

Master's Programme Biomedicine and Biotechnology

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1. General Provisions

1.1. Legal Basis

The legal basis for Master's Studies can be found in the Austrian Universities Act or *Universitätsgesetz* (UG 2002).

1.2. Qualification Profile

1.2.1. General Qualifications

Initially, graduates of the Master's Programme "Biomedicine and Biotechnology" are provided with the necessary skills to apply basic and specialized scientific work methods and laboratory technologies. In addition, graduates attain specialized skills not only in the application of molecular and cell-biological methods for approaching complex biomedical problems, but also animal models and alternative methods for preclinical biomedical research. Furthermore, graduates should be capable of critically and independently reviewing scientific insights and results so as to apply such knowledge in their own projects. Particular focus is placed on integrating students into current research projects at the University early on (as of the first semester). As a result, graduates are introduced to team-oriented work and complex problem-solving at an early stage.

1.2.2. Special Qualifications

In the course of Master's Studies, a special focus is placed on scientific specialization by conducting research-based education in the field of Biomedicine and Biotechnology. In this connection, an independent scientific thinking and working process is of particular importance, which is reflected in the concluding thesis. Therefore, students are expected to phrase a thematically-adequate question together with a leading scientist/researcher, present the current published state of knowledge, choose working methods for solving the relevant issue and independently perform all necessary laboratory work and measurements. Finally, in the course of their master's thesis, graduates must critically review and adequately formulate their findings, draw conclusions and publicly present them before an audience of peers. Evaluation is primarily based on the reliable and exact implementation of laboratory work and knowledge of the relevant subject, rather than the final result.

1.2.3. Occupational Fields

As a result, Master's Programme graduates can most notably be found in leading positions in the following fields:

- Research facilities of the pharmaceutical and biomedical industry
- Product development and research in the biomedical field
- Universities and other post-secondary education facilities
- Public and private pertinent research facilities
- Public and private health facilities

1.2.4. Professional and Key Qualifications

The goal of the University of Veterinary Medicine Vienna's Master's Programme, is to introduce students to the most relevant foundations of certain subjects in the fields of natural science, biomedicine and veterinary medicine as well as molecular methodology. In addition, students receive a specialized education in the field of animal models and their application. The Programme conveys interdisciplinary and problem-oriented work and facilitates graduates' unproblematic integration into scientific project groups. Students are enabled both to apply their acquired knowledge and skills in the pertinent field of work and establish themselves in other occupations.

1.2.5. Practical Experience

To facilitate practical implementation and a work-related application of knowledge, students must participate in at least one project as well as several practices (see 2.2). In the course of these practical experiences, students are provided with an insight into potential fields of work early on. At the same time, such a practical education encourages social and problem-solving skills. Project participation may be performed at the University of Veterinary Medicine Vienna, domestic and foreign universities, as well as appropriate external institutions or corporations.

1.3. Structure, Weekly Hours and Duration of Studies

The Master's Programme encompasses 4 semesters with a total course-hour total of 67 semester hours. Additionally, project participation in the amount of 4 semester hours as well as practises in the amount of at least 8 weeks is mandatory.

1.4. Requirements for Admission to Master's Studies in Biomedicine and Biotechnology

Pursuant to Article 64 (5) of the UG 2002, admission to Master's Studies in Biomedicine and Biotechnology requires completion of a relevant university or technical college (*Fachhochschule*) degree in the amount of at least 180 ECTS points.

2. Methods of Instruction

2.1. Semester Hours

The extent of lectures and other classes is measured in semester hours (SSt) and ECTS credit points. Considering a semester duration of 15 weeks, one semester hour amounts to a 15-fold academic hour of 45 minutes.

2.2. Methods of instruction

Lectures or *Vorlesungen* (VO) serve to convey basic concepts and elaborate certain content in a didactically-appropriate manner with modern audio-visual support.

Exercises or *Übungen* (UE) serve to communicate practical skills and special capabilities needed in a professional environment.

Colloquia or *Konversatorien* (KV) serve to acquire knowledge by leading qualified and competent discussions, as well as train problem-solving skills. Grading of colloquia is particularly based on regular participation.

Seminars or *Seminare* (SE) serve to facilitate scientific discussion. Students are expected to actively participate in seminars, where learning in small groups hones the ability to apply knowledge for analysis and problem-solving. Participants are expected to provide oral and written participation.

Project Participation or *Projektmitarbeit* (PM) constitutes co-work on a scientific subject under instruction and assistance of an instructor. Regular summarized presentations of work progress are expected.

Practice or *Praxis* (PA) constitutes occupation with a certain aspect of a scientific issue under instruction and assistance of an instructor. Regular summarized presentations of work progress are expected.

2.3. Methods of Examination

Class examinations are either written or oral examinations which take place at the end of a given class. In classes with immanent examination (Colloquies, Seminars, Exercises) are characterized by a regular verification of knowledge during class.

