

Master's Programme Comparative Biomedicine

Infection Biomedicine and Tumour Signalling Pathways

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Content

1. General Provisions	3
1.1. Legal Basis	3
1.2. Qualification Profile	3
1.3. Structure, Weekly Hours and Duration of Studies	4
1.4. Requirements for Admission to the Master's Programme "Biomedicine and Biotechnology"	4
2. Methods of Instruction	5
2.1. Semester Hours	5
2.2. Methods of Instruction	5
2.3. Methods of Examination	5
2.4. Master's Thesis	5
2.5. ECTS Points	6
2.6. Language of Instruction	6
3. Master's Programme	7
3.1. Hours	7
4. Examination Regulations for the Master's Programme	9
4.1. Examination Subjects	9
4.2. Requirements for Admission to Courses and Examinations	9
5. Practice	9
6. Master's Thesis	9
7. Completion of the Master's Programme	10
8. Coming into Force	10

1. General Provisions

1.1. Legal Basis

The legal basis for the Master's Programme "Comparative Biomedicine" is the Austrian Universities Act or *Universitätsgesetz 2002* (UG 2002).

1.2. Qualification Profile

1.2.1. General Qualifications

The University of Veterinary Medicine, Vienna, offers a research-oriented Master's programme in English, providing students with the necessary skills and qualifications for basic and applied research in the academic field and in the industry as well as for public administration in the life sciences. Graduates also gain the necessary qualifications for subsequent PhD studies.

The interdisciplinary programme focuses on infection and tumour diseases which are a great challenge for our health system – not least because of future consequences of the demographic change. The programme is in line with the latest research findings in order to train the urgently needed experts for these challenges. Students will gain knowledge in the fields of diagnosis, research into the diseases, development of new active agents, management of the disease and application of innovative therapies. They will learn to understand the causative molecular and cellular mechanisms. The programme draws on the application and development of model organisms to understand the course of complex biological interactions. The curriculum does not only give a sound overview of the latest bioanalytical methods including omics and imaging technologies, but also provides students with the necessary tools for a qualified bioinformatical analysis of data. Students are involved in team-oriented and independent laboratory work in research projects so that they will be able to sustainably evaluate and realise experimental scientific work at the end of their studies. They also develop the ability to draft a project, write a scientific paper and participate in the public scientific discourse.

1.2.2. Occupational Fields

The Master's programme qualifies graduates for leading positions in particular 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 educational establishments
- Non-university research facilities
- Public and private pertinent research facilities
- Public and private health facilities

1.2.3. Professional and key qualifications are gained in the following fields:

- Biology of tumours and infections
- Immunology and molecular host-pathogen interaction
- Functional genetics, genomics and epigenomics
- Bioinformatics und biostatistics
- Comparative medicine in the context of evolution
- Animal models in inflammations, infections and tumour diseases
- Molecular and personalised precision therapy
- Molecular bioanalytics
- Laboratory animal medicine

1.2.4. Internationality

The Master's programme is in line with international standards. Application of the ECTS system ensures recognition of credits. The language of instruction is English. Students write their Master's theses in English, too.

Students can choose to complete elective classes and practice or write their Master's theses at other universities and research facilities in Austria and abroad.

1.3. Structure, Weekly Hours and Duration of Studies

The Master's programme comprises several modules. After completion of the first year courses, students can choose between two practice-oriented modules ("Tumour Signalling Pathways" and "Infection Biomedicine").

The Master's programme encompasses 4 semesters and 71 ECTS points (mandatory and elective courses including exams). Additionally, practice of at least 8 weeks, in-depth methodical training (technology training) of 2 weeks and a scientific Master's thesis are mandatory.

1.4. Requirements for Admission to the Master's Programme

"Comparative Biomedicine"

According to Article 64 (5) of the UG 2002, admission to the Master's programme "Comparative Biomedicine" 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 hour of 45 minutes.

2.2. Methods of Instruction

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

Seminars or *Seminare* (SE) promote 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.

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

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

Technology Training or *Technologietraining* (TT) is an in-depth methodical training in a scientific method. This method learned in intensive practice will enable students to efficiently investigate a research question in their Master's theses.

