

Note:

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Curriculum for the
Master's Programme in Biomedical Life Sciences
at the Faculty of Biology of the University of Innsbruck

(New release 2025)

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§ 1 Allocation of the studies programme

Pursuant to §54 para. 1 Universities Act 2002, the Master's Programme in Biomedical Life Sciences is allocated to the group of natural science study programmes.

§ 2 Admission

- (1) Admission to the Master's Programme in Biomedical Life Sciences requires the completion of a relevant bachelor's programme or a relevant bachelor's degree completed at a university of applied sciences or another equivalent degree programme passed at a recognised national or international postsecondary educational institution.
- (2) In any case, the completion of the Bachelor's Programme in Biology at the University of Innsbruck is deemed to be a subject-relevant study programme. The Rectorate decides on the relevance of another subject-relevant study programme pursuant to §64 para. 3 Universities Act.
- (3) In order to compensate for significant subject-related differences, supplementary examinations totalling a maximum of 30 ECTS-Credits may be prescribed, which must be taken by the end of the second semester of the master's programme. The Rectorate may determine which of these supplementary examinations are a prerequisite for taking the examinations provided for in the master's degree programme curriculum.

§ 3 Qualification profile

- (1) Subject-specific qualifications:
 - The Master's programme in Biomedical Life Sciences teaches the technical skills and methods required for scientific research in biomedicine and related fields.
 - The programme is designed to focus on current research fields, closely linking theoretical training with experimental/practical skills.
 - It offers comprehensive education in biomedicine and, through the selection of suitable content, enables extensive specialisation or a focus on specific subjects in line with students' inclinations and interests, e.g. in cell biology, stem cell research, bioinformatics, developmental genetics, tumour biology and immunology.
 - It allows students to acquire advanced knowledge based on the current state of knowledge and expertise in biomedical research.
- (2) General qualifications:
 - Graduates of the Master's Programme in Biomedical Life Sciences are qualified to conduct scientific research in biomedicine and related fields independently and in a significant manner.
 - It promotes social and ethical awareness of the benefits and risks of scientific research.
 - The Master's Programme in Biomedical Life Sciences promotes not only technical skills but also interdisciplinary key qualifications, such as teamwork and oral and written communication skills.
- (3) Professional qualifications:
 - The master's programme provides the qualifications required to start a career in research, technology, industry, the environment and biomedical-related fields of activity within public authorities. Possible career fields include:
 - research and teaching in the field of biomedicine or related subjects,
 - scientific activities in private companies,
 - scientific activities in public institutions and public administration (e.g. in the fields of medicine, healthcare, food monitoring, forensics, research funding)
 - Scientific activities in public institutions and public administration (e.g. in the fields of medicine, healthcare, food monitoring, forensics, research funding),
 - any other activity at the interface with other disciplines (e.g. science journalism) in conjunction with a corresponding additional qualification.

- The Master's Programme in Biomedical Life Sciences qualifies students to enrol in a further doctoral programme/PhD programme.

§ 4 Scope and duration

The Master's Programme in Biomedical Life Sciences covers 120 ECTS-Credits. This corresponds to a duration of the studies of four semesters. One ECTS-Credit corresponds to a workload of 25 hours.

§ 5 Language

The Master's Programme in Biomedical Life Sciences is offered in English. English language skills at level B2 (Common European Framework of Reference) are required. The regulations of the University of Innsbruck apply to the type of proof required.

§ 6 Types of courses and maximum number of students per course

- (1) Courses without continuous performance evaluation:
Lectures (VO) are courses held in lecture format. They introduce the research areas, methods and schools of thought for a given subject. No maximum number of students per course.
- (2) Courses with continuous performance evaluation:
 1. Working groups (AG) serve to impart knowledge and methods of scientific work and/or to treat a topic in a collective fashion, examining theories, methods and techniques of an area using group work. Maximum number of students: 60
 2. Practical courses (PR) provide practical experience with concrete scientific tasks, complementing occupational and academic training. Maximum number of students: 10-15.
 3. Proseminars (PS) introduce students interactively to a subject area and impart knowledge and methods of scientific working. Maximum number of students: 12–30
 4. Seminars (SE) provide in-depth study of contents, methods and techniques of a specialist area including presentations and discussions. Maximum number of students: 8–16
 5. Tutorials (UE) focus on the practical treatment of concrete scientific tasks within an area. Maximum number of participants: 6–16
- (3) Courses taken from other curricula are subject to the maximum number of students as specified in the respective curricula.

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

In courses with a limited number of participants, the following criteria are applied to the allocation:

1. Attendance at the preliminary meeting (in person or by a deputy).
2. Students of the Master's Programme in Biomedical Life Sciences are given priority.
3. Number of semesters of registration for the Master's Programme in Molecular Cell and Developmental Biology or Biomedical Life Sciences resp., whereby students with a longer period of registration are given priority.
4. Drawing lots.