Subject Examinations or *Fachprüfungen*, are examinations on individual subjects.

Overall Examinations or *Gesamtprüfungen*, are examinations on several subjects.

Overall Committee Examinations or *kommisionelle Gesamtprüfungen*, are examinations on several subjects, involving at least one examiner per subject. Any failed Overall Committee Examinations must be repeated in full, insofar as examination regulations or university provisions do not state otherwise.

2.4. Master's Thesis

All students are required to compile a Master's thesis.

The subject of the relevant thesis must be derived from one of the examination subjects included in the degree curriculum.

Students are entitled to suggest a subject or choose a subject from several suggestions provided by supervisors.

Assignments must be chosen so as to facilitate a possible and reasonable workload, accomplishable for students within one semester.

2.5. ECTS points

The European Credit Transfer System (ECTS) serves to facilitate inter-university and inter-European accreditation. ECTS points are allotted based on the necessary work load (both in and outside class). Both practises and master's theses are allotted ECTS points as well.

The ECTS requires 120 points for a two-year master's programme.

ECTS points for lectures including examinations as well as classes with immanent examination are listed separately. Should a class with immanent examination be part of a class including regular examination, then all ECTS points stated are deemed included in the overall points for the relevant subject.

ECTS points are divided into mandatory and elective subjects, practises and a master's thesis.

Mandatory courses	Electives	Project Participation	Practice	Masters' Thesis	Total
63,5	11	2,5	13	30	120

2.6. Language of Instruction

By offering all courses in English, the Master programme is conceived as being explicitly open to students from abroad. Thus, international mobility of students in the framework of the Bologna Process is supported and facilitated.

3. Master's Studies

3.1. Hours

Over the course of the 4 semesters of master's studies, classes in the amount of 67 semester hours are designated. Additionally, project participation in the amount of 4 semester hours as well as a master's thesis are mandatory. Furthermore, two mandatory practises of four weeks each are required.

3.2. Mandatory Master Classes

Title	SSt	ECTS
Molecular Biology	17	19
Biomedicine and Biotechnology	13	13
Laboratory Animal Science	15	17
Virology	2	2,5
Bacteriology	3	3
Parasitology	1	1
Immunology	1	1
Pathology	1	1
Biomathematics	3	3
Bioinformatics	2	2
Biomedical Economics	1	1
Total	59	63,5
Electives	11	11
Total Classes	70	74,5
Project Participation	4	2,5
8 Weeks Practice	22	13
Master's Thesis	40	30
Total	136	120

3.3. Recommended Semester Schedule

1st Semester

Title	Academic Hours					ECTS
	VO	KV	SE	UE	SSt	
Molecular Biology						
<i>Special Molecular Biology</i>	45				3	5*
<i>Molecular Bioanalytics</i>		15			1	1
<i>Special Gene Regulations</i>		15			1	1
Biomedicine and Biotechnology						
<i>Animal Models in Biomedicine</i>		15			1	1
<i>Proteomics</i>		15			1	1
<i>Metabolomics</i>		15			1	1
<i>Current Subjects of Biomedicine and Biotechnology VII</i>			15		1	1
<i>Darwinian Medicine</i>		15		15	2	2
Laboratory Animal Science						
<i>Basics of Animal Experiment Law</i>		15			1	1
Virology						
<i>Molecular Biology of Viruses</i>		30			2	2,5
Bacteriology						
<i>Molecular Biology of Bacteria</i>		15			1	1
<i>Bacteria-host Interactions</i>			15		1	1
<i>Bacterial Toxins</i>		15			1	1
Parasitology						
<i>Molecular Biology of Parasites</i>		15			1	1
Immunology						
<i>Immunology and Vaccination</i>		15			1	1
Pathology						
<i>Pathogenesis and Pathology of Infectious Diseases</i>			15		1	1
Practical Research Experience						
<i>Project Participation V</i>				60	4	5
Electives					2,5	2,5
Total	45	195	45	75	26,5	27,5

2nd Semester

Title	Academic Hours					ECTS
	VO	KV	SE	UE	SSt	
Molecular biology						
<i>Exercises in Molecular cell biology</i>		30		60	6	6
Biomedicine and Biotechnology						
<i>Current Subjects of Biomedicine and Biotechnology VIII</i>			15		1	1
<i>Legal Basis of Biomedicine</i>		30			2	2
Biomathematics						
<i>Statistical Planning of Experiments</i>		15			1	1
Bioinformatics						
<i>Special Bioinformatics of Biomedicine</i>		30			2	2
Laboratory Animal Science						
<i>Illnesses and Zoonoses</i>		30			2	2
<i>Transgenic Animal Models and Reproductive Biology</i>		15		15	2	3
<i>Anesthetics, Analgesia and Euthanasia</i>	30			30	4	4
<i>Breeding of Laboratory Animals</i>		30			2	2
<i>Replacement and Supplementation Methods</i>		30			2	2
Practical Research Experience						
<i>4 Weeks Practice</i>				165	11	6,5
Total	30	210	15	270	35	32,5

