Julius-Maximilians-
UNIVERSITÄT
WÜRZBURG

Module Catalogue

for the Subject

Biomedicine

as a Bachelor's with 1 major

with the degree "Bachelor of Science"

(180 ECTS credits)

Examination regulations version: 2020
Responsible: Faculty of Medicine
Responsible: Faculty of Biology

Contents

The subject is divided into

Learning Outcomes

German contents and learning outcome available but not translated yet.

Wissenschaftliche Befähigung

- Die Absolventen/-innen können Experimente nach Anleitung durchführen, analysieren, interpretieren und die Ergebnisse fachlich diskutieren.
- Die Absolventen/-innen sind in der Lage, Problemanalysen durchzuführen und Problemlösungen zu entwickeln.
- Die Absolventen/-innen sind in der Lage, Fachliteratur adäquat zu verstehen, in den naturwissenschaftlichen Kontext einzuordnen und kritisch zu hinterfragen.
- Die Absolventen/-innen erwerben Grundwissen. in den naturwissenschaftlichen Kernfächern Biologie, Physik, Chemie, Mathematik in der Vorklinik mit den Fächern, Anatomie, Physiologie und Biochemie. im klinisch-theoretischen Bereich der Humanmedizin mit den Fächern Infektiologie, Immunologie, Pharmakologie, Neurobiologie, Humangenetik, Pathologie. Sie sind so in der Lage, interdisziplinäre Verknüpfungen herzustellen.
- Die Absolventen/-innen erlernen experimentelle Methoden der Biochemie, Bioinformatik, Molekularbiologie sowie der Bioanalytik.
- Die Absolventen/-innen sind in der Lage, Fachliteratur adäquat zu verstehen und nach Anleitung neue Experimente und Lösungsansätze zu entwickeln und diese vor Fachpublikum zu präsentieren.
- Die Absolventen/-innen besitzen die Fähigkeit, theoretisch erlerntes Wissen in der Praxis anzuwenden und eigenständig Experimente zu entwickeln.
- Die Absolventen/-innen lernen, organsiert und strukturiert den naturwissenschaftlichen Grundprinzipien folgend, zu arbeiten und praktische Experimente in Schriftform und als Präsentation darzustellen.

Befähigung, eine qualifizierte Erwerbstätigkeit aufzunehmen

- Die Absolventen/-innen sind in der Lage, theoretisches Wissen in der Praxis anzuwenden.
- Die Absolventen/-innen können Probleme erkennen und dazu eigene Lösungsansätze entwickeln.
- Die Absolventen/-innen können ihr naturwissenschaftliches Wissen und die Praxisarbeit in Schriftform und Präsentationen darstellen und konstruktive Kritik umsetzen.
- Die Absolventen/-innen sind in der Lage, Englisch als Wissenschaftssprache anzuwenden.
- Die Absolventen/-innen sind in der Lage, wissenschaftlich eigenständig zu arbeiten.
- Die Absolventen/-innen können praktische Aufgaben nach Anleitung durchführen, analysieren, interpretieren und anschließend diskutieren.

Befähigung zum gesellschaftlichen Engagement

- Die Absolventen/-innen sind in der Lage, naturwissenschaftliche Fachliteratur sowie die neusten Entwicklungen der Forschung kritisch zu reflektieren, in den aktuellen Kontext einzuordnen sowie Auswirkungen auf gesellschaftliche Bereiche wie Umwelt, Wirtschaft etc. zu erkennen und zu diskutieren.
- Die Absolventen/-innen haben sich Wissen auch außerhalb ihres Fachgebietes angeeignet, tauschen sich mit fachfremden Kommilitonen und Dozierenden aus und können begründet Position zu gesellschaftlichen, kulturellen etc. Fragestellungen nehmen.
- Die Absolventen/-innen sind in der Lage, ethische Fragestellungen zum Thema Tierversuche zu reflektieren sowie zu diskutieren.
- Die Absolventen/-innen entwickeln die Motivation und Fähigkeit, eigene Ideen in partizipative Prozesse einzubringen und zu diskutieren.
- Die Absolventen/-innen können ihre erworbenen Kompetenzen anwenden.

Persönlichkeitsentwicklung

- Die Absolventen/-innen kennen die Regeln guten wissenschaftlichen Arbeitens und befolgen diese.
- Die Absolventen/-innen erlernen Eigenorganisation und Zeitmanagement.
- Die Absolventen/-innen erlernen die Fähigkeit, im Team zu kommunizieren und zu arbeiten.
- Die Absolventen/-innen erlernen das eigenständige wissenschaftliche Arbeiten sowie die Fähigkeit, ihre Ergebnisse zu reflektieren, mit anderen Positionen zu vergleichen und zu diskutieren.
- Die Absolventen/-innen übernehmen die Verantwortung für ihr Handeln.

Abbreviations used

Course types: **E** = field trip, **K** = colloquium, **O** = conversatorium, **P** = placement/lab course, **R** = project, **S** = seminar, **T** = tutorial, **Ü** = exercise, **V** = lecture

Term: **SS** = summer semester, **WS** = winter semester

Methods of grading: **NUM** = numerical grade, **B/NB** = (not) successfully completed

Regulations: **(L)ASPO** = general academic and examination regulations (for teaching-degree programmes), **FSB** = subject-specific provisions, **SFB** = list of modules

Other: **A** = thesis, **LV** = course(s), **PL** = assessment(s), **TN** = participants, **VL** = prerequisite(s)

Conventions

Unless otherwise stated, courses and assessments will be held in German, assessments will be offered every semester and modules are not creditable for bonus.

Notes

Should there be the option to choose between several methods of assessment, the lecturer will agree with the module coordinator on the method of assessment to be used in the current semester by two weeks after the start of the course at the latest and will communicate this in the customary manner.

Should the module comprise more than one graded assessment, all assessments will be equally weighted, unless otherwise stated below.

Should the assessment comprise several individual assessments, successful completion of the module will require successful completion of all individual assessments.

In accordance with

the general regulations governing the degree subject described in this module catalogue:

ASPO2015

associated official publications (FSB (subject-specific provisions)/SFB (list of modules)):

24-Mar-2020 (2020-24)

This module handbook seeks to render, as accurately as possible, the data that is of statutory relevance according to the examination regulations of the degree subject. However, only the FSB (subject-specific provisions) and SFB (list of modules) in their officially published versions shall be legally binding. In the case of doubt, the provisions on, in particular, module assessments specified in the FSB/SFB shall prevail.

Compulsory Courses

(115 ECTS credits)

Modules Biology

(20 ECTS credits)

Module title			Abbreviation
Basics of Biology - From Cells to Organisms			07-ZEORG-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
7	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Admission prerequisite to assessment: exercises. Regular attendance of exercises (minimum 80%) and successful completion of the respective exercises (approx. 25 to 30 hours) are prerequisites for admission to assessment.	

Contents

The first part of the course will acquaint students with the elementary building blocks of life as well as biological categories. Building on this knowledge, the course will then discuss the cell, the smallest unit of life, starting with its macroscopic structure before moving on to its microscopic structure. The course will point out differences and similarities between prokaryotic cells (bacteria, archaebacteria) and eukaryotic cells (animals, plants). The second part will address one of the central issues of biology: evolution. Fundamental mechanisms and hypotheses will be discussed and students will be introduced to major phylogenetic reconstruction methods. Using the examples of plants and animals, the subsequent module components will introduce students to the phylogenetic diversity of eukaryotes. At the level of groups in the plant and animal kingdoms, students will acquire the fundamental knowledge necessary to understand the forms and functions of animal and plant organisms, with morphology and cytology being discussed in an evolutionary and ecological context. The contents of the module are relevant for biological disciplines at all levels of biological organisation. Students will also acquire and practise some of the fundamental preparation skills bioscientists are often required to possess.

Intended learning outcomes

Knowledge of the structures of prokaryotic and eukaryotic cells and their (biological) macromolecules. Knowledge of the specific characteristics of the intracellular and extracellular structures of prokaryotes as well as animal and plant cells. Ability to recognise evolution as the driving force behind the phylogeny of species. Familiarity with the concepts of phylogenetic relationships between plants/animals. Familiarity with the distinguishing characteristics and major representatives of groups in the plant and animal kingdoms. Ability to select those plant and animal organisms that are most suitable for particular scientific issues. Familiarity with the components and functioning of microscopes. Fundamental skills in the interpretation of macroscopic and histologic preparations by light microscopy. Fundamental preparation skills.

Courses (type, number of weekly contact hours, language — if other than German)

V (1.5) + V (1.5) + V (2) + Ü (3)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (approx. 60 minutes)
creditable for bonus

Allocation of places

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Additional information

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Workload

210 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor's degree (1 major) Biomedicine (2015) Bachelor's degree (1 major) Biomedicine (2018) Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Physiology of Organisms			07-PHYORG-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Admission prerequisite to assessment: exercises. Regular attendance of exercises (minimum 80%) and successful completion of the respective exercises (approx. 25 to 30 hours) are prerequisites for admission to assessment.	

Contents

This module will acquaint students with the principles of the general and comparative physiology of organisms and will provide them with an opportunity to develop the fundamental skills for working in a physiological laboratory. The module will first address the biochemistry of the cell and will then move on to discuss prokaryotic metabolic diversity. Subsequently, the module will discuss the physiological processes that regulate the internal environment of multicellular organisms such as plants and animals.

Intended learning outcomes

Students have developed an understanding of the physiological functions and regulation of organisms. They have acquired fundamental knowledge on planning, setup, interpretation and presentation of scientific results.

Courses (type, number of weekly contact hours, language — if other than German)

V (1) + V (1) + V (1) + Ü (2)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (approx. 60 minutes)
creditable for bonus

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Genetics and Neurobiology			07-GENEU-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Neurobiology and Genetics		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
4	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Admission prerequisite to assessment: exercises. Regular attendance of exercises (minimum 80%) and successful completion of the respective exercises (approx. 25 to 30 hours) are prerequisites for admission to assessment.	

Contents

Fundamental principles of genetics and neurobiology.

Intended learning outcomes

Students will understand that there are molecular, cellular and system biological mechanisms and processes involved in animal behaviour and will be able to relate animal behaviour to the molecular and formal bases of inheritance.

Courses (type, number of weekly contact hours, language — if other than German)

V (2) + Ü (1.5)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (60 to 90 minutes)
creditable for bonus

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Module title	Abbreviation
Developmental Biology of Animals	07-3A3EBIOTI-152-m01

Module coordinator	Module offered by
Dean of Studies Biologie (Biology)	Faculty of Biology

ECTS	Method of grading	Only after succ. compl. of module(s)
4	numerical grade	--

Duration	Module level	Other prerequisites
1 semester	undergraduate	Admission prerequisite to assessment: exercises. Regular attendance (minimum 80%) and successful completion of exercises (approx. 25 to 30 hours) are prerequisites for admission to assessment.

Contents

In this module, students will acquire theoretical and practical background knowledge on animal developmental biology. The following topics will be covered: early embryonic development of various model organisms (amphibians, nematodes, Drosophila, mouse) and relevance for the systematics of animals, gametogenesis (production of spermatozoa and ova), differential gene expression, cell growth and molecular regulation of cell development, organogenesis, pattern formation, carcinogenesis, stem cell research and cloning, metamorphosis (amphibians, insects), eco-devo, evo-devo.

Intended learning outcomes

1. Fundamental concepts in developmental biology. 2. Embryonic and postembryonic development of selected model organisms (pattern formation). 3. Molecular mechanisms as well as control of cell development. 4. Interdisciplinary connections between developmental biology and other branches of biology. 5. Cell biology of cotyledon, cancer and stem cells as well as gametes. 6. Interrelations between ontogeny and evolution/environment. 7. Physiological aspects of the developmental processes discussed.