§ 8 Compulsory and elective modules

(1) The following compulsory modules covering altogether 27.5 ECTS-Credits are to be passed:

1.	Compulsory Module: Current Topics and Methods in Biomedical Research	h	ECTS-Credits
a.	AG Current Topics and Methods in Biomedical Research	2	3
b.	AG Methods and Experimental Planning in Biomedical Research	3	4.5
	Total	5	7.5
<p>Learning Outcomes: ad a.: Students can critically analyse current topics in biomedical research and discuss them in a team. ad b.: Students are familiar with current methods of biomedical research. They can plan experiments in these areas (method selection, experimental design, controls), evaluate them statistically and develop strategies for graphical representation.</p>			
Prerequisite/s: none			

2.	Compulsory Module: Instructions for Scientific Working	h	ECTS-Credits
	PS Instructions for Scientific Working	1	17.5
	Total	1	17.5
<p>Learning Outcomes: Students are able to formulate scientific questions for their Master's Thesis based on the current state of knowledge. They can develop hypotheses, test them using suitable methods and reflect on the results in scientific discourse. They are familiar with the standards of good scientific practice, understand the structure and creation process of a scientific paper and know the principles of good scientific writing style. They are also able to create and deliver academic presentations.</p>			
Prerequisite/s: none			

3.	Compulsory Module: Master's Thesis Defense (Defensio)	h	ECTS-Credits
	Presentation and oral defence of the Master's Thesis before an examination board		2.5
	Total		2.5
<p>Learning Outcomes: Students are able to orally present and reflect on the theoretical and methodological positions as well as results of the Master's Thesis in the overall context of the Master's programme. They are able to present the main results of their Master's thesis and defend the thesis in a scientific discussion.</p>			
Prerequisite/s: positive evaluation of all other compulsory and elective modules as well as the Master's Thesis			

(2) Elective modules covering altogether 67.5 ECTS-Credits are to be passed:

1.	Elective Module: Fundamentals of Bioinformatics	h	ECTS-Credits
a.	VO Fundamentals of Bioinformatics	1	1.5
b.	SE Current Topics in Bioinformatics	1	1.5
c.	UE Methods in Bioinformatics	3	4.5
	Total	5	7.5
<p>Learning Outcomes: ad a.: Students are able to describe and compare the key concepts of bioinformatics. ad b.: Students are able to interpret current literature from selected, applied areas of bioinformatics, present it clearly and in a target group-oriented manner, and discuss it critically. ad c.: Students acquire specialised skills to navigate the most important biological databases, independently solve problems in bioinformatics through the practical application of bioinformatic methods and present the results of their investigations in graphic and written form.</p>			
Prerequisite/s: none			

2.	Elective Module: Bioinformatic Analysis of Transcriptomics Data	h	ECTS-Credits
a.	VO High-Throughput Transcriptomics	1	1.5
b.	UE Computer-Assisted Analysis of Transcriptomics Data	4	6.0
	Total	5	7.5
<p>Learning Outcomes: ad a.: Students can demonstrate their highly specialised knowledge of the analysis and interpretation of transcriptomics data generated using various high-throughput sequencing technologies. ad b.: Students are able to independently create scripts to analyse different types of transcriptomics data. Students can answer biological questions by analysing transcriptomics data and present their results graphically and in written form.</p>			
Prerequisite/s: none			

3.	Elective Module: Genome-Wide Technologies in Biology	h	ECTS-Credits
a.	VO Genome-Wide Technologies in Biology	1	1.5
b.	SE Current Aspects of Genome-Wide Technologies	1	1.5
c.	UE Methods of Genome-Wide Technologies	3	4.5
	Total	5	7.5
<p>Learning Outcomes: ad a.: Students can demonstrate their highly specialised knowledge, which is linked to the latest findings in the field of genome-wide technologies. They can describe and compare various genome- and system-wide analysis techniques for DNA (short- and long-read sequencing), RNA, proteins, metabolites and lipids. ad b.: Students are able to interpret current literature from selected, applied subject areas of multi-omics analyses, present it clearly and in a target group-oriented manner, and discuss it critically. ad c.: Students can analyse genome-wide data sets and summarise their results in writing.</p>			

	Prerequisite/s: none
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4.	Elective Module: Single-Cell-Methods	h	ECTS-Credits
a.	VO Single-Cell-Methods	1	1.5
b.	SE Current Topics in Single-Cell Biology	1	1.5
c	UE Methods of Single-Cell Biology	3	4.5
	Total	5	7.5
<p>Learning Outcomes: ad a.: Students have highly specialised knowledge based on the latest findings in the field of single-cell methods and are able to assess the methodological advantages and disadvantages in order to design experimental strategies. ad b.: Students are able to interpret current literature in the field of single-cell methods, present it clearly and in a target group-oriented manner, and discuss it critically. ad c.: Students can analyse and interpret single-cell data sets and coupled data sets, correlating them with cell type atlases. They can summarise their results in writing.</p>			
Prerequisite/s: none			

5.	Elective Module: Computer-Assisted Modelling in Cell and Developmental Biology	h	ECTS-Credits
a.	VO Models and Simulation of Dynamic Biological Processes	1	1.5
b.	SE Current Topics and Methods in Biological Modelling	1	1.5
c.	UE Simulation and Machine Learning in Cell and Developmental Biology	3	4.5
	Total	5	7.5
<p>Learning Outcomes: ad a.: Students can demonstrate their highly specialised knowledge of computer-assisted methods for describing dynamic biological processes at the molecular, cellular and organismic levels. They can describe and compare basic models for describing biological processes, such as the formation of biological patterns and shapes. ad b.: Students are able to interpret current literature in the field of computer-aided modelling, present it clearly and in a target group-oriented manner, and discuss it critically. ad c.: Students can create computer programmes and apply them to specific problems. They can analyse data using machine learning methods based on highly specialised knowledge. They can graphically represent, interpret and summarise the data and statistics obtained.</p>			
Prerequisite/s: none			

