		6		

Module MBM 10: Advanced Immunology and Allergology							
Molecular and Cellular Immunology	2	VO	3		3		
Lab Course in Immunobiochemistry	2	UE	3		3		
Subtotal for Module MBM 10	4		6		6		

Module MBM 11: Research Lab Training							
Training Lab I	4	UE	6		6		
Training Lab II	4	UE	6		6		
Subtotal for Module MBM 11	8		12		12		

Total Sum Compulsory Modules	48		72	30	30	12	
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2) Elective Module according to § 6

Module MBM 12: Elective Modules							
Courses worth 12 ECTS points need to be completed from the following areas:							
- Biomedicine	4	UV	6			6	
- Cell Biology and Pathophysiology	4	UV	6			6	
- Molecular Diagnostics and Clinical Chemistry	4	UV	6			6	
Subtotal Elective Module MBM 12	8		12			12	

Total Sum Elective Modules	8		12			12	
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(3) Elective Courses			6			6	
(5) Master Thesis			26				26
(6) Master Exam			4				4

Sum total	60		120		60		60
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§ 6 Elective module catalogues and/or bundled elective modules

(1) In the master's programme in Medical Biology students have to complete courses totalling 12 ECTS points from the following areas:

- Biomedicine
- Cell Biology and Pathophysiology
- Molecular Diagnostics and Clinical Chemistry

In the case of an appropriate choice of the student, the lectures can be completed in one area. The free choice of elective modules permits a further specialization, extension or broadening of the education in the field of biomedicine.

§ 7 Elective courses

(1) In the master's programme in Medical Biology, students are to complete elective courses totalling 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 area of medical 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).

§ 9 Internship

A: Recommended internship:

It is recommended that, as part of the elective requirement, students complete a practical internship of up to 4 weeks equivalent to full-time employment (this corresponds to a maximum of 6 ECTS points). The internship must have a reasonable connection to the degree 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 organisational skills in a professional context.
- Assessment of economic and socio-political conditions of bioanalytical and medical technologies
- Job-specific network formation and project management

§ 10 Study abroad

Students in the master's programme in Medical Biology 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 notification in writing before beginning the study abroad period of which courses and/or exams planned to be taken abroad are transferable to the University of Salzburg

In addition to field-specific knowledge and skills, students stand to gain the following qualifications by studying abroad:

- acquisition and consolidation of field-specific knowledge in a foreign language
- acquisition and consolidation of general foreign-language skills (comprehension, conversation, etc.)
- acquisition and consolidation of organisational skills gained by independently navigating the bureaucracy and organisational structure of a university abroad as well as daily challenges of student life abroad
- becoming acquainted with international student exchange programmes and broadening one's perspectives in one's 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 abroad 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 Medical Biology for the following course types is limited as follows:

Lectures (VO)	no limit
UV, UE, SE	20
UV, UE in the laboratory	15

- (2) In instances in which courses with a restricted number of participants are 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 Medical Biology 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 Admission Requirements for Exams

For admission to the exams listed in the table below the following requirements apply:

Course:	Requirement for:
At least two compulsory modules of Modules MBM 01-10 need to be completed	Module MBM 11 Research Lab Training

§ 13 Examination regulations

- (1) The determination of the overall grade of a module has to be in accordance with §19 Abs. 3 of the statute.
- (2) 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.

§ 14 Master's examination [by examining committee]

- (1) The master's programme in Medical Biology concludes with a master's examination worth 4 ECTS

credits [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.

§ 15 Effective date

The curriculum comes into force 1 October 2016.

§ 16 Transitional provisions

- (1) Students enrolled in the curriculum for the master's programme of study in Biology at the Paris Lodron University of Salzburg (2011 Version, Mitteilungsblatt – Sondernummer 126 from 3.6.2011) when this curriculum comes into force have to complete the programme in which they are enrolled until 30.09.2018.
- (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/>).