Courses (type, number of weekly contact hours, language — if other than German)

V (1) + Ü (3)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (approx. 60 minutes)
creditable for bonus

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biology (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major, 1 minor) Biology (Minor, 2015)
Bachelor's degree (1 major) Biology (2017)
Bachelor's degree (1 major) Biomedicine (2018)

Bachelor's degree (1 major) Biomedicine (2020)
Bachelor's degree (1 major) Biology (2021)
Bachelor's degree (1 major, 1 minor) Biology (Minor, 2020)
Bachelor's degree (1 major, 1 minor) Biology (Minor, 2021)
Bachelor's degree (1 major) Biology (2022)
Bachelor's degree (1 major) Mathematics (2023)

Modules Chemistry

(12 ECTS credits)

Module title			Abbreviation
General Chemistry for Students of Biomedicine			08-CH-BM-152-m01

Module coordinator	Module offered by
Dean of Studies Chemie (Chemistry)	Institute of Organic Chemistry

ECTS	Method of grading	Only after succ. compl. of module(s)
8	numerical grade	--

Duration	Module level	Other prerequisites
2 semester	undergraduate	--

Contents

The module teaches the basics of chemistry in theory and practice, with special emphasis on medical references. Starting with atoms and ending with biochemically relevant macromolecules, theories and principles of chemistry that are essential for the understanding of biochemical processes are dealt with. The focus of the practical course is on basic experimental working techniques and the safe handling of hazardous substances. For this purpose, qualitative and quantitative analyses as well as simple reactions are carried out and interpreted.

Intended learning outcomes

Describe and explain the basic models for structure and reactivity of chemical compounds. Draw structural formulas and set up reaction equations. Know and apply formulas for the calculation of substance-specific properties and parameters of chemical processes. Carry out and document experiments based on existing protocols. Verify theoretical models based on experimental findings. Explain the relationships between chemical properties and medical effects as well as the chemical background of diagnostic procedures.

Courses (type, number of weekly contact hours, language — if other than German)

V (2) + V (2) + P (5)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (approx. 120 minutes) and assessment of practical skills during lab course (ungraded): Vortestate/Nachtestate (pre and post-experiment oral exams; approx. 15 minutes each) and log (approx. 3 to 5 pages)
Assessment offered: Once a year, summer semester

Allocation of places

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Additional information

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Workload

240 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Advanced Organic Chemistry for Students of Biomedicine			08-OC-BM-152-m01
Module coordinator		**Module offered by**	
lecturer of lecture "Organische Chemie für Studierende der Medizin, Biomedizin, Zahnmedizin, Ingenieur- and Naturwissenschaften"		Institute of Organic Chemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
4	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module deals with the fundamental principles of organic chemistry.

Intended learning outcomes

Students have developed a knowledge of the fundamental principles of organic chemistry and are able to apply that knowledge to research problems.

Courses (type, number of weekly contact hours, language — if other than German)

V (3)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) written examination (90 to 180 minutes) or
b) oral examination of one candidate each (approx. 20 minutes) or
c) oral examination in groups (approx. 30 minutes)

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Modules Physics

(10 ECTS credits)

Module title			Abbreviation
Introduction to Physics for Students of other Disciplines			11-EFNF-152-m01
Module coordinator		**Module offered by**	
Managing Director of the Institute of Applied Physics		Faculty of Physics and Astronomy	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
7	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
2 semester	undergraduate	--	

Contents

Fundamentals of mechanics, vibration theory, thermodynamics, optics, science of electricity, atomic and nuclear physics.

Intended learning outcomes

The students are able to identify fundamental physical contexts. They are able to assign them to corresponding fields in physics. They are able to apply simple formulae in order to analyse and evaluate these contexts.

Courses (type, number of weekly contact hours, language — if other than German)

V (4) + V (3)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (60 to 120 minutes)

Allocation of places

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Additional information

according to § 2 para. 2 sentence 2 APOLmCh in conjunction with No. I 2nd letter d) and No. I 1st letter d) of annex 1 to the APOLmCh and No. 4 of annex 2 to the APOLmCh

Workload

210 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biology (2011)
Bachelor's degree (1 major) Chemistry (2010)
Bachelor's degree (1 major) Psychology (2010)
Bachelor's degree (1 major, 1 minor) Pedagogy (2013)
Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013)
Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008)
Bachelor's degree (2 majors) Special Education (2009)
Magister Theologiae Catholic Theology (2013)
First state examination for the teaching degree Gymnasium English (2009)
First state examination for the teaching degree Gymnasium Biology (2009)
First state examination for the teaching degree Gymnasium Chemistry (2009)
First state examination for the teaching degree Gymnasium Geography (2009)
First state examination for the teaching degree Gymnasium French Studies (2009)
First state examination for the teaching degree Gymnasium German (2009)
First state examination for the teaching degree Gymnasium History (2009)

First state examination for the teaching degree Gymnasium Greek Philology (2009)
First state examination for the teaching degree Gymnasium Computer Science (2009)
First state examination for the teaching degree Gymnasium Italian Studies (2009)
First state examination for the teaching degree Gymnasium Catholic Theology (2009)
First state examination for the teaching degree Gymnasium Latin Philology (2009)
First state examination for the teaching degree Gymnasium Mathematics (2012)
First state examination for the teaching degree Gymnasium Mathematics (2009)
First state examination for the teaching degree Gymnasium Music (2009)
First state examination for the teaching degree Gymnasium Physics (2009)
First state examination for the teaching degree Gymnasium Russian (2009)
First state examination for the teaching degree Gymnasium Social Science (2009)
First state examination for the teaching degree Gymnasium Spanish Studies (2009)
First state examination for the teaching degree Gymnasium Science of Sport (2009)
First state examination for the teaching degree Gymnasium Music Education, Advanced Studies (2009)
Bachelor's degree (2 majors) English and American Studies (2009)
Bachelor's degree (2 majors) German Language and Literature (2013)
Bachelor's degree (1 major) Biochemistry (2015)
Bachelor's degree (1 major) Chemistry (2015)
Bachelor's degree (1 major) Geography (2015)
Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Food Chemistry (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Musicology (2015)
Bachelor's degree (1 major) Physics (2015)
Bachelor's degree (1 major) Psychology (2015)
Bachelor's degree (1 major) Business Management and Economics (2015)
Bachelor's degree (1 major) Nanostructure Technology (2015)
Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Music Education (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major) Political and Social Studies (2015)
Bachelor's degree (1 major) Functional Materials (2015)
Bachelor's degree (1 major) Academic Speech Therapy (2015)
Bachelor's degree (1 major) Indology/South Asian Studies (2015)
Bachelor's degree (1 major, 1 minor) Egyptology (2015)
Bachelor's degree (1 major, 1 minor) Pedagogy (2015)
Bachelor's degree (1 major, 1 minor) History (2015)
Bachelor's degree (1 major, 1 minor) Musicology (2015)
Bachelor's degree (1 major, 1 minor) Philosophy (2015)
Bachelor's degree (1 major, 1 minor) Pre- and Protohistoric Archaeology (2015)
Bachelor's degree (1 major, 1 minor) Ancient World (2015)
Bachelor's degree (1 major, 1 minor) Philosophy and Religion (2015)
Bachelor's degree (1 major, 1 minor) Theological Studies (2015)
Bachelor's degree (1 major, 1 minor) Political and Social Studies (2015)
Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2015)
Bachelor's degree (1 major, 1 minor) German Language and Literature (2015)
Bachelor's degree (2 majors) Egyptology (2015)
Bachelor's degree (2 majors) Pedagogy (2015)
Bachelor's degree (2 majors) Protestant Theology (2015)
Bachelor's degree (2 majors) Musicology (2015)
Bachelor's degree (2 majors) Philosophy (2015)
Bachelor's degree (2 majors) Special Education (2015)
Bachelor's degree (2 majors) Pre- and Protohistoric Archaeology (2015)

Bachelor's degree (2 majors) Latin Philology (2015)
Bachelor's degree (2 majors) Music Education (2015)
Bachelor's degree (2 majors) Philosophy and Religion (2015)
Bachelor's degree (2 majors) Theological Studies (2015)
Bachelor's degree (2 majors) Political and Social Studies (2015)
Bachelor's degree (2 majors) Russian Language and Culture (2015)
Bachelor's degree (2 majors) Greek Philology (2015)
Bachelor's degree (2 majors) European Ethnology (2015)
Bachelor's degree (2 majors) Indology/South Asian Studies (2015)
First state examination for the teaching degree Gymnasium English (2015)
First state examination for the teaching degree Gymnasium Biology (2015)
First state examination for the teaching degree Gymnasium Chemistry (2015)
First state examination for the teaching degree Gymnasium Geography (2015)
First state examination for the teaching degree Gymnasium French Studies (2015)
First state examination for the teaching degree Gymnasium German (2015)
First state examination for the teaching degree Gymnasium History (2015)
First state examination for the teaching degree Gymnasium Greek Philology (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
First state examination for the teaching degree Gymnasium Italian Studies (2015)
First state examination for the teaching degree Gymnasium Catholic Theology (2015)
First state examination for the teaching degree Gymnasium Latin Philology (2015)
First state examination for the teaching degree Gymnasium Mathematics (2015)
First state examination for the teaching degree Gymnasium Physics (2015)
First state examination for the teaching degree Gymnasium Russian (2015)
First state examination for the teaching degree Gymnasium Social Science (2015)
First state examination for the teaching degree Gymnasium Spanish Studies (2015)
First state examination for the teaching degree Gymnasium Science of Sport (2015)
Bachelor's degree (2 majors) Geography (2015)
Bachelor's degree (2 majors) French Studies (2015)
Bachelor's degree (2 majors) History (2015)
Bachelor's degree (2 majors) Sport Science (Focus on health and Pedagogics in Movement) (2015)
Bachelor's degree (2 majors) German Language and Literature (2015)
Bachelor's degree (1 major) Mathematical Physics (2016)
First state examination for the teaching degree Gymnasium Music (2015)
First state examination for the teaching degree Gymnasium Music Education, Advanced Studies (2015)
Bachelor's degree (1 major, 1 minor) French Studies (2016)
Bachelor's degree (2 majors) French Studies (2016)
Bachelor's degree (1 major, 1 minor) Italian Studies (2016)
Bachelor's degree (2 majors) Italian Studies (2016)
Bachelor's degree (1 major, 1 minor) Spanish Studies (2016)
Bachelor's degree (2 majors) Spanish Studies (2016)
Bachelor's degree (1 major) Romanic Languages (French/Italian) (2016)
Bachelor's degree (1 major) Romanic Languages (French/Spanish) (2016)
Bachelor's degree (1 major) Romanic Languages (Italian/Spanish) (2016)
Bachelor's degree (1 major) Business Information Systems (2016)
First state examination for the teaching degree Gymnasium French Studies (2016)
First state examination for the teaching degree Gymnasium Italian Studies (2016)
First state examination for the teaching degree Gymnasium Spanish Studies (2016)
Bachelor's degree (1 major) Games Engineering (2016)
Bachelor's degree (1 major, 1 minor) English and American Studies (2016)
Bachelor's degree (2 majors) English and American Studies (2016)
First state examination for the teaching degree Gymnasium English (2016)
Bachelor's degree (1 major) Media Communication (2016)