6.	Elective Module: Computer-Aided Structural Biology	h	ECTS-Credits
a.	VO Theoretical Foundations of Computer-Aided Structural Biology	1	1.5
b.	SE Current Topics in Computer-Aided Structural Biology	1	1.5
c.	UE Methods in Computer-Aided Structural Biology	3	4.5
	Total	5	7.5

	<p>Learning Outcomes:</p> <p>ad a.: Students have highly specialised knowledge based on the latest findings in the field of structural biology and are able to analyse and interpret complex protein structures and their functions.</p> <p>ad b.: Students are able to interpret current literature in the field of computer-aided structural biology, present it clearly and in a manner appropriate to the target audience, and discuss it critically.</p> <p>ad c.: Students can innovatively apply various methods of computer simulation and in silico proteomics to solve scientific problems and combine them with laboratory data. Students can independently plan and carry out corresponding experiments using in silico methods, as well as evaluate their results, present them in written form and interpret them.</p>
	Prerequisite/s: none

7.	Elective Module: Quantitative Image Analysis Methods	h	ECTS-Credits
a.	VO Concepts and Methods in Image Analysis	1	1.5
b.	SE New Developments in Image Analysis	1	1.5
c.	UE Use and Programming of Image Analysis Tools	3	4.5
	Total	5	7.5
	<p>Learning Outcomes:</p> <p>ad a.: Students have in-depth knowledge and practical skills in the application of current image analysis methods in the life sciences and have a comprehensive understanding of the theoretical principles of various image analysis techniques.</p> <p>ad b.: Students are able to interpret current literature in the field of image analysis methods and their applications, present them clearly and in a target group-oriented manner, and discuss them critically.</p> <p>ad c.: Students can demonstrate their specialised practical knowledge of the application of current software in image analysis (e.g. segmentation, object recognition, morphometry, tracking). They can programme routines for the automated analysis of microscopic 2D, 3D and 4D image data and interpret and summarise the corresponding results of image analyses in writing.</p>		
	Prerequisite/s: none		

8.	Elective Module: Organisation, Function and Pathological Changes in Tissues	h	ECTS-Credits
a.	VO Organisation, Function and Pathological Changes in Tissues	1	1.5
b.	SE Organisation, Function and Pathological Changes in Tissues	1	1.5
c.	UE Organisation, Function and Pathological Changes in Tissues	3	4.5
	Total	5	7.5
	<p>Learning Outcomes:</p> <p>ad a.: Students can demonstrate a sound knowledge of the structure, organisation and physiological functions of tissues. They are able to understand how the relationship between structure and function changes in dysfunctional, aged and diseased tissues.</p> <p>ad b.: Students are able to analyse current research topics in histology, present them clearly and in a target group-oriented manner, and discuss them critically.</p> <p>ad c.: Students can prepare tissue samples for histology (fixation, embedding and sectioning techniques). They are able to apply various staining techniques to visualise the structure,</p>		

	composition and pathological changes in tissues and can interpret and summarise the results in writing.
	Prerequisite/s: none

9.	Elective Module: Live Cell Imaging	h	ECTS-Credits
a.	VO Live Cell Imaging und Fluorescence Techniques in Microscopy	1	1.5
b.	SE Live Cell Imaging	1	1.5
c.	UE Live Cell Imaging	3	4.5
	Total	5	7.5
	<p>Learning Outcomes: ad a.: Students can demonstrate their highly specialised knowledge of microscopy techniques, particularly in the areas of live cell microscopy, fluorescence microscopy and super-resolution. They can assess the methodological advantages and disadvantages of measurement methods, imaging and image processing, and fluorescence sensors in order to design experimental strategies. ad b.: Students are able to interpret current literature on microscopy techniques, present it clearly and in a target group-oriented manner, and discuss it critically. ad c.: Students are able to apply methods of live cell microscopy innovatively to solve scientific problems, from the subcellular to the organismic level. They can independently plan, carry out and evaluate corresponding experiments, and summarise their results in written form.</p>		
	Prerequisite/s: none		

10.	Elective Module: Genetic and Optogenetic Methods	h	ECTS-Credits
a.	VO Genetic and Optogenetic Methods in Biomedical Research	1	1.5
b.	SE Current Publications on Genetics and Optogenetics	1	1.5
c.	UE Genetic and Optogenetic Applications in the Model Organism Zebrafish	3	4.5
	Total	5	7.5
	<p>Learning Outcomes: ad a.: Students can demonstrate their highly specialised knowledge of genetic and optogenetic methods and their applications in biomedical research. ad b.: They are able to independently research current literature on genetic and optogenetic methods in biomedicine and present and critically discuss this information in a clear and target group-oriented manner. ad c.: Students are able to apply current genetic and optogenetic methods innovatively to solve scientific problems. Students can independently plan, carry out and evaluate corresponding experiments.</p>		
	Prerequisite/s: none		

11.	Elective Module: Mechanobiology in Development and Disease	h	ECTS-Credits
a.	VO Fundamentals, Concepts and Methods of Mechanobiology	1	1.5
b.	SE Current Topics and Methods in Mechanobiology	1	1.5
c.	UE Experimental and Quantitative Methods in Mechanobiology	3	4.5
	Total	5	7.5
	Learning Outcomes: ad a.: Students can demonstrate their highly specialised knowledge, which is based on the latest findings in the field of mechanobiology. They are able to comprehensively understand the biomechanical properties of cells and tissues, the mechanisms and signalling pathways through which cells generate mechanical forces, and their role in development, physiology and disease. ad b.: Students can independently study current literature on mechanobiology, present it clearly and in a target group-oriented manner, and discuss it critically. ad c.: Students are able to apply current experimental techniques and quantitative methods for investigating mechanobiological processes in innovative ways to solve scientific problems. They can analyse and interpret experimental data and summarise results in written form.		
	Prerequisite/s: none		