2.3. Methods of Examination

Class examinations are either written or oral examinations which take place at the end of a course. Courses with immanent examination (colloquies, seminars, exercises) are characterised by regular knowledge examination during class.

Subject examinations or *Fachprüfungen* are examinations on single subjects.

Overall examinations or *Gesamtprüfungen* are cumulative examinations on several subjects.

2.4. Master's Thesis

Students are required to compile a Master's thesis.

The subject of the thesis must be derived from one of the examination subjects included in the 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 workload (both in class and in independent studies). 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 (including examinations) and elective subjects, practises and the Master's thesis (including the Master's examination) according to the following scheme:

Mandatory courses	Electives	Practice	Technology training	Master's thesis	Total
59	12	15	4	30	120

2.6. Language of Instruction

By offering all courses in English, the Master's 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 Programme

3.1. Hours

Over the course of the 4 semesters of the Master's programme, classes in the amount of 71 ECTS points are designated. Additionally, a practice of eight weeks, a technology training of two weeks and a Master's thesis are mandatory.

3.2 Recommended semester schedule

1 st semester						
Academic hours						
Title	VO	KV	SE	UE	SSt	ECTS
Proliferation & Differentiation		2			2	2
Cell Death		1			1	1
Immunity and Inflammation		3			3	3
Angiogenesis & Haematopoiesis		2			2	2
Metabolism		2			2	2
Stem Cells		1			1	1
Invertebrate Biomodels		1			1	2
Vertebrate Biomodels		2			2	2
Darwinian Medicine		2			2	3
Comparative Genome Analysis		2			2	3
Statistic Planning of Experiments		1			1	1
Analysis of High-throughput Data I		2			2	2
Examination 4.1.1						2
Electives						
Total		21			21	30

2nd semester						
	Academic hours					
Title	VO	KV	SE	UE	SSt	ECTS
Analysis of High-throughput Data II		2			2	2
Practical Bioinformatics		1		2	3	4
Bioanalysis in Cancer und Infection		4			4	4
Module Tumour Signalling Pathways						
Tumour Biology		1			1	1
Functional Tumour Genomics		2	1		3	3
Animal Models in Tumour Research		2			2	2
New Therapeutic Approaches in Tumour Therapy		2			2	2
Module Infection Biomedicine						
Infection Biology		5			5	5
Functional Genomics in Host-pathogen Interaction		1			1	1
Animal Models in Infection Research		1			1	1
New Therapeutic Approaches in Infection Medicine		1			1	1
Examination 4.1.2						2
Examination 4.1.3						2
Total		21	2	2	25	30
3rd and 4th semester						
	Academic hours					
Title	VO	KV	SE	UE	SSt	ECTS
Eight-week Practice						15
Two-week Technology Training						4
Scientific Writing		1		2	3	3
Electives						8
Master's Examination (4.1.4)						3
Master's Thesis						27
Total		1		2	3	60

4. Examination Regulations for the Master's Programme

4.1. Examination Subjects

- 4.1.1. **A written overall examination on the courses of the first semester**
- 4.1.2. **A written overall examination on the courses of the module "Tumour Signalling Pathways"**
- 4.1.3. **A written overall examination on the courses of the module "Infection Biomedicine"**
- 4.1.4. **An oral Master's examination 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 4.1.3 is compulsory for commencing the Master's thesis work.

5. Practice

Practices and Technology Training have to be completed over the course of the 3rd semester and comprise eight and two weeks. Practices may be attained either at the University of Veterinary Medicine, Vienna, or other universities and appropriate research institutions (research facilities; private corporations). Proof of completed practices is provided in the form of confirmation certificates issued by the relevant institutions.

6. Master's Thesis

Master's theses may be submitted following successful completion of the above-mentioned examinations 4.1.1 to 4.1.3. Master's theses have to be compiled in English and should reflect issues that were 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 practices is recommended.

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

7. Completion of the Master's Programme

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.).

Completion of the Master's programme "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. Coming into Force

This curriculum shall come into force on October 1, 2016.