Bachelor's degree (1 major) Food Chemistry (2016)
Bachelor's degree (1 major, 1 minor) Digital Humanities (2016)
Bachelor's degree (1 major) Biology (2017)
Bachelor's degree (1 major, 1 minor) Geography (2017)
Bachelor's degree (1 major, 1 minor) History of Medieval and Modern Art (2017)
Bachelor's degree (2 majors) History of Medieval and Modern Art (2017)
Bachelor's degree (2 majors) Comparative Indo-European Linguistics (2017)
Bachelor's degree (1 major) Aerospace Computer Science (2017)
Bachelor's degree (1 major) Biochemistry (2017)
Bachelor's degree (1 major) Chemistry (2017)
Bachelor's degree (1 major, 1 minor) Museology and material culture (2017)
Bachelor's degree (1 major) Economathematics (2017)
Bachelor's degree (1 major) Games Engineering (2017)
Bachelor's degree (1 major) Computer Science (2017)
First state examination for the teaching degree Gymnasium Greek Philology (2018)
Bachelor's degree (1 major) Media Communication (2018)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Human-Computer Systems (2018)
Bachelor's degree (2 majors) Classical Archaeology (2018)
Bachelor's degree (1 major, 1 minor) Classical Archaeology (2018)
Bachelor's degree (1 major, 1 minor) Digital Humanities (2018)
Bachelor's degree (2 majors) Digital Humanities (2018)
First state examination for the teaching degree Gymnasium Physics (2018)
Bachelor's degree (1 major) Computer Science (2019)
First state examination for the teaching degree Gymnasium Mathematics (2019)
Bachelor's degree (1 major, 1 minor) English and American Studies (2019)
Bachelor's degree (1 major) Indology/South Asian Studies (2019)
Bachelor's degree (1 major) Business Information Systems (2019)
Bachelor's degree (2 majors) Indology/South Asian Studies (2019)
Bachelor's degree (1 major) Business Management and Economics (2019)
Bachelor's degree (1 major) Modern China (2019)
Bachelor's degree (1 major) Food Chemistry (2019)
Bachelor's degree (1 major) Biomedicine (2020)
Bachelor's degree (1 major) Pedagogy (2020)
Bachelor's degree (1 major) Political and Social Studies (2020)
Bachelor's degree (1 major) Business Information Systems (2020)
Bachelor's degree (1 major, 1 minor) Political and Social Studies (2020)
Bachelor's degree (2 majors) European Ethnology (2020)
Bachelor's degree (2 majors) Political and Social Studies (2020)
Bachelor's degree (2 majors) Special Education (2020)
Bachelor's degree (1 major) Physics (2020)
Bachelor's degree (1 major) Nanostructure Technology (2020)
Bachelor's degree (1 major) Mathematical Physics (2020)
Bachelor's degree (1 major) Aerospace Computer Science (2020)
Bachelor's degree (1 major, 1 minor) Museology and material culture (2020)
First state examination for the teaching degree Gymnasium Physics (2020)
Bachelor's degree (1 major, 1 minor) Pedagogy (2020)
Bachelor's degree (2 majors) Pedagogy (2020)
First state examination for the teaching degree Gymnasium Political and Social Studies (2020)
Bachelor's degree (1 major) Psychology (2020)
Bachelor's degree (1 major) Biology (2021)
Magister Theologiae Catholic Theology (2021)
Bachelor's degree (2 majors) History (2021)

Bachelor's degree (1 major, 1 minor) History (2021)
First state examination for the teaching degree Gymnasium History (2021)
Bachelor's degree (1 major) Media Communication (2021)
Bachelor's degree (2 majors) Theological Studies (2021)
Bachelor's degree (1 major, 1 minor) Theological Studies (2021)
Bachelor's degree (1 major, 1 minor) English and American Studies (2021)
Bachelor's degree (2 majors) English and American Studies (2021)
First state examination for the teaching degree Gymnasium English (2021)
Bachelor's degree (1 major) Functional Materials (2021)
First state examination for the teaching degree Gymnasium Philosophy and Ethics (2021)
Bachelor's degree (1 major) Computer Science and Sustainability (2021)
Bachelor's degree (2 majors) Comparative Indo-European Linguistics (2021)
Bachelor's degree (1 major) Food Chemistry (2021)
Bachelor's degree (1 major) Quantum Technology (2021)
Bachelor's degree (2 majors) Special Education (2021)
Bachelor's degree (1 major) Business Information Systems (2021)
Bachelor's degree (1 major) Economathematics (2021)
Bachelor's degree (1 major) Business Management and Economics (2021)
Bachelor's degree (1 major) Human-Computer Systems (2022)
Bachelor's degree (1 major, 1 minor) Museology and material culture (2022)
Bachelor's degree (1 major) Biochemistry (2022)
Bachelor's degree (1 major) Biology (2022)
Bachelor's degree (1 major) Economathematics (2022)
Bachelor's degree (1 major) Mathematical Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
First state examination for the teaching degree Gymnasium Philosophy and Ethics (2022)
Bachelor's degree (2 majors) Ancient Near Eastern Archaeology (2022)
Bachelor's degree (1 major, 1 minor) Ancient World (2022)
Bachelor's degree (2 majors) Ancient Near Eastern Studies (2022)
Bachelor's degree (1 major) Franco-German studies: language, culture, digital competence (2022)
First state examination for the teaching degree Gymnasium Russian (2023)
First state examination for the teaching degree Gymnasium Mathematics (2023)
First state examination for the teaching degree Gymnasium English (2023)
First state examination for the teaching degree Gymnasium Geography (2023)
Bachelor's degree (1 major) European Law (2023)
Bachelor's degree (1 major, 1 minor) English and American Studies (2023)
Bachelor's degree (2 majors) English and American Studies (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Mathematics (2023)
Bachelor's degree (1 major) Business Information Systems (2023)
Bachelor's degree (1 major) Economathematics (2023)
Bachelor's degree (1 major, 1 minor) History of Medieval and Modern Art (2023)
Bachelor's degree (2 majors) History of Medieval and Modern Art (2023)
Bachelor's degree (2 majors) Special Education (2023)
Bachelor's degree (1 major) Business Management and Economics (2023)
Bachelor's degree (1 major) Geography (2023)
Bachelor's degree (2 majors) Geography (2023)
Bachelor's degree (1 major, 1 minor) Geography (2023)
Bachelor's degree (2 majors) European Ethnology/Empiric Cultural Studies (2023)
First state examination for the teaching degree Gymnasium German (2024)
Bachelor's degree (1 major) Mathematical Physics (2024)
Bachelor's degree (2 majors) German Language and Literature (2024)
Bachelor's degree (1 major, 1 minor) German Language and Literature (2024)

Bachelor's degree (1 major) Music Education (2024)
Bachelor's degree (2 majors) Music Education (2024)
Bachelor's degree (1 major, 1 minor) Music Education (2024)
Bachelor's degree (1 major) Indology/South Asian Studies (2024)
Bachelor's degree (2 majors) Indology/South Asian Studies (2024)
Bachelor's degree (1 major, 1 minor) Indology/South Asian Studies (2024)
Bachelor's degree (1 major, 1 minor) Ancient World (2024)
Bachelor's degree (2 majors) Digital Humanities (2024)
Bachelor's degree (1 major, 1 minor) Digital Humanities (2024)
Bachelor's degree (1 major) Midwifery (2024)
Bachelor's degree (2 majors) Greek Philology (2024)
Bachelor's degree (2 majors) Latin Philology (2024)
First state examination for the teaching degree Gymnasium Latin Philology (2024)
Bachelor's degree (1 major) Business Information Systems (2024)
Bachelor's degree (1 major) Economathematics (2024)
Bachelor's degree (1 major) Business Management and Economics (2024)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)
First state examination for the teaching degree Gymnasium English (2024)
First state examination for the teaching degree Gymnasium History (2024)
First state examination for the teaching degree Gymnasium Greek Philology (2024)
Bachelor's degree (1 major) Human-Computer-Interaction (2024)
Bachelor's degree (2 majors) Art Education (2024)
Bachelor's degree (1 major) Digital Business & Data Science (2024)
Bachelor's degree (1 major) Classics (2024)
Bachelor's degree (1 major) Diversity, Ethics and Religions (2024)
Bachelor's degree (1 major) Functional Materials (2025)
Bachelor's degree (1 major) (2025)
Bachelor's degree (1 major) Food Chemistry (2025)
Bachelor's degree (1 major, 1 minor) European Ethnology/Empiric Cultural Studies (2025)
Bachelor's degree (1 major) Pedagogy (2025)
Bachelor's degree (2 majors) Pedagogy (2025)
Bachelor's degree (1 major) Economathematics (2025)
Bachelor's degree (1 major) Academic Speech Therapy (2025)
Bachelor's degree (1 major, 1 minor) Pedagogy (2025)
Bachelor's degree (1 major) Games Engineering (2025)
Bachelor's degree (2 majors) Sport Science (Focus on health and Pedagogics in Movement) (2025)
First state examination for the teaching degree Gymnasium German (2025)
Bachelor's degree (1 major) Aerospace Computer Science (2025)
Bachelor's degree (1 major, 1 minor) German Language and Literature (2025)
Bachelor's degree (1 major) Computer Science (2025)
Bachelor's degree (2 majors) German Language and Literature (2025)
First state examination for the teaching degree Gymnasium Computer Science (2025)
Bachelor's degree (1 major) Computer Science and Sustainability (2025)
First state examination for the teaching degree Gymnasium (2025)

Module title			Abbreviation
Laboratory Course Physics for Students of other Disciplines			11-PFNF-152-m01
Module coordinator		**Module offered by**	
Managing Director of the Institute of Applied Physics		Faculty of Physics and Astronomy	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Simple experiments in the fields of mechanics, vibration theory, thermodynamics, optics, X-rays, nuclear magnetic resonance atomic and nuclear physics, imaging methods.

Intended learning outcomes

The students have recognised and understood physical contexts on the basis of the implementation of own experiments. They can conduct simple experiments in the laboratory. They are able to identify and assess sources of errors in experiments. They are able to compile a protocol for experimental procedures. They have a basic understanding of physical phenomena and know the basic ideas and ways of functioning of different measuring and imaging methods as well as their applications, especially in the field of biomedicine.

Courses (type, number of weekly contact hours, language — if other than German)

P (4)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) practical assignment with oral test (approx. 15 minutes, during experiments) and b) written examination (approx. 90 minutes).
Each experiment comprises preparation, performance and evaluation. Test as well as performance of experiments can each be repeated once.