12.	Elective Module: Cell Homeostasis and Metabolism	h	ECTS-Credits
a.	VO Homeostasis of Cell Metabolism	1	1.5
b.	SE Current Topics in Metabolic Physiology	1	1.5
c.	UE Methods of Metabolic Physiology	3	4.5
	Total	5	7.5
	Learning Outcomes: ad a.: Students can provide a well-founded overview of metabolic processes in animal cells and are familiar with selected examples of regulatory processes of intracellular homeostasis. ad b.: Students are able to interpret current literature on the topics of cell metabolism, stress physiology and cell homeostasis, present it clearly and in a target group-oriented manner, and discuss it critically. ad c.: Students can plan, conduct and evaluate experiments to measure various intra- and extracellular parameters of living cells, and summarise their results in written form.		
	Prerequisite/s: none		

13.	Elective Module: Cell Proliferation, Differentiation and Cell Death	h	ECTS-Credits
a.	VO Molecular Mechanisms of Cell Proliferation, Differentiation and Cell Death	1	1.5
b.	SE Current Topics in Cell Proliferation, Differentiation and Cell Death	1	1.5
c.	UE Cell Proliferation, Differentiation and Cell Death	3	4.5
	Total	5	7.5
	Learning Outcomes: ad a.: Students can demonstrate their in-depth knowledge of the processes and regulation of cell proliferation, cell death and differentiation.		

	<p>ad b.: Students are able to interpret literature on the topics of cell proliferation, cell death and differentiation, present it clearly and in a target group-oriented manner in a presentation, and discuss it critically.</p> <p>ad c.: Students are able to apply current experimental techniques for investigating cell proliferation, cell death and differentiation in innovative ways to solve scientific problems. They can plan, carry out and evaluate appropriate experiments and summarise their results in written form.</p>
	Prerequisite/s: none

14.	Elective Module: Cell Migration in Development and Disease	h	ECTS-Credits
a.	VO Concepts of Cell Migration	1	1.5
b.	SE Current Topics in Cell Migrations	1	1.5
c.	UE Cell Migration	3	4.5
	Total	5	7.5
	<p>Learning Outcomes:</p> <p>ad a.: Students are able to demonstrate a comprehensive understanding of the types, control and implementation of cell migration, as well as its diverse functions in biology and medicine. They are able to understand the types of cell migration and their role, e.g. during development and in the onset of diseases.</p> <p>ad b.: Students are able to critically read current research articles on the topic of cell migration, present them clearly and in a target group-oriented manner, and discuss them critically.</p> <p>ad c.: Students can apply current experimental in vitro and in vivo techniques and quantitative methods for investigating cell migration in innovative ways to solve scientific problems. Students are able to plan, conduct and evaluate experiments and summarise their results in written form.</p>		
	Prerequisite/s: none		

15.	Elective Module: Cellular Stress Response	h	ECTS-Credits
a.	VO Cellular Stress Response	1	1.5
b.	SE Cellular Stress Response	1	1.5
c.	UE Cellular Stress Response	3	4.5
	Total	5	7.5
	<p>Learning Outcomes:</p> <p>ad a.: Students have a comprehensive understanding of how cells respond to different types of stress and can describe the underlying molecular mechanisms and cellular coping strategies.</p> <p>ad b.: Students are able to interpret current literature on the topic of stress response in cells, present it clearly and in a manner appropriate for the target audience, and discuss it critically.</p> <p>ad c.: Students can apply current methods for detecting and analysing cellular stress in innovative ways to solve scientific problems. They can plan, conduct, and evaluate relevant experiments and summarize their results in written form.</p>		
	Prerequisite/s: none		

16.	Elective Module: Chronobiology	h	ECTS-Credits
a.	VO Basics of Chronobiology	1	1.5
b.	SE Circadian Rhythm	1	1.5
c.	UE Analysis of Cellular Circadian Patterns	3	4.5
	Total	5	7.5
<p>Learning Outcomes: ad a.: Students will be able to demonstrate a comprehensive understanding of the molecular functioning of the internal clock, its significance for cellular signalling pathways and functions, and its role in the pathophysiology of diseases. ad b.: Students are able to interpret current literature in the field of chronobiology, present it clearly and in a manner appropriate to the target audience, and discuss it critically. ad c.: Students are able to apply current methods for analysing circadian processes in cells in innovative ways to solve scientific problems. They are able to conduct, validate and interpret relevant experiments and summarise them in written form.</p>			
Prerequisite/s: none			

17.	Elective Module: Senescence and Cell Ageing	h	ECTS-Credits
a.	VO Molecular Biological Aspects of Cellular Senescence	1	1.5
b.	SE Current Aspects of Senescence Research	1	1.5
c.	UE Methods of Senescence Research	3	4.5
	Total	5	7.5
<p>Learning Outcomes: ad a.: Students are able to demonstrate a comprehensive understanding of the molecular and cellular factors of cellular senescence and their role in the ageing process. ad b.: Students are able to interpret current publications on the regulation and function of cellular senescence, present them clearly and in a target group-oriented manner, and discuss them critically. ad c.: Students can apply current methods for detecting stress-induced senescence in innovative ways to solve scientific problems. They can plan, conduct and evaluate corresponding experiments and summarise their results in written form.</p>			
Prerequisite/s: none			