3rd and 4th Semester

Title	Academic Hours					ECTS
	VO	KV	SE	UE	SSt	
Biomedicine and Biotechnology						
<i>Current Subjects of Biomedicine and Biotechnology IX</i>			15		1	1
<i>Production Process of Drugs</i>		15			1	1
<i>Development Process of Drugs</i>		15			1	1
<i>Structural Analysis in Biomedicine</i>		15			1	1
Molecular Biology						
<i>Exercises in Molecular Cell Biology II</i>		30		60	6	6
Laboratory Animal Science						
<i>Phenotyping of Biomodels</i>	15			15	2	2
Biomathematics						
<i>Special Statistics in Biomedicine</i>		15		15	2	2
Biomedical Economics						
<i>Applied Biomedical Economics</i>		15			1	1
Practical Research Experience						
<i>4 Weeks Practice</i>				165	11	6,5
Electives						
					8,5	8,5
Master's Thesis						
<i>Master's Thesis</i>					40	30
Total	15	105	15	255	74,5	60

4. Examination Regulations for Master Studies

4.1. Requirements for Admission to Courses and Examinations

- 4.1.1. One written exam in Special Molecular Biology
- 4.1.2. One oral exam in an infectiological subject (Virology, Bacteriology, Parasitology, Immunology)
- 4.1.3. One written exam in Laboratory Animal Science
- 4.1.4. One oral exam in Biomedicine and Biotechnology
- 4.1.5. One oral Master's exam on the subject of the Master's Thesis

4.2. Requirements for Admission to Courses and Examinations

Successful completion of the exams outlined under points 4.1.1. through 4.1.4. is compulsory for commencing Master's Thesis work.

5. Practice

Practices in a total amount of 4 weeks (10 semester hours) must be completed over the course of semesters 2 and 3. These practices may be attained either at the University of Veterinary Medicine Vienna or external Universities and appropriate institutions (research facilities and private corporations). Proof of completed practices is provided in the form of confirmation certificates issued by the relevant practical institutions.

6. Master's Thesis

Master's theses may be submitted following successful completion of the above-mentioned examinations.

The subject of a thesis must reflect an issue treated in class in the course of the degree programme.

Master's theses must either have a total scope of between 50 and 100 A4 pages or be suitable for publication in a scientific journal.

Incorporating, elaborating and critically reflecting on experiences gained in the course of project participation and practices is recommended.

Evaluation is performed through grading (1 (very good) to 5 (fail)).

7. Completion of Master Studies

After completing all mandatory classes (or accredited respective classes visited abroad) and receiving a passing Master's Thesis grade, studies are deemed completed and students are presented with a confirmatory certificate. This certificate allows graduates to carry the title Master of Science (MSc.). Furthermore, completion of Master's Studies in Biomedicine and Biotechnology empowers students to enrol in a doctorate or PhD programme and pursue a profession in a leading capacity in one of the occupational fields outlined under 1.2.

8. Transitional Provisions

Students, who have commenced studies before the coming into force of this curriculum, are subject to the new curriculum as well. Accreditation for any achievements between the original and present curricula is conducted pursuant to the equivalence table under point 10.

9. Coming Into Force

This curriculum shall come into force with its announcement coming October 1.

10. Equivalency Table

10.1. Mandatory Classes in Examination Subjects

Mandatory classes in examination subjects pursuant to the original curriculum are equivalent to all mandatory classes in examination subjects of the new curriculum as outlined in the equivalency table.

Classes of the curriculum 2003	Equivalent classes
Molecular Quantification Methods in Biomedicine and Scientific Problem-Solving Aspects	Exercises in Molecular Cell Biology I
Molecular Genetics and Biomedicine	Metabolomics
Legal Basics of Animal Laboratory Science	Basics of Animal Experiment Law
Special Animal Laboratory Science	Phenotyping of Biomodels
Special Animal Laboratory Science	Bacterial Toxins
Comparative Biochemistry of Animals	Darwinian Medicine
Advanced Conversational English and Special Developmental Biology	Exercises in Molecular Cell Biology II
Planning Experiments With Laboratory Animals	Statistical Planning of Experiments
Advanced Scientific English	Development Process of Drugs
Current Subjects of Biomedicine and Biotechnology X	Production Process of Drugs
Molecular Neuropathology	Pathogenesis and Pathology of Infectious Diseases

10.2. Equivalency of Examinations

For the period of transition between the original and new curriculum, already passed oral exams in elective subjects are deemed equivalent and accredited to the exams listed under 4.1.2 and 4.1.4.