Allocation of places

Only as part of pool of general transferable skills (ASQ): 10 places (lottery)

Additional information

according to § 2 para. 2 sentence 2 APOLmCh in conjunction with No. I 2nd letter d) and No. I 1st letter d) of annex 1 to the APOLmCh and No. 4 of annex 2 to the APOLmCh

Workload

90 h

Teaching cycle

--

Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biology (2011)
Bachelor's degree (1 major) Chemistry (2010)
Bachelor's degree (1 major) Psychology (2010)
Bachelor's degree (1 major, 1 minor) Pedagogy (2013)
Bachelor's degree (1 major, 1 minor) Political and Social Studies (2013)
Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2008)
Bachelor's degree (2 majors) Special Education (2009)
Magister Theologiae Catholic Theology (2013)
First state examination for the teaching degree Gymnasium English (2009)

First state examination for the teaching degree Gymnasium Biology (2009)
First state examination for the teaching degree Gymnasium Chemistry (2009)
First state examination for the teaching degree Gymnasium Geography (2009)
First state examination for the teaching degree Gymnasium French Studies (2009)
First state examination for the teaching degree Gymnasium German (2009)
First state examination for the teaching degree Gymnasium History (2009)
First state examination for the teaching degree Gymnasium Greek Philology (2009)
First state examination for the teaching degree Gymnasium Computer Science (2009)
First state examination for the teaching degree Gymnasium Italian Studies (2009)
First state examination for the teaching degree Gymnasium Catholic Theology (2009)
First state examination for the teaching degree Gymnasium Latin Philology (2009)
First state examination for the teaching degree Gymnasium Mathematics (2012)
First state examination for the teaching degree Gymnasium Mathematics (2009)
First state examination for the teaching degree Gymnasium Music (2009)
First state examination for the teaching degree Gymnasium Physics (2009)
First state examination for the teaching degree Gymnasium Russian (2009)
First state examination for the teaching degree Gymnasium Social Science (2009)
First state examination for the teaching degree Gymnasium Spanish Studies (2009)
First state examination for the teaching degree Gymnasium Science of Sport (2009)
First state examination for the teaching degree Gymnasium Music Education, Advanced Studies (2009)
Bachelor's degree (2 majors) English and American Studies (2009)
Bachelor's degree (2 majors) German Language and Literature (2013)
Bachelor's degree (1 major) Biochemistry (2015)
Bachelor's degree (1 major) Chemistry (2015)
Bachelor's degree (1 major) Geography (2015)
Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Food Chemistry (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Musicology (2015)
Bachelor's degree (1 major) Physics (2015)
Bachelor's degree (1 major) Psychology (2015)
Bachelor's degree (1 major) Business Management and Economics (2015)
Bachelor's degree (1 major) Nanostructure Technology (2015)
Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Music Education (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major) Political and Social Studies (2015)
Bachelor's degree (1 major) Functional Materials (2015)
Bachelor's degree (1 major) Academic Speech Therapy (2015)
Bachelor's degree (1 major) Indology/South Asian Studies (2015)
Bachelor's degree (1 major, 1 minor) Egyptology (2015)
Bachelor's degree (1 major, 1 minor) Pedagogy (2015)
Bachelor's degree (1 major, 1 minor) History (2015)
Bachelor's degree (1 major, 1 minor) Musicology (2015)
Bachelor's degree (1 major, 1 minor) Philosophy (2015)
Bachelor's degree (1 major, 1 minor) Pre- and Protohistoric Archaeology (2015)
Bachelor's degree (1 major, 1 minor) Ancient World (2015)
Bachelor's degree (1 major, 1 minor) Philosophy and Religion (2015)
Bachelor's degree (1 major, 1 minor) Theological Studies (2015)
Bachelor's degree (1 major, 1 minor) Political and Social Studies (2015)
Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2015)
Bachelor's degree (1 major, 1 minor) German Language and Literature (2015)
Bachelor's degree (2 majors) Egyptology (2015)

Bachelor's degree (2 majors) Pedagogy (2015)
Bachelor's degree (2 majors) Protestant Theology (2015)
Bachelor's degree (2 majors) Musicology (2015)
Bachelor's degree (2 majors) Philosophy (2015)
Bachelor's degree (2 majors) Special Education (2015)
Bachelor's degree (2 majors) Pre- and Protohistoric Archaeology (2015)
Bachelor's degree (2 majors) Latin Philology (2015)
Bachelor's degree (2 majors) Music Education (2015)
Bachelor's degree (2 majors) Philosophy and Religion (2015)
Bachelor's degree (2 majors) Theological Studies (2015)
Bachelor's degree (2 majors) Political and Social Studies (2015)
Bachelor's degree (2 majors) Russian Language and Culture (2015)
Bachelor's degree (2 majors) Greek Philology (2015)
Bachelor's degree (2 majors) European Ethnology (2015)
Bachelor's degree (2 majors) Indology/South Asian Studies (2015)
First state examination for the teaching degree Gymnasium English (2015)
First state examination for the teaching degree Gymnasium Biology (2015)
First state examination for the teaching degree Gymnasium Chemistry (2015)
First state examination for the teaching degree Gymnasium Geography (2015)
First state examination for the teaching degree Gymnasium French Studies (2015)
First state examination for the teaching degree Gymnasium German (2015)
First state examination for the teaching degree Gymnasium History (2015)
First state examination for the teaching degree Gymnasium Greek Philology (2015)
First state examination for the teaching degree Gymnasium Computer Science (2015)
First state examination for the teaching degree Gymnasium Italian Studies (2015)
First state examination for the teaching degree Gymnasium Catholic Theology (2015)
First state examination for the teaching degree Gymnasium Latin Philology (2015)
First state examination for the teaching degree Gymnasium Mathematics (2015)
First state examination for the teaching degree Gymnasium Physics (2015)
First state examination for the teaching degree Gymnasium Russian (2015)
First state examination for the teaching degree Gymnasium Social Science (2015)
First state examination for the teaching degree Gymnasium Spanish Studies (2015)
First state examination for the teaching degree Gymnasium Science of Sport (2015)
Bachelor's degree (2 majors) Geography (2015)
Bachelor's degree (2 majors) French Studies (2015)
Bachelor's degree (2 majors) History (2015)
Bachelor's degree (2 majors) Sport Science (Focus on health and Pedagogics in Movement) (2015)
Bachelor's degree (2 majors) German Language and Literature (2015)
Bachelor's degree (1 major) Mathematical Physics (2016)
First state examination for the teaching degree Gymnasium Music (2015)
First state examination for the teaching degree Gymnasium Music Education, Advanced Studies (2015)
Bachelor's degree (1 major, 1 minor) French Studies (2016)
Bachelor's degree (2 majors) French Studies (2016)
Bachelor's degree (1 major, 1 minor) Italian Studies (2016)
Bachelor's degree (2 majors) Italian Studies (2016)
Bachelor's degree (1 major, 1 minor) Spanish Studies (2016)
Bachelor's degree (2 majors) Spanish Studies (2016)
Bachelor's degree (1 major) Romanic Languages (French/Italian) (2016)
Bachelor's degree (1 major) Romanic Languages (French/Spanish) (2016)
Bachelor's degree (1 major) Romanic Languages (Italian/Spanish) (2016)
Bachelor's degree (1 major) Business Information Systems (2016)
First state examination for the teaching degree Gymnasium French Studies (2016)
First state examination for the teaching degree Gymnasium Italian Studies (2016)

First state examination for the teaching degree Gymnasium Spanish Studies (2016)
Bachelor's degree (1 major) Games Engineering (2016)
Bachelor's degree (1 major, 1 minor) English and American Studies (2016)
Bachelor's degree (2 majors) English and American Studies (2016)
First state examination for the teaching degree Gymnasium English (2016)
Bachelor's degree (1 major) Media Communication (2016)
Bachelor's degree (1 major) Food Chemistry (2016)
Bachelor's degree (1 major, 1 minor) Digital Humanities (2016)
Bachelor's degree (1 major) Biology (2017)
Bachelor's degree (1 major, 1 minor) Geography (2017)
Bachelor's degree (1 major, 1 minor) History of Medieval and Modern Art (2017)
Bachelor's degree (2 majors) History of Medieval and Modern Art (2017)
Bachelor's degree (2 majors) Comparative Indo-European Linguistics (2017)
Bachelor's degree (1 major) Aerospace Computer Science (2017)
Bachelor's degree (1 major) Biochemistry (2017)
Bachelor's degree (1 major) Chemistry (2017)
Bachelor's degree (1 major, 1 minor) Museology and material culture (2017)
Bachelor's degree (1 major) Economathematics (2017)
Bachelor's degree (1 major) Games Engineering (2017)
Bachelor's degree (1 major) Computer Science (2017)
First state examination for the teaching degree Gymnasium Greek Philology (2018)
Bachelor's degree (1 major) Media Communication (2018)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Human-Computer Systems (2018)
Bachelor's degree (2 majors) Classical Archaeology (2018)
Bachelor's degree (1 major, 1 minor) Classical Archaeology (2018)
Bachelor's degree (1 major, 1 minor) Digital Humanities (2018)
Bachelor's degree (2 majors) Digital Humanities (2018)
First state examination for the teaching degree Gymnasium Physics (2018)
Bachelor's degree (1 major) Computer Science (2019)
First state examination for the teaching degree Gymnasium Mathematics (2019)
Bachelor's degree (1 major, 1 minor) English and American Studies (2019)
Bachelor's degree (1 major) Indology/South Asian Studies (2019)
Bachelor's degree (1 major) Business Information Systems (2019)
Bachelor's degree (2 majors) Indology/South Asian Studies (2019)
Bachelor's degree (1 major) Business Management and Economics (2019)
Bachelor's degree (1 major) Modern China (2019)
Bachelor's degree (1 major) Food Chemistry (2019)
Module studies (Bachelor) Orientierungsstudien (2020)
Bachelor's degree (1 major) Biomedicine (2020)
Bachelor's degree (1 major) Pedagogy (2020)
Bachelor's degree (1 major) Political and Social Studies (2020)
Bachelor's degree (1 major) Business Information Systems (2020)
Bachelor's degree (1 major, 1 minor) Political and Social Studies (2020)
Bachelor's degree (2 majors) European Ethnology (2020)
Bachelor's degree (2 majors) Political and Social Studies (2020)
Bachelor's degree (2 majors) Special Education (2020)
Bachelor's degree (1 major) Physics (2020)
Bachelor's degree (1 major) Nanostructure Technology (2020)
Bachelor's degree (1 major) Mathematical Physics (2020)
Bachelor's degree (1 major) Aerospace Computer Science (2020)
Bachelor's degree (1 major, 1 minor) Museology and material culture (2020)
First state examination for the teaching degree Gymnasium Physics (2020)

Bachelor's degree (1 major, 1 minor) Pedagogy (2020)
Bachelor's degree (2 majors) Pedagogy (2020)
First state examination for the teaching degree Gymnasium Political and Social Studies (2020)
Bachelor's degree (1 major) Psychology (2020)
Bachelor's degree (1 major) Biology (2021)
Magister Theologiae Catholic Theology (2021)
Bachelor's degree (2 majors) History (2021)
Bachelor's degree (1 major, 1 minor) History (2021)
First state examination for the teaching degree Gymnasium History (2021)
Bachelor's degree (1 major) Media Communication (2021)
Bachelor's degree (2 majors) Theological Studies (2021)
Bachelor's degree (1 major, 1 minor) Theological Studies (2021)
Bachelor's degree (1 major, 1 minor) English and American Studies (2021)
Bachelor's degree (2 majors) English and American Studies (2021)
First state examination for the teaching degree Gymnasium English (2021)
Bachelor's degree (1 major) Functional Materials (2021)
First state examination for the teaching degree Gymnasium Philosophy and Ethics (2021)
Bachelor's degree (1 major) Computer Science and Sustainability (2021)
Bachelor's degree (2 majors) Comparative Indo-European Linguistics (2021)
Bachelor's degree (1 major) Food Chemistry (2021)
Bachelor's degree (1 major) Quantum Technology (2021)
Bachelor's degree (2 majors) Special Education (2021)
Bachelor's degree (1 major) Business Information Systems (2021)
Bachelor's degree (1 major) Economathematics (2021)
Bachelor's degree (1 major) Business Management and Economics (2021)
Bachelor's degree (1 major) Human-Computer Systems (2022)
Bachelor's degree (1 major, 1 minor) Museology and material culture (2022)
Bachelor's degree (1 major) Biochemistry (2022)
Bachelor's degree (1 major) Biology (2022)
Bachelor's degree (1 major) Economathematics (2022)
Bachelor's degree (1 major) Mathematical Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
First state examination for the teaching degree Gymnasium Philosophy and Ethics (2022)
Bachelor's degree (2 majors) Ancient Near Eastern Archaeology (2022)
Bachelor's degree (1 major, 1 minor) Ancient World (2022)
Bachelor's degree (2 majors) Ancient Near Eastern Studies (2022)
Bachelor's degree (1 major) Franco-German studies: language, culture, digital competence (2022)
First state examination for the teaching degree Gymnasium Russian (2023)
First state examination for the teaching degree Gymnasium Mathematics (2023)
First state examination for the teaching degree Gymnasium English (2023)
First state examination for the teaching degree Gymnasium Geography (2023)
Bachelor's degree (1 major) European Law (2023)
Bachelor's degree (1 major, 1 minor) English and American Studies (2023)
Bachelor's degree (2 majors) English and American Studies (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Mathematics (2023)
Bachelor's degree (1 major) Business Information Systems (2023)
Bachelor's degree (1 major) Economathematics (2023)
Bachelor's degree (1 major, 1 minor) History of Medieval and Modern Art (2023)
Bachelor's degree (2 majors) History of Medieval and Modern Art (2023)
Bachelor's degree (2 majors) Special Education (2023)
Bachelor's degree (1 major) Business Management and Economics (2023)
Bachelor's degree (1 major) Geography (2023)