18.	Elective Module: Molecular Biology and Genetics of Bioadhesion	h	ECTS-Credits
a.	VO Fundamentals of Biomimetic Adhesives	1	1.5
b.	SE Current Aspects of Bioadhesion Research	1	1.5
c.	UE Methods for the Identification of Biological Adhesives	3	4.5
	Total	5	7.5
<p>Learning Outcomes: ad a.: Students are able to demonstrate a comprehensive understanding of biological adhesives, from their natural origins to their technical and medical applications. ad b.: Students are able to interpret current publications on bioadhesion, present them clearly and in a manner appropriate to the target audience, and discuss them critically.</p>			

	ad c.: Students can apply current methods of bioadhesion research innovatively to solve scientific problems. They can plan, carry out and evaluate relevant experiments and summarise their results in written form.
	Prerequisite/s: none

19.	Elective Module: Stem Cells and Regeneration in Invertebrate Model Organisms	h	ECTS-Credits
a.	VO Stem Cells and Regeneration in Invertebrate Model Organisms	1	1.5
b.	SE Stem Cells and Regeneration in Invertebrate Model Organisms	1	1.5
c.	UE Stem Cells and Regeneration in Invertebrate Model Organisms	3	4.5
	Total	5	7.5
	Learning Outcomes: ad a.: Students are able to demonstrate a comprehensive understanding of the concepts of plasticity and differentiation of embryonic and adult stem cells, as well as the role of stem cells in differentiation and regeneration processes in invertebrates. ad b.: Students are able to interpret current literature on stem cell and regenerative biology, present it clearly and in a manner appropriate to the target audience, and discuss it critically. ad c.: Students can apply current methods for analysing stem cells in invertebrate model organisms in innovative ways to solve scientific problems. They can plan, carry out and evaluate relevant experiments and summarise their results in written form.		
	Prerequisite/s: none		

20.	Elective Module: Production and Reprogramming of Human Stem Cells	h	ECTS-Credits
a.	VO Human Stem Cell Biology	1	1.5
b.	SE Current Topics in Stem Cell Biology	1	1.5
c.	UE Cell Biological Methods in Stem Cell Biology	3	4.5
	Total	5	7,5
	Learning Outcomes: ad a.: Students can demonstrate a comprehensive understanding of the processes and concepts involved in the production of human stem cells and cell reprogramming. ad b.: Students are able to interpret current literature from selected, applied topics in stem cell biology, present it clearly and in a target group-oriented manner, and discuss it critically. ad c.: Students can apply current cell and molecular biology methods for characterising stem cells as well as fundamental bioinformatic methods in innovative ways to solve scientific problems. They can plan, carry out and evaluate corresponding experiments and summarise their results in written form.		
	Prerequisite/s: none		

21.	Elective Module: Stem Cells in Regenerative Medicine and Disease Modelling	h	ECTS-Credits
a.	VO Regenerative Medicine and Disease Modelling	1	1.5
b.	SE Current Topics in Regenerative Medicine	1	1.5
c.	UE Bell Biology Methods for Disease Modelling	3	4.5
	Total	5	7.5

	<p>Learning Outcomes:</p> <p>ad a.: Students are able to demonstrate a comprehensive understanding of concepts and processes for the targeted differentiation of pluripotent and multipotent stem cells into relevant human disease models and their application to the study of pathophysiological processes.</p> <p>ad b.: Students are able to interpret current literature from selected, applied topics in regenerative medicine, present it clearly and in a target group-oriented manner, and discuss it critically.</p> <p>ad c.: Students can apply current methods for the creation, validation and bioinformatic analysis of stem cell-based human disease models in innovative ways to solve scientific problems. They can plan, carry out and evaluate corresponding experiments and summarise their results in written form.</p>
	Prerequisite/s: none

22.	Elective Module: 3D Cell Culture and Organoids	h	ECTS-Credits
a.	VO 3D Cell Culture and Organoids	1	1.5
b.	SE Current Topics in 3D Cell Culture and Organoids	1	1.5
c.	UE 3D Cell Culture and Organoid Techniques	3	4.5
	Total	5	7.5
	<p>Learning Outcomes:</p> <p>ad a.: Students are able to demonstrate a comprehensive understanding of human 3D cell culture techniques and organoids and their applications in university, medical and pharmaceutical research.</p> <p>ad b.: Students are able to interpret current literature on organoids and related biological issues, present them clearly and in a target group-oriented manner, and discuss them critically.</p> <p>ad c.: Students can apply current methods for creating and analysing organoids in innovative ways to solve scientific problems. They can plan, carry out and evaluate relevant experiments and summarise their results in written form.</p>		
	Prerequisite/s: none		

23.	Elective Module: Bioprinting and Cultivation of Human Tissue	h	ECTS-Credits
a.	VO Tissue Engineering, 3D Bioprinting and Organ-on-Chip	1	1.5
b.	SE New Strategies for Growing Human Tissue for Drug Testing and Precision Medicine Applications	1	1.5
c.	UE 3D Bioprinting and Organ-on-Chip as Models in Tumour Biology	3	4.5
	Total	5	7.5
	<p>Learning Outcomes:</p> <p>ad a.: Students can explain methods and concepts in the field of tissue engineering, 3D bioprinting, and microphysiological ‘organ-on-chip’ systems, as well as their significance in drug development, disease modelling, and the avoidance of animal testing.</p> <p>ad b.: Students are able to interpret current literature on tissue engineering and bioprinting, present it clearly and in a target group-oriented manner, and discuss it critically.</p> <p>ad c.: Students can apply current methods for creating and analysing biofabricated tissues in innovative ways to solve scientific problems. They are able to plan, conduct and evaluate experiments and summarise their results in written form.</p>		
	Prerequisite/s: none		