Bachelor's degree (2 majors) Geography (2023)
Bachelor's degree (1 major, 1 minor) Geography (2023)
Bachelor's degree (2 majors) European Ethnology/Empiric Cultural Studies (2023)
First state examination for the teaching degree Gymnasium German (2024)
Bachelor's degree (1 major) Mathematical Physics (2024)
Bachelor's degree (2 majors) German Language and Literature (2024)
Bachelor's degree (1 major, 1 minor) German Language and Literature (2024)
Bachelor's degree (1 major) Music Education (2024)
Bachelor's degree (2 majors) Music Education (2024)
Bachelor's degree (1 major, 1 minor) Music Education (2024)
Bachelor's degree (1 major) Indology/South Asian Studies (2024)
Bachelor's degree (2 majors) Indology/South Asian Studies (2024)
Bachelor's degree (1 major, 1 minor) Indology/South Asian Studies (2024)
Bachelor's degree (1 major, 1 minor) Ancient World (2024)
Bachelor's degree (2 majors) Digital Humanities (2024)
Bachelor's degree (1 major, 1 minor) Digital Humanities (2024)
Bachelor's degree (1 major) Midwifery (2024)
Bachelor's degree (2 majors) Greek Philology (2024)
Bachelor's degree (2 majors) Latin Philology (2024)
First state examination for the teaching degree Gymnasium Latin Philology (2024)
Bachelor's degree (1 major) Business Information Systems (2024)
Bachelor's degree (1 major) Economathematics (2024)
Bachelor's degree (1 major) Business Management and Economics (2024)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)
First state examination for the teaching degree Gymnasium English (2024)
First state examination for the teaching degree Gymnasium History (2024)
First state examination for the teaching degree Gymnasium Greek Philology (2024)
Bachelor's degree (1 major) Human-Computer-Interaction (2024)
Bachelor's degree (2 majors) Art Education (2024)
Bachelor's degree (1 major) Digital Business & Data Science (2024)
Bachelor's degree (1 major) Classics (2024)
Bachelor's degree (1 major) Diversity, Ethics and Religions (2024)
Bachelor's degree (1 major) Functional Materials (2025)
Bachelor's degree (1 major) (2025)
Bachelor's degree (1 major) Food Chemistry (2025)
Bachelor's degree (1 major, 1 minor) European Ethnology/Empiric Cultural Studies (2025)
Bachelor's degree (1 major) Pedagogy (2025)
Bachelor's degree (2 majors) Pedagogy (2025)
Bachelor's degree (1 major) Economathematics (2025)
Bachelor's degree (1 major) Academic Speech Therapy (2025)
Bachelor's degree (1 major, 1 minor) Pedagogy (2025)
Bachelor's degree (1 major) Games Engineering (2025)
Bachelor's degree (2 majors) Sport Science (Focus on health and Pedagogics in Movement) (2025)
First state examination for the teaching degree Gymnasium German (2025)
Bachelor's degree (1 major) Aerospace Computer Science (2025)
Bachelor's degree (1 major, 1 minor) German Language and Literature (2025)
Bachelor's degree (1 major) Computer Science (2025)
Bachelor's degree (2 majors) German Language and Literature (2025)
First state examination for the teaching degree Gymnasium Computer Science (2025)
Bachelor's degree (1 major) Computer Science and Sustainability (2025)
First state examination for the teaching degree Gymnasium (2025)

Modules Mathematics/Statistics

(5 ECTS credits)

Module title			Abbreviation
Statistics for Students of natural sciences and biomedicine			10-M-STAB-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Mathematik (Mathematics)		Institute of Mathematics	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Basics of descriptive statistics, important discrete and continuous probability distributions, basic procedures of inferential statistics: selected confidence intervals, parametric and nonparametric tests.

Intended learning outcomes

After finishing the course, students will be able to utilise basic statistical methods for the evaluation of data and to interpret the results. They will know the principles behind applied statistical methods and will be able to take a critical look at the statistical procedures which are available. By presenting solutions of excercises, students will improve their communication skills and learn to justify their solutions using logical arguments.

Courses (type, number of weekly contact hours, language — if other than German)

V (2) + Ü (2)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (90 to 120 minutes)

Allocation of places

--

Additional information

--

Workload

150 h

Teaching cycle

--

Referred to in LPO I (examination regulations for teaching-degree programmes)

--

Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)
exchange program Mathematics (2023)

Modules Biochemistry and Molecular Biology

(20 ECTS credits)

Module title			Abbreviation
Basic Biochemistry and Molecular Biology			03-98-BCH-202-m01
Module coordinator		**Module offered by**	
holders of the Chairs of Physiological Chemistry, Developmental Biochemistry, Biochemistry and Molecular Biology		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
2 semester	undergraduate	Admission prerequisite to assessment: Eingangstestate	

Contents

Biochemistry: structure and function of the building blocks of life, enzyme kinetics, biochemical analytics, fundamentals of intermediate and energy metabolism, mitochondrial function.
Molecular biology: storage, transduction and expression of genetic information, control of cell functions by hormones and signal transduction processes, basic immunology.
Performing biochemical detection reactions and molecular biology experiments.

Intended learning outcomes

After successful completion of the module, students are able to describe the molecular structure of cells and organisms. They understand basic metabolic processes in humans and their regulation. They can describe molecular biological relationships of cell and organ functions and possible application examples. They possess the ability to review and present limited topics in small teams. They are proficient in the reproducible collection of simple biochemical and molecular biological measurement data and they can describe quality parameters.

Courses (type, number of weekly contact hours, language — if other than German)

V (5) + S (4) + Ü (4)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Written examination (45 to 90 minutes) and presentation (weighted 3:1)

Allocation of places

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Additional information

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Workload

300 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Advanced Biochemistry and Molecular Biology			03-98-BCHF-202-m01
Module coordinator		**Module offered by**	
holders of the Chairs of Physiological Chemistry, Developmental Biochemistry, Biochemistry and Molecular Biology		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Admission prerequisite to assessment: log.	

Contents

Enhanced insight into functional biochemical and molecular biological relationships. Examples of the molecular control of cell and organ functions. Application of molecular biology and genetic engineering methods to investigate cellular parameters such as gene expression patterns, protein expression or growth and apoptosis. Review of current literature on selected topics.

Intended learning outcomes

After participating in the module courses, the students have internalized advanced knowledge of biochemistry and are able to present and use it (professional competence). In addition, they have learned to acquire new knowledge from the primary literature (self-competence), to process this knowledge and to communicate it to people with a comparable level of knowledge (social competence). They have acquired practical routine in circumscribed experiments (methodological competence) and can plan and develop their own experimental analyses on this basis.

Courses (type, number of weekly contact hours, language — if other than German)

V (4) + S (1) + Ü (6)
Module taught in: German and English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Written examination (30 to 90 minutes) and presentation (weighted 3:1)

Allocation of places

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Additional information

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Workload

300 h

Teaching cycle

--

Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Modules Anatomy and Pathology

(15 ECTS credits)

Module title			Abbreviation
Anatomy and Cell Biology			03-98-ANA-1-152-m01
Module coordinator		**Module offered by**	
Institute of Anatomy and Cell Biology		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Gross anatomy: musculoskeletal system, cranium, respiratory system, cardiovascular organs, digestive organs, urinary organs, sexual organs, brain. Introduction to cytology and histology.

Intended learning outcomes

The students have developed a fundamental knowledge of general microscopic as well as macroscopic anatomy.

Courses (type, number of weekly contact hours, language — if other than German)

V (3) + S (2) + Ü (2)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (60 to 90 minutes)
Assessment offered: Once a year, winter semester

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Histology			03-98-ANA-2-152-m01
Module coordinator		**Module offered by**	
Institute of Anatomy and Cell Biology		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Foundations of general cytology and histology. General and special microscopic anatomy (histology) of the digestive, cardiovascular, respiratory and urogenital organs and endocrine glands, central and peripheral nervous system (microscopy of tissue sections and practical exercises), fundamentals of histopathology.

Intended learning outcomes

The students have developed a fundamental knowledge of general and special microscopic anatomy.

Courses (type, number of weekly contact hours, language — if other than German)

V (1) + P (5)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (approx. 60 minutes) and assessment of practical skills (approx. 60 minutes), weighted 1:2
Assessment offered: Once a year, summer semester

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
General Pathology			03-98-APA-152-m01
Module coordinator		**Module offered by**	
Institute of Pathology		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

General and special pathology: pathology of cell damage, classification of inflammation, immunopathology, tumour pathology, examples of important organ diseases.

Intended learning outcomes

The students achieve knowledge of the basics of general pathology and methods of pathology such as morphological, immunohistochemical, cytogenetic and molecular biological investigations. They acquire the ability to classify methods of pathology in the context of other medical disciplines and to include them in differential diagnostic considerations.

Courses (type, number of weekly contact hours, language — if other than German)

V (3) + P (1)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (60 to 90 minutes) and successful completion of practical exercises (ungraded)

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Modules Physiology

(10 ECTS credits)

Module title			Abbreviation
Human Physiology 1			03-98-PHY1-202-m01
Module coordinator		**Module offered by**	
holders of the Chairs of Cardiovascular Physiology and Neurophysiology		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Learn basic principles of physiology and pathophysiology. One focus is on the hemodynamic processes in the heart and circulatory system, the vegetative regulation of the cardiovascular system and the spread of excitation and contraction of the heart muscle. Other topics include the physiology of the cell membrane, the regulation of the water and electrolyte balance in the kidneys, the acid-base balance and the regulation of respiration. Application of the necessary techniques.

Intended learning outcomes

Professional work with measuring devices to record the necessary parameters on humans and evaluation of the measured values obtained for the analysis of bodily functions. Checking, evaluating and error analysis of the results. Understanding of the physiological principles and their importance for human diseases. Independent work and problem-oriented learning through presentation and discussion of the measurement results and the organ functions derived from them. Acquiring the ability to discuss scientific and medical aspects of physiology and pathophysiology.

Courses (type, number of weekly contact hours, language — if other than German)

V (3) + Ü (3)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Written examination (approx. 60 minutes)
Assessment offered: Once a year, winter semester

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Human Physiology 2			03-98-PHY2-202-m01
Module coordinator		**Module offered by**	
holders of the Chairs of Cardiovascular Physiology and Neurophysiology		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Learn basic principles of physiology and pathophysiology. The focus is on the processes of neuronal excitation, the coordination of motor nerves and muscles and the sensory nerve functions. Further content includes the functions of the blood, thermoregulation of the human body and carbohydrate balance, exercise physiology, acoustics with the vestibular system and optics. Application of the necessary techniques.