24.	Elective Module: Oncogene Signal Transduction	h	ECTS-Credits
a.	VO Signal Transduction in Cancer	1	1.5
b.	SE Current Topics in Cancer Therapy	1	1.5
c.	UE Methods for Analysing Signalling Pathways in Cancer Cells	3	4.5
	Total	5	7.5
	<p>Learning Outcomes: ad a.: Students are able to demonstrate a comprehensive understanding of carcinogenic factors and the molecular mechanisms underlying the aetiology, progression and pharmaceutical treatment of cancer. ad b.: Students are able to interpret current literature on cancer research, present it clearly and in a manner appropriate to the target audience, and discuss it critically. ad c.: Students can apply current biochemical and cell biological methods of cancer research in innovative ways to solve scientific problems. They can plan, carry out and evaluate relevant experiments and summarise their results in writing.</p>		
	Prerequisite/s: none		

25.	Elective Module: Epigenetics and Cancer	h	ECTS-Credits
a.	VO Epigenetics and Cancer	1	1.5
b.	SE Epigenetics and Cancer	1	1.5
c.	UE Epigenetics and Cancer	3	4.5
	Total	5	7.5
	<p>Learning Outcomes: ad a.: Students are able to demonstrate a comprehensive understanding of the significance of epigenetics in the development of disease, particularly with regard to cancer. ad b.: Students are able to critically discuss the advantages and disadvantages of different clinical study designs as well as ethical and practical aspects of research involving human patients. They can interpret current literature in the field of epigenetics, present it clearly and in a target group-oriented manner, and discuss it critically. ad c.: Students are able to develop their own research ideas into translational study protocols and ethics applications. They can innovatively apply and interpret practical methods for cancer diagnosis and risk prediction to solve scientific problems and summarise their results in written form.</p>		
	Prerequisite/s: none		

26.	Elective Module: Model Organisms in Aging Research	h	ECTS-Credits
a.	VO Model Organisms in Aging Research	1	1.5
b.	SE Model Organisms in Aging Research	1	1.5
c.	UE Model Organism <i>Caenorhabditis elegans</i>	3	4.5
	Total	5	7.5
	<p>Learning Outcomes: ad a.: Students are able to demonstrate a comprehensive understanding of relevant concepts and models in ageing research, as well as the biology and genetics of the model organism <i>caenorhabditis elegans</i>.</p>		

	<p>ad b.: Students are able to interpret current publications on the application of model organisms in ageing research, present them clearly and in a target group-oriented manner, and discuss them critically.</p> <p>ad c.: Students can apply experimental methods and techniques to <i>C. elegans</i> in innovative ways to solve scientific problems. They can plan, carry out and evaluate appropriate experiments and summarise their results in writing.</p>
	Prerequisite/s: none

27.	Elective Module: Model Organisms in Diabetes Research	h	ECTS-Credits
a.	VO Causes and Consequences of Diabetes	1	1.5
b.	SE Current Methods in Diabetes Research	1	1.5
c.	UE Practical Approaches to Diabetes Research	3	4.5
	Total	5	7.5
	<p>Learning Outcomes:</p> <p>ad a.: Students are able to demonstrate a comprehensive understanding of the genetic, molecular and physiological causes and consequences of diabetes and are familiar with the current methods and applications of diabetes research.</p> <p>ad b.: Students can independently study current literature on diabetes, present it clearly and in a target group-oriented manner, and discuss it critically.</p> <p>ad c.: Students can apply methods for investigating diabetes-related issues and parameters in relevant model systems in innovative ways to solve scientific problems. They can plan, carry out and evaluate appropriate experiments and summarise their results in written form.</p>		
	Prerequisite/s: none		

28.	Elective Module: Flexibility of the Cardiovascular System	h	ECTS-Credits
a.	VO Flexibility of the Cardiovascular System	1	1.5
b.	SE Current Topics in Cardiovascular Physiology	1	1.5
c.	UE Methods in Cardiovascular Research	3	4.5
	Total	5	7.5
	<p>Learning Outcomes:</p> <p>ad a.: Students can demonstrate a comprehensive understanding of the function and adaptability of the cardiovascular system and the underlying cardiovascular physiology.</p> <p>ad b.: Students are able to interpret current literature on cardiovascular physiology, present it clearly and in a manner appropriate to the target audience, and discuss it critically.</p> <p>ad c.: Students can innovatively apply experimental methods and techniques specifically developed for working with vertebrate models to solve scientific problems. Students can plan, conduct, and evaluate appropriate experiments and summarize their results in written form.</p>		
	Prerequisite/s: none		

29.	Elective Module: Mice in Biomedical Research	h	ECTS-Credits
a.	VO Mice in Biomedical Research	1	1.5
b.	SE Mice in Biomedical Research	1	1.5
c.	UE Fundamentals of Experimental Work with Mice	3	4.5
	Total	5	7.5
	<p>Learning Outcomes: ad a.: Students have comprehensive specialist knowledge of the use of mice as model organisms for investigating fundamental biological processes and disease-related pathological changes and can explain the methods used to specifically modify gene functions. ad b.: Students can interpret current literature on the topic of mouse models, present it clearly and in a manner appropriate for the target audience, and discuss it critically. ad c.: Students can apply current research methods using mouse models in innovative ways to solve scientific problems. They can plan, conduct and evaluate relevant experiments and summarise their results in written form.</p>		
	Prerequisite/s: none		

30.	Elective Module: Molecular Mechanisms of Immunity	h	ECTS-Credits
a.	VO Molecular Mechanisms of Immunity	1	1.5
b.	SE Molecular Mechanisms of Immunity	1	1.5
c.	UE Functional and Mechanistic Analysis of Immune Cell Physiology	3	4.5
	Total	5	7.5
	<p>Learning Outcomes: ad a.: Students can demonstrate comprehensive specialist knowledge of the molecular and cellular mechanisms that regulate the development and function of immune cells. ad b.: Students are able to interpret current literature on the mechanistic aspects of immune cell physiology, present it clearly and in a manner appropriate to the target audience, and discuss it critically. ad c.: Students can apply current methods for investigating immune cells in innovative ways to solve scientific problems. They can plan, carry out and evaluate appropriate experiments and summarise their results in written form.</p>		
	Prerequisite/s: none		

31.	Elective Module: Interactions between the Immune System and Pathogens	h	ECTS-Credits
a.	VO Defence against Pathogens and Immune Evasion	1	1.5
b.	SE Immune Defence against Pathogens	1	1.5
c.	UE Pathogen-Specific Immune Responses	3	4.5
	Total	5	7.5
	<p>Learning Outcomes: ad a.: Students have comprehensive knowledge of the immunological processes involved in defending against pathogens and can explain concepts of immune evasion strategies and mechanisms of different pathogens.</p>		

	<p>ad b.: Students are able to interpret current literature on the topics of immune defence and immune evasion, present it clearly and in a target group-oriented manner, and discuss it critically.</p> <p>ad c.: Students can apply current methods for detecting pathogen-specific immune responses in innovative ways to solve scientific problems. They can plan, conduct and evaluate relevant experiments and summarise their results in written form.</p>
	Prerequisite/s: none

32.	Elective Module: Applied Immunology	h	ECTS-Credits
a.	VO Applied Immunology	1	1.5
b.	SE Current Topics in Applied Immunology	1	1.5
c.	UE Applied Immunological Methods	3	4.5
	Total	5	7.5
	<p>Learning Outcomes: ad a.: Students can demonstrate comprehensive knowledge of immunological processes and concepts that go beyond the defence against pathogens, such as transplant immunology, allergies and tumour cell defence.</p> <p>ad b.: Students are able to interpret current literature from selected topics in applied immunology, present it clearly and in a target group-oriented manner, and discuss it critically.</p> <p>ad c.: Students can apply current immunological methods innovatively in the context of applied topics to solve scientific problems. They can plan, carry out and evaluate corresponding experiments and summarise their results in written form.</p>		
	Prerequisite/s: none		

33.	Elective Module: Research-Related Laboratory Project 1	h	ECTS-Credits
a.	PR Research-Related Laboratory Project 1	9	13.5
b.	SE Research-Related Laboratory Project 1	1	1.5
	Total	10	15
	<p>Learning Outcomes:</p> <p>ad a.: Under supervision, students are able to develop their own research question and put it into practice. They can develop hypotheses, plan and carry out experiments, and analyse and interpret their data. They are able to place their considerations and results in the context of current literature and summarise their project in a detailed scientific report.</p> <p>ad b.: Students can present their work to an academic audience and critically discuss their findings.</p>		
	Prerequisite/s: none		

34.	Elective Module: Research-Related Laboratory Project 2	h	ECTS-Credits
a.	PR Research-Related Laboratory Project 2	9	13.5
b.	SE Research-Related Laboratory Project 2	1	1.5
	Total	10	15
	<p>Learning Outcomes:</p> <p>ad a.: Under supervision, students are able to develop their own research question and put it into practice. They can develop hypotheses, plan and carry out experiments, and analyse and</p>		

	interpret their data. They are able to place their considerations and results in the context of current literature and summarise their project in a detailed scientific report. ad b.: Students can present their work to an academic audience and critically discuss their findings.
	Prerequisite/s: none

35.	Elective Module: Selected Topics in Biomedicine	h	ECTS-Credits
a.	VO Selected Topics in Biomedicine	1	1.5
b.	SE Selected Topics in Biomedicine	1	1.5
c.	UE Selected Topics in Biomedicine	3	4.5
	Total	5	7.5
	Learning Outcomes: ad a.: Students can demonstrate in-depth knowledge of selected topics in biomedicine. ad b.: They are able to analyse, present and critically discuss current literature in this field. ad c.: Students are able to apply current methods in this field in theory and practice, plan, carry out and interpret corresponding experiments, and summarise their results in written form.		
	Prerequisite/s: none		

36.	Elective Module: Selected Topics in Digital Biomedicine	h	ECTS-Credits
a.	VO Selected Topics in Digital Biomedicine	1	1.5
b.	SE Selected Topics in Digital Biomedicine	1	1.5
c.	UE Selected Topics in Digital Biomedicine	3	4.5
	Total	5	7.5
	Learning Outcomes: ad a.: Students can demonstrate in-depth knowledge of selected topics in digital biomedicine. ad b.: They can analyse, present and critically discuss current literature in the field of digital biomedicine. ad c.: Students are able to apply current digital methods from selected areas of biomedicine in theory and practice, plan, carry out and interpret corresponding experiments and analyses, and summarise their results in written form.		
	Prerequisite/s: none		

37.	Elective Module: Module from other Master's Programmes Offered at the Faculty of Biology	h	ECTS-Credits
	A module from another master's programme at the Faculty of Biology at the University of Innsbruck can be completed.		7.5
	Total		7.5
	Learning Outcomes: Students acquire additional and in-depth knowledge, skills and qualifications in another field of biology. They are able to establish connections to their own specialist knowledge and demonstrate a critical awareness of specialist topics at the interface between different areas. They are able to individualise and deepen their specialist profile by acquiring additional qualifications.		