Intended learning outcomes

Professional work with measuring devices to record the necessary parameters on humans and evaluation of the measured values obtained for the analysis of bodily functions. Checking, evaluating and error analysis of the results. Understanding of the physiological principles and their importance for human diseases. Independent work and problem-oriented learning through presentation and discussion of the measurement results and the organ functions derived from them. Acquiring the ability to discuss scientific and medical aspects of physiology and pathophysiology.

Courses (type, number of weekly contact hours, language — if other than German)

V (3) + Ü (3)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Written examination (approx. 60 minutes)
Assessment offered: Once a year, summer semester

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Modules Pharmacology and Toxicology

(5 ECTS credits)

Module title			Abbreviation
Pharmacology and Toxicology			03-98-APT-152-m01
Module coordinator		**Module offered by**	
Institute of Pharmacology and Toxicology		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

General principles of pharmacology and toxicology, pharmacodynamics and pharmacokinetics, pharmaceuticals influencing the autonomous and central nervous system, cardiac drugs, diuretics, anticoagulants, pharmaceuticals influencing the gastrointestinal tract as well as lipid and glucose metabolism, analgesics, anti-rheumatics, hormones, tumor therapeutics, immunosuppressants, anti-infectives, asthma, toxins, treatment of intoxications.

Intended learning outcomes

Students have acquired a fundamental knowledge of general principles in pharmacology and toxicology. They have acquired specific knowledge of each named drug class, their mechanisms of action, basal pharmacokinetic properties and their most relevant side effects.

Courses (type, number of weekly contact hours, language — if other than German)

V (5)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (45 to 60 minutes)
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (20 to 30 minutes) or an oral examination in groups of up to 3 candidates (approx. 20 minutes per candidate).

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Modules Microbiology, Virology and Immunology

(10 ECTS credits)

Module title			Abbreviation
Microbiology			03-98-MIK-202-m01
Module coordinator		**Module offered by**	
Institute of Molecular Infection Biology		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

The theoretical basics of microbiology are introduced in the lecture. This includes historical developments and milestones in microbiological research, overview of the diversity of microbiological organisms and their role in ecosystems, classification and function of virulence factors, evolution of pathogenicity, processes of gene regulation, application of diagnostic methods, interactions of pathogens with the immune system, common infectious diseases and their causes, function of the microbiota and characteristics of parasitic pathogens.

Intended learning outcomes

Students are able to compare characteristics of prokaryotic cells and eukaryotic cells, to classify historical developments, to assess modern methods of microbiological research, to analyze the virulence potential of a pathogen, to discuss evolutionary aspects of pathogenic microorganisms, to evaluate the role of horizontal gene transfer in the emergence of new pathogenic variants. Acquisition of the ability to structure and network complex relationships.

Courses (type, number of weekly contact hours, language — if other than German)

V (3)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Written examination (approx. 60 minutes)
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (20 to 30 minutes) or an oral examination in groups of up to 3 candidates (approx. 20 minutes per candidate).

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
General Virology and Immunology			03-98-VIM-202-m01
Module coordinator		**Module offered by**	
Institute of Virology and Immunobiology		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Immunology: Learning the basics of immunology, including the components of the immune system and the classification of immune reactions, organs, cell types and important molecules. Understanding of basic principles such as immune cell migration or systemic communication via soluble factors. Knowledge of the innate immune system, such as complement, antimicrobial peptides, inflammation, the cell types and function of macrophages, granulocytes, natural killer cells and dendritic cells. Molecular components of pathogen recognition and antigen presentation to cells of the adaptive immune system. Overviews of the generation, activation and effector functions of B and T cells of the adaptive immune system, including anti-bodies. Learn how components of the immune system respond to various situations of immune tolerance and immune responses against viruses, bacteria and parasites. Basics of hyperreactivities, autoimmunity, transplantation, immune deficiency, tumor immunology, vaccinations and modern approaches to immune therapy.
Virology: Learning the structure of viruses and understanding the basic principles of diagnostics, viral replication cycles, and transmission using the example of DNA viruses, RNA viruses and retroviruses. Furthermore, the basic features of tumor-associated viruses are elaborated. In particular, virion and genome structure, viral gene expression, assembly and release of viruses are explained. Furthermore, the basics of pathogenesis, antiviral vaccines and therapeutics are presented and discussed

Intended learning outcomes

Immunology: Understanding of the basics of immunology and knowledge of the components and functions of the immune system. Theoretical expertise in classifying the interaction of the components of the immune system in various diseases. Collection and classification of current research results in the field of immunology.
Virology: Understanding of the basics of virology and knowledge of the molecular biological characteristics of different virus families. Theoretical expertise to work in molecular biology-oriented laboratories in the field of virology. Acquisition and classification of current research results in the field of virology.

Courses (type, number of weekly contact hours, language — if other than German)

V (2) + V (2)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Written examination (approx. 60 minutes)
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (20 to 30 minutes) or an oral examination in groups of up to 3 candidates (approx. 20 minutes per candidate).

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor's degree (1 major) Biomedicine (2020)

Modules Advanced Lab Course

(8 ECTS credits)

Module title			Abbreviation
Project Work in a Research Laboratory			03-98-IPP-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biomedizin (Biomedicine)		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
8	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Prior approval from degree programme coordinator required.	

Contents

Project work in a research laboratory focusing on training in new methods and the in-depth analysis of a scientific problem. This project may lay the foundation for a subsequent Bachelor's thesis.

Intended learning outcomes

Performing more elaborate experiments with sequential methods. Application of methods learned in the course and learning of project-specific analysis and evaluation procedures. Gradual introduction to independent experimental work and problem-solving strategies. Students gain an in-depth insight of a current research topic based on primary literature and knowledge transfer.

Courses (type, number of weekly contact hours, language — if other than German)

R (12)
Module taught in: German/English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

presentation (20 to 30 minutes) as well as log (10 to 15 pages) or, where applicable, project proposal (approx. 5 pages)
Language of assessment: German or English

Allocation of places

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Additional information

Additional information on module duration: 6 to 8 weeks.

Workload

240 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Compulsory Electives

(30 ECTS credits)

Compulsory Electives Cell Biology, Genetics and Bioinformatics

(10 ECTS credits)

Module title			Abbreviation
Cell Biology - Focus signal transduction and stem cells			03-98-PZB1-172-m01
Module coordinator		**Module offered by**	
Woking Group Molecular Genetics of the Faculty of Medicine		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	May not be combined with 03-98-PZB2 or 03-98-PZB3.	

Contents

Becoming familiar with basic cell biological principles via hands-on training and individual seminars. Major topics are the structural organization of eukaryotic cells and differentiation of stem cells into different cell types. Analyses of cellular processes such as reorganization of the cytoskeleton under stress conditions, proliferation, apoptosis, differentiation, regulation of transcription, stimulation of signaling pathways and cellular responses. Application of the necessary techniques.

Intended learning outcomes

Problem-oriented handling of eukaryotic cells under sterile conditions as well as the ability to independently apply basic working techniques to analyze cells. Checking, evaluating and error analysis of the results. Understanding the molecular basis of cell biology as well as cellular malfunctions and their significance for disease processes. Independent extraction of relevant information and presentation of selected examples of the current literature in a seminar. Acquiring the ability to discuss scientific and ethical aspects of stem cell biology.

Courses (type, number of weekly contact hours, language — if other than German)

P (5) + S (1)
Module taught in: German/English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) written examination (45 to 90 minutes) or
b) oral examination of one candidate each (20 to 30 minutes)
Students will be informed about the type and length of assessment at the beginning of the course.
Language of assessment: German and/or English

Allocation of places

Biomedizin (Biomedicine) Bachelor's: 18 places.

Additional information

Additional information on module duration: 2 weeks, full time.

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Module title	Abbreviation
Cell Biology - Focus Cytoskeleton and Microscopic Imaging	03-98-PZB2-202-m01

Module coordinator	Module offered by
Institute of Experimental Biomedicine, holder of the Professorship of Molecular Microscopy	Faculty of Medicine

ECTS	Method of grading	Only after succ. compl. of module(s)
5	numerical grade	--

Duration	Module level	Other prerequisites
1 semester	undergraduate	May not be combined with 03-98-PZB1 or 03-98-PZB3.

Contents

Becoming familiar with basic cell biological principles via hands-on training and seminars. Major topics are the structural organisation, the stability and the dynamics of the cytoskeleton in eukaryotic cells. Biochemical analysis of cytoskeletal components. Complementary imaging using modern microscopic approaches and implementation of the results into the dynamic processes of the cytoskeleton living cells.

Intended learning outcomes

Problem-oriented handling of eukaryotic cells under sterile conditions and understanding principles of techniques for the analysis of the cellular cytoskeleton. Understanding the molecular basis of cell biology and recognizing targets for drugs affecting the cytoskeleton. Principles and limitations of classical and modern forms of microscopic imaging for the analysis of the cytoskeleton. Cellular malfunctions and their significance for the disease development. Independent extraction of relevant information and presentation of selected examples of the current literature.

Courses (type, number of weekly contact hours, language — if other than German)

P (5) + S (1)
Module taught in: German/English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) written examination (45 to 90 minutes) or
b) oral examination of one candidate each (20 to 30 minutes)
Language of assessment: German and/or English

Allocation of places

Bachelor's Biomedicine: 12 places

Additional information

Duration: 2 weeks

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Cell Biology - Focus Immunology			03-98-PZB3-202-m01
Module coordinator		**Module offered by**	
Institute of Experimental Biomedicine, University Hospital, Department of Dermatology, Venerology and Allergology		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	May not be combined with 03-98-PZB1 or 03-98-PZB2.	

Contents

The main topics are: Cell culture of adherent cells under sterile conditions, gene expression analysis at RNA level using quantitative real-time PCR and fluorescence reporter genes, identification and quantification of proteins using immunological techniques such as Western blot, FACS and ELISA, investigating cell migration using single cell tracking and time-lapse microscopy, as well as preparing and staining of histological sections.

Intended learning outcomes

Understanding and self-reliant application of basic cell and molecular biological techniques and generally applicable methods for the analysis of gene expression and cell migration. Analysis, evaluation and (critical) consideration of the results with error analysis. The aim of the qualification is to acquire basic specialist and methodological skills in cell and molecular biology in the context of inflammatory processes, as well as to understand and remember basic cellular and immunological principles.

Courses (type, number of weekly contact hours, language — if other than German)

P (5) + S (1)
Module taught in: German/English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) written examination (45 to 90 minutes) or
b) oral examination of one candidate each (20 to 30 minutes)
Language of assessment: German and/or English

Allocation of places

Biomedizin (Biomedicine) Bachelor's: 8 places.

Additional information

Duration: 2 weeks

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title	Abbreviation
Introduction to Genetics and Human Genetics	03-98-PGH-202-m01

Module coordinator	Module offered by
holder of the Chair of Clinical Biochemistry and Pathobiochemistry and holder of the Chair of Neurobiology and Genetics and Research Center for Infectious Diseases	Faculty of Medicine

ECTS	Method of grading	Only after succ. compl. of module(s)
5	numerical grade	--

Duration	Module level	Other prerequisites
1 semester	undergraduate	--

Contents

Introduction to human genetics, general genetics and genetic diagnostics in human diseases: diseases caused by genetic instability, neurodegenerative diseases, hereditary cancer. Practical part: molecular genetic diagnostics, genetic tools in Drosophila.

Intended learning outcomes

Students will acquire a fundamental knowledge of human and Drosophila genetics as well as molecular genetic diagnostics and genetic counselling. They will develop an advanced knowledge of the genetics of selected diseases. Acquiring the ability to analyze und interpret diagnostic data. Independent presentation of results.

Courses (type, number of weekly contact hours, language — if other than German)

V (2) + Ü (3)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (45 to 90 minutes) and successful completion of exercises (ungraded), oral test during experiments (approx. 15 minutes) and written examination (90 minutes)
Each experiment comprises preparation, performance and evaluation. Test as well as performance of experiments can each be repeated once.

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Introduction to Bioinformatics			07-BI-202-m01
Module coordinator		**Module offered by**	
holder of the Chair of Bioinformatics		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Fundamental principles of bioinformatics.

Intended learning outcomes

Students are proficient in methods for the analysis of DNA and protein databases.

Courses (type, number of weekly contact hours, language — if other than German)

V (0.5) + Ü (4)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Log (approx. 30 pages)

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)
Master's degree (1 major) Computer Science (2021)
Master's degree (1 major) Mathematics (2022)

Advanced Compulsory Electives

(20 ECTS credits)

Students may also take modules from the areas "Zellbiologie, Genetik und Bioinformatik" ("Cell Biology, Genetics and Bio Informatics") and "Infektiologie und Immunologie" ("Infection and Immunity").

Module title	Abbreviation
Practical Course in Immunology and Virology	03-98-PIV-202-m01

Module coordinator	Module offered by
Institute of Virology and Immunobiology	Faculty of Biology, Faculty of Medicine

ECTS	Method of grading	Only after succ. compl. of module(s)
5	numerical grade	--

Duration	Module level	Other prerequisites
1 semester	undergraduate	--

Contents

Part immunology: Learning the basics of immunology through practical exercises with different immune cells. The focus is on antigen uptake by dendritic cells and their antigen presentation to T cells. Subsequent time-kinetic analyzes to determine the activation of the T cells.
Part virology: Learning of virological basic principles by means of practical exercises. The focus is on the infection of cells with wild-type and transgenic viruses, morphological examination of infected cells with cytopathic effect, determination of virus titer and tropism, investigation of the functionality of antiviral antibodies and of the humoral immune response against viral infections.

Intended learning outcomes

Part immunology: Professional work with primary immune cells under sterile conditions and the ability to independently apply basic immunological working methods. Mastering the basic safety aspects of working in the S2 laboratory when dealing with pathogen-stimulated cell cultures and principles of immunological methods in research. Checking, analyzing, interpreting, evaluating and classifying/judging the results. Allocation of the molecular basis of the immunoregulatory mechanisms, their consequences and causal impact on immune tolerance and immune stimulation.
Part virology: Expert work with viruses and eukaryotic cells under sterile conditions as well as the ability to independently apply basic working methods of virology. Mastery of the basic safety aspects of working in an S2 laboratory with infectious agents as well as the concepts of genetic safety and principles of virological methods in research and diagnostics. Review, analyze, interpret, evaluate and classify/assess results. Assign the molecular basis of viral infections, their consequences and causal site in the disease process.

Courses (type, number of weekly contact hours, language — if other than German)

P (5) + S (1)
Module taught in: German/English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) Written examination (45 to 90 minutes) or
b) Log (10 to 20 pages) or
c) Oral examination of one candidate each (20 to 30 minutes)

Allocation of places

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Additional information

Duration: 2 Weeks

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Practical Course in Molecular Infection Biology			03-98-PMIB-202-m01
Module coordinator		**Module offered by**	
Institute of Molecular Infection Biology		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Experiments to characterize pathogens and their pathogenic properties are carried out. The internship includes, among other things, methods for identifying bacterial pathogens, physiological tests, biochemical detection assays and molecular methods. Furthermore, the genetic causes of antibiotic resistance are determined and gene regulation mechanisms investigated. Methods for determining the human microbiome are learned and working with databases is practiced. Virulence factors that are important in the host-pathogen interaction are analyzed.

Intended learning outcomes

Acquisition of professional competences to characterize bacterial pathogens, to classify their virulence and physiological properties and to understand their role in disease processes. Ability to analyze sequencing data using databases. Ability to discuss general aspects of infectious diseases in the society. Methodological competence to solve complex problems based on scientific data. Ability to present scientific work to others.

Courses (type, number of weekly contact hours, language — if other than German)

P (5) + S (1)
Module taught in: German/English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) Written examination (45 to 90 minutes) or
b) Log (10 to 20 pages) or
c) oral examination of one candidate each (20 to 30 minutes)

Allocation of places

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Additional information

Duration: 2 weeks

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Practical Course in Molecular Microbiology			03-98-PMoMi-202-m01
Module coordinator		**Module offered by**	
Institute of Molecular Infection Biology		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Basic microbiological experiments are carried out. The internship includes methods of disinfection and sterilization, diagnostic determination of pathogens, staining and microscopy of grampositive and gramnegative pathogens, analysis of growth curves, determination of the cell count of bacteria, metabolic reactions in bacteria, determination of antibiotic resistance, familiarization with processes of horizontal gene transfer, generation of genetic mutations and their detection, analysis of gene regulation.

Intended learning outcomes

The students acquire the ability to apply microbiological and molecular methods with pathogenic bacteria. They are able to design, carry out and analyse scientific experiments. They are able to assess experimental and methodological errors. The students are able to develop strategies to solve problems. They can analyse and present own experimental data.

Courses (type, number of weekly contact hours, language — if other than German)

P (5) + S (1)
Module taught in: German/English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) written examination (45 to 90 minutes) or
b) log (10 to 20 pages) or
c) oral examination of one candidate each (20 to 30 minutes)
Language of assessment: German or English

Allocation of places

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Additional information

Duration: 2 weeks

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Practical Course in Pharmacology and Toxicology			03-98-PPT-202-m01
Module coordinator		**Module offered by**	
holder of the Chair of Pharmacology and Toxicology		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Students learn selected pharmacological and toxicological working techniques, including cell culture, cell transfection, receptor pharmacology, receptor-signal transduction analysis and effects of pharmacological substances, in vitro tests for cell toxicity or the characterisation of enzymes.

Intended learning outcomes

At the end of the course, students will be able to perform routine pharmacological and toxicological techniques. They will also be able to perform microscopic analyses of samples, the functional characterisation of selected target proteins and cell toxicity analyses. Checking, interpreting and evaluation of errors in the results and independently working out and presenting the results in an accompanying seminar.

Courses (type, number of weekly contact hours, language — if other than German)

P (3) + S (1)
Module taught in: German/English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Presentation of pracitcal work (approx. 30 minutes)

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Pathophysiology and Pathobiochemistry			03-98-PPC-202-m01
Module coordinator		**Module offered by**	
holder of the Chair of Experimental Biomedicine		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

The lecture series will cover the pathobiochemistry and pathophysiology of selected diseases from nephrology, cardiology, endocrinology, pneumology, psychiatry and aspects of clinical molecular biology. The focus is on the biochemical and molecular causes of these diseases and the challenges for respective clinical diagnosis, treatment and translational research.

Intended learning outcomes

Understanding and remembering the pathobiochemical and pathophysiological bases of diseases and their importance for disease processes. Understanding how the pathobiochemical and pathophysiological mechanismus of diseases are used in clinical diagnosis and treatment.

Courses (type, number of weekly contact hours, language — if other than German)

V (3) + V (1)
Module taught in: German/English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) Written examination (45 to 90 minutes) or
b) oral examination of one candidate each (20 to 30 minutes)

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Introduction to Methods in Experimental Biomedicine			03-98-RVZ-202-m01
Module coordinator		**Module offered by**	
holder of the Chair of Experimental Biomedicine		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Fundamental knowledge and analytical approaches of experimental biomedicine are taught based on selected questions of platelet physiology and megakaryopoiesis. Emphasis is put on the generation and use of antibodies. Transgenic mouse models are used to elucidate the interplay underlying (patho-)physiological processes.

Intended learning outcomes

Professional competence: General knowledge on the generation and application of antibodies, generation and use of transgenic mouse models and acquisition of specialized knowledge on the study of platelet function and production.
Methodological competence: Analyzing and evaluating scientific figures.
Social competence: The communicative competence is promoted by independent research, analysis and presentation of current literature (in English) in the accompanying seminar.
After participation in the module courses, students will be able to apply the experimental techniques learned during the course. Furthermore, they will be able to analyze and evaluate experimental data obtained using monoclonal antibodies and genetically modified mouse models.

Courses (type, number of weekly contact hours, language — if other than German)

P (6)
Module taught in: German/English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) written examination (45 to 90 minutes) or
b) Log (10 to 20 pages) or
c) oral examination of one candidate each (20 to 30 minutes)
Language of assessment: German or English

Allocation of places

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Additional information

Duration: 2 weeks

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Practical Course in a Research Laboratory			03-98-PF2-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biomedizin (Biomedicine)		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Working in a research laboratory under individual supervision. The topic will vary according to the lab selected and enables an intensive introduction to special methods of research and reading of the relevant literature. The experiments are documented in a protocol.

Intended learning outcomes

Students expand their repertoire of experimental methods and learn how to critically examine experimental data. They become familiar with workflows and organisational patterns in research laboratories.

Courses (type, number of weekly contact hours, language — if other than German)

P (6)
Module taught in: German/English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

practical assignment with presentation (approx. 10 minutes) and log (approx. 10 pages)
Language of assessment: German or English

Allocation of places

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Additional information

Additional information on module duration: 3 to 4 weeks, full time.

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Module title	Abbreviation
Imaging methods in life-sciences	08-BGV-202-m01

Module coordinator	Module offered by
holder of the Chair of Biochemistry	Chair of Biochemistry

ECTS	Method of grading	Only after succ. compl. of module(s)
5	numerical grade	--

Duration	Module level	Other prerequisites
1 semester	undergraduate	--

Contents

The module "Imaging Techniques in the Life Sciences" contains a lecture part and a seminar part. In the lecture part basic concepts of optics will be discussed and the functionality of a light microscope will be explained. Afterwards the principles of different variants of superresolution light microscopy will be introduced. Typical applications for the study of dynamic processes in cells and the temporal and spatial resolution potential of the different methods play a special role. Subsequently, the principles of electron microscopy (transmission electron microscopy and scanning electron microscopy) will be discussed. As far as possible, parallels to light microscopy will be developed. Typical electron microscopic applications in cell biology and structural biology will be discussed including correlative methods combining light and electron microscopy. Then the principles of more specific microscopy methods such as X-ray microscopy, scanning probe microscopy and nuclear resonance microscopy will be introduced. It will be worked out how the fields of application differ from those of classical microscopy methods and what the temporal and spatial resolution capabilities of the individual methods are. Finally, selected imaging methods from the clinical field (X-ray tomography, nuclear spin tomography and ultrasound) for the imaging of entire organisms will be discussed. As far as possible, parallels are drawn to the microscopic procedures. In the seminar part some aspects of the different methods will be deepened by case studies from the literature and by applying the theoretical basics.

Intended learning outcomes

The participants learn the functionalities of different imaging techniques. They will be able to classify typical advantages and limitations of the methods and understand general principles of imaging techniques. Building on this understanding, they can easily evaluate and classify other methods. In order to apply what they have learned independently, the participants will analyse a primary publication independently and answer questions on the imaging methods in writing. The participants will acquire competences in dealing with primary literature in a foreign lan-guage. By working on the questions, the participants are trained to recognise relevant information in the primary publication and to reproduce it in a different context. Participants will have the opportunity to optimise their written expression skills in a scientific environment by working on questions relating to primary literature.