	Prerequisite/s: The prerequisites specified by the respective curriculum are to be met.
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38.	Elective Module: Module from other Master's Programmes Offered at the Faculty of Biology	h	ECTS-Credits
	A module from another master's programme at the Faculty of Biology at the University of Innsbruck can be completed.		5
	Total		5
	Learning Outcomes: Students acquire additional and in-depth knowledge, skills and qualifications in another field of biology. They are able to establish connections to their own specialist knowledge and demonstrate a critical awareness of specialist topics at the interface between different areas. They are able to individualise and deepen their specialist profile by acquiring additional qualifications.		
	Prerequisite/s: The prerequisites specified by the respective curriculum are to be met.		

39.	Elective Module: Interdisciplinary Skills I	h	ECTS-Credits
	Provided that places are available, courses covering 5 ECTS-Credits may be freely chosen from the curricula of other master's programmes offered at the University of Innsbruck. It is recommended to select courses from the field of gender competence promotion.		5
	Total		5
	Learning Outcomes: Students acquire additional and in-depth knowledge, skills and qualifications. They are able to relate this knowledge to their own subject area and demonstrate critical awareness of specialist topics at the interface between different fields. They are able to individualise and deepen their subject profile by acquiring additional qualifications.		
	Prerequisite/s: The prerequisites specified by the respective curriculum are to be met.		

40.	Elective Module: Interdisciplinary Skills II	h	ECTS-Credits
	Students acquire additional and in-depth knowledge, skills and qualifications. They are able to relate this knowledge to their own subject area and demonstrate critical awareness of specialist topics at the interface between different fields. They are able to individualise and deepen their subject profile by acquiring additional qualifications.		2.5
	Summe		2.5
	Learning Outcomes: Students acquire additional and in-depth knowledge, skills and qualifications. They are able to relate this knowledge to their own subject area and demonstrate critical awareness of specialist topics at the interface between different fields. They are able to individualise and deepen their subject profile by acquiring additional qualifications.		
	Prerequisite/s: The prerequisites specified by the respective curriculum are to be met.		

§ 9 Master's Thesis

- (1) In the Master's Programme in Biomedical Life Sciences, a Master's Thesis covering 25 ECTS-Credits must be written. The Master's Thesis is a scientific paper that serves as proof of the ability to work independently on a scientific topic in a manner that is flawless in terms of content and methodology.
- (2) All topics that contribute to knowledge building in Biomedical Life Sciences research are eligible for the Master's Thesis.
- (3) The completed Master's Thesis must be submitted to the Director of Studies in electronic form. It must be accompanied by an affidavit confirming that the rules of good scientific practice have been followed. At the request of the assessor, the Master's Thesis must also be submitted in written form in addition to the electronic form.

§ 10 Examination regulations

- (1) A module, with the exception of the Module Master's Thesis Defense (Defensio), is completed by the positive evaluation of its courses.
- (2) The performance in courses of the modules is assessed by course examinations. Course examinations serve to proof the knowledge and skills imparted by a single course whereby
 1. in the case of courses without continuous performance evaluation, the evaluation is based on a single exam at the end of the course.
 2. in the case of courses with continuous performance evaluation the evaluation is based on at least two written, oral and/or practical contributions of the participants.
- (3) The course instructor has to define and announce the examination method (written, oral or practical) before the start of the semester.
- (4) The performance of Compulsory Module 3 (Master's Thesis Defense – Defensio) which completes the study programme has the form of an oral exam in front of an examination board consisting of three persons.
- (5) Modules and courses taken from other study programmes are subject to the examination regulations of the curriculum they have been taken from.

§ 11 Academic degree

Graduates of the Master's Programme in Biomedical Life Sciences are awarded the academic degree "Master of Science", abbreviated "MSc".

§ 12 Coming into force

This curriculum comes into force on 1 October 2025.

§ 13 Transitional provisions

- (1) This curriculum applies to all students who start the study programme from the 2025/26 winter semester onwards.
- (2) Regular degree students who started the Master's Programme in Cell and Developmental Biology, published in the University of Innsbruck Bulletin of 29 April 2008, Issue 38, No. 267, last amended on 28 June 2019, Issue 65, No. 575 at the University of Innsbruck before 1 October 2025, are entitled to finish this study programme within a maximum of six semesters from this point in time.
- (3) If the Master's Programme in Molecular Cell and Developmental Biology is not finished in time pursuant to para. 2, the students will be subject to the curriculum for the Master's Programme in Biomedical Life Sciences.
- (4) The students of the Master's Programme in Molecular Cell and Developmental Biology are entitled to subject to the curriculum for the Master's Programme in Biomedical Life Sciences on a voluntary basis any time.