Courses (type, number of weekly contact hours, language — if other than German)

V (2) + S (1)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) written examination (approx. 45 to 90 minutes) or
b) oral examination of one candidate each (20 to 30 minutes) or
c) oral examination in groups of up to 3 candidates (approx. 15 to 20 minutes per candidate)
Language of assessment: German or English
Assessment offered: Once a year, winter semester

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle
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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor's degree (1 major) Biomedicine (2020) Bachelor's degree (1 major) Biochemistry (2022)

Module title			Abbreviation
Introduction to Neurobiology			03-98-PGN-202-m01
Module coordinator		**Module offered by**	
holder of the Chair of Clinical Neurobiology		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Students participating in this module will receive fundamental knowledge in neurobiology. This includes topics such as synaptic plasticity, ion channels, RNA biology in neuroscience, neural stem cells, various diseases of the nervous system: symptoms, diagnosis, therapeutic options. Methodological competence with regard to experimental approaches will be discussed and strengthened in accompanied seminars and practical lessons. Presentations of current research topics related to lecture topics further strengthens the acquired knowledge of neurobiological topics.

Intended learning outcomes

Students who successfully completed this module are able to remember a fundamental knowledge about the structure and function of the nervous system. Using oral presentations, students have received the competence to critical reflect current research topics and to classify data of current publications into the right context.

Courses (type, number of weekly contact hours, language — if other than German)

V (2) + S (3)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (90 minutes) and successful completion of seminar/exercise

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)
Bachelor's degree (1 major) Biochemistry (2022)

Module title			Abbreviation
Selected Courses from Related Study Programs			03-98-VVER-202-m01
Module coordinator		**Module offered by**	
Dean of Studies Biomedizin (Biomedicine)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Prior approval from degree programme coordinator required.	

Contents

Students broaden their insights into related disciplines and thereby complement the teaching portfolio of the program.

Intended learning outcomes

Students understand the approaches of related disciplines and are able to apply corresponding concepts and methods to problems in translational medicine. They possess enhanced cooperation and communication skills across disciplinary boundaries.

Courses (type, number of weekly contact hours, language — if other than German)

V (3)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) written examination (45 to 90 minutes) or
b) log (10 to 20 pages) or
c) oral examination of one candidate each (20 to 30 minutes)

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Cell Biology - Focus signal transduction and stem cells			03-98-PZB1-172-m01
Module coordinator		**Module offered by**	
Woking Group Molecular Genetics of the Faculty of Medicine		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	May not be combined with 03-98-PZB2 or 03-98-PZB3.	

Contents

Becoming familiar with basic cell biological principles via hands-on training and individual seminars. Major topics are the structural organization of eukaryotic cells and differentiation of stem cells into different cell types. Analyses of cellular processes such as reorganization of the cytoskeleton under stress conditions, proliferation, apoptosis, differentiation, regulation of transcription, stimulation of signaling pathways and cellular responses. Application of the necessary techniques.

Intended learning outcomes

Problem-oriented handling of eukaryotic cells under sterile conditions as well as the ability to independently apply basic working techniques to analyze cells. Checking, evaluating and error analysis of the results. Understanding the molecular basis of cell biology as well as cellular malfunctions and their significance for disease processes. Independent extraction of relevant information and presentation of selected examples of the current literature in a seminar. Acquiring the ability to discuss scientific and ethical aspects of stem cell biology.

Courses (type, number of weekly contact hours, language — if other than German)

P (5) + S (1)
Module taught in: German/English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) written examination (45 to 90 minutes) or
b) oral examination of one candidate each (20 to 30 minutes)
Students will be informed about the type and length of assessment at the beginning of the course.
Language of assessment: German and/or English

Allocation of places

Biomedizin (Biomedicine) Bachelor's: 18 places.

Additional information

Additional information on module duration: 2 weeks, full time.

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Cell Biology - Focus Cytoskeleton and Microscopic Imaging			03-98-PZB2-202-m01
Module coordinator		**Module offered by**	
Institute of Experimental Biomedicine, holder of the Professorship of Molecular Microscopy		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	May not be combined with 03-98-PZB1 or 03-98-PZB3.	

Contents

Becoming familiar with basic cell biological principles via hands-on training and seminars. Major topics are the structural organisation, the stability and the dynamics of the cytoskeleton in eukaryotic cells. Biochemical analysis of cytoskeletal components. Complementary imaging using modern microscopic approaches and implementation of the results into the dynamic processes of the cytoskeleton living cells.

Intended learning outcomes

Problem-oriented handling of eukaryotic cells under sterile conditions and understanding principles of techniques for the analysis of the cellular cytoskeleton. Understanding the molecular basis of cell biology and recognizing targets for drugs affecting the cytoskeleton. Principles and limitations of classical and modern forms of microscopic imaging for the analysis of the cytoskeleton. Cellular malfunctions and their significance for the disease development. Independent extraction of relevant information and presentation of selected examples of the current literature.

Courses (type, number of weekly contact hours, language — if other than German)

P (5) + S (1)
Module taught in: German/English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) written examination (45 to 90 minutes) or
b) oral examination of one candidate each (20 to 30 minutes)
Language of assessment: German and/or English

Allocation of places

Bachelor's Biomedicine: 12 places

Additional information

Duration: 2 weeks

Workload

150 h

Teaching cycle

--

Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Cell Biology - Focus Immunology			03-98-PZB3-202-m01
Module coordinator		**Module offered by**	
Institute of Experimental Biomedicine, University Hospital, Department of Dermatology, Venerology and Allergology		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	May not be combined with 03-98-PZB1 or 03-98-PZB2.	

Contents

The main topics are: Cell culture of adherent cells under sterile conditions, gene expression analysis at RNA level using quantitative real-time PCR and fluorescence reporter genes, identification and quantification of proteins using immunological techniques such as Western blot, FACS and ELISA, investigating cell migration using single cell tracking and time-lapse microscopy, as well as preparing and staining of histological sections.

Intended learning outcomes

Understanding and self-reliant application of basic cell and molecular biological techniques and generally applicable methods for the analysis of gene expression and cell migration. Analysis, evaluation and (critical) consideration of the results with error analysis. The aim of the qualification is to acquire basic specialist and methodological skills in cell and molecular biology in the context of inflammatory processes, as well as to understand and remember basic cellular and immunological principles.

Courses (type, number of weekly contact hours, language — if other than German)

P (5) + S (1)
Module taught in: German/English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) written examination (45 to 90 minutes) or
b) oral examination of one candidate each (20 to 30 minutes)
Language of assessment: German and/or English

Allocation of places

Biomedizin (Biomedicine) Bachelor's: 8 places.

Additional information

Duration: 2 weeks

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title	Abbreviation
Introduction to Genetics and Human Genetics	03-98-PGH-202-m01

Module coordinator	Module offered by
holder of the Chair of Clinical Biochemistry and Pathobiochemistry and holder of the Chair of Neurobiology and Genetics and Research Center for Infectious Diseases	Faculty of Medicine

ECTS	Method of grading	Only after succ. compl. of module(s)
5	numerical grade	--

Duration	Module level	Other prerequisites
1 semester	undergraduate	--

Contents

Introduction to human genetics, general genetics and genetic diagnostics in human diseases: diseases caused by genetic instability, neurodegenerative diseases, hereditary cancer. Practical part: molecular genetic diagnostics, genetic tools in Drosophila.

Intended learning outcomes

Students will acquire a fundamental knowledge of human and Drosophila genetics as well as molecular genetic diagnostics and genetic counselling. They will develop an advanced knowledge of the genetics of selected diseases. Acquiring the ability to analyze und interpret diagnostic data. Independent presentation of results.

Courses (type, number of weekly contact hours, language — if other than German)

V (2) + Ü (3)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (45 to 90 minutes) and successful completion of exercises (ungraded), oral test during experiments (approx. 15 minutes) and written examination (90 minutes)
Each experiment comprises preparation, performance and evaluation. Test as well as performance of experiments can each be repeated once.

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Introduction to Bioinformatics			07-BI-202-m01
Module coordinator		**Module offered by**	
holder of the Chair of Bioinformatics		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Fundamental principles of bioinformatics.

Intended learning outcomes

Students are proficient in methods for the analysis of DNA and protein databases.

Courses (type, number of weekly contact hours, language — if other than German)

V (0.5) + Ü (4)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Log (approx. 30 pages)

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)
Master's degree (1 major) Computer Science (2021)
Master's degree (1 major) Mathematics (2022)

Key Skills Area

(20 ECTS credits)

General Key Skills

(5 ECTS credits)

In the area of general transferable skills, students may choose from the modules offered as part of the pool of general transferable skills (ASQ) of the University of Würzburg.

Subject-specific Key Skills

(15 ECTS credits)

Module title			Abbreviation
Framework conditions of biomedical laboratory work			03-98-FSQ-GEN-202-m01
Module coordinator		**Module offered by**	
Institute of Molecular Infection Biology and Graduate School of Life Sciences		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
1	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

The lecture imparts knowledge in the following sub-areas:
1) Theoretical fundamentals of genetic engineering and genetic engineering safety requirements as well as an overview of the areas of application of genetic engineering. Introduction to the legal framework and regulations that must be observed when handling biomaterials, genetically modified organisms and pathogens.
2) Learn and reflect

- principles of good scientific practice
- genesis and worldwide establishment of principles
- individual people, (societal) groups and institutions involved, their roles and interests
- specific regulations and procedures of dealing with misconduct, especially those of JMU

Intended learning outcomes

Ad 1) The students have knowledge of methods of genetic engineering as well as the relevant regulations of the Infection Protection Act and the Genetic Engineering Safety and Biological Substances Ordinance. They can categorize biomedical work with regard to its hazard potential. The students remember safety-relevant rules of conduct in the laboratory and are able to apply them in practice.
Ad 2) Factual competencies: Knowledge of rules, knowledge of the current discussion on GSP worldwide
Self-competencies: Ability to understand GSP as a process in science and starting point to develop one's own awareness of and attitude towards GSP.

Courses (type, number of weekly contact hours, language — if other than German)

V (1)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Written examination (approx. 30 minutes)

Allocation of places

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Additional information

Students MUST take this module.

Workload

30 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Laboratory Animal Sciences 1			03-98-FSQ-VTK1-152-m01
Module coordinator		**Module offered by**	
Animal Welfare Officer of the University of Würzburg		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
2	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

According to the Animal Welfare Regulation Govering Experimental Animals (TierSchVersV), animal experiments on vertebrates and cephalopods may only be carried out by persons who possess the required knowledge and skills. This means that both theoretical and practical expertise must be acquired. In the lecture Animal Welfare and Laboratory Animal Science, the theoretical knowledge is taught, which is listed in Annex 1 Chapter 3 TierSchVersV.

Intended learning outcomes

Students acquire the expertise for the theoretical part for conducting animal experiments, which is certified by passing the exam. Raising awareness of ethical issues related to the relationship between humans and animals, intrinsic value of life, and arguments for and against the use of animals for scientific purposes.

Courses (type, number of weekly contact hours, language — if other than German)

V (2)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (approx. 90 minutes)

Allocation of places

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Additional information

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Workload

60 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Module title	Abbreviation
Laboratory Animal Sciences 2	03-98-FSQ-VTK2-152-m01

Module coordinator	Module offered by
holder of the Chair of Experimental Biomedicine and Animal Welfare Officer of the University of Würzburg	Faculty of Medicine

ECTS	Method of grading	Only after succ. compl. of module(s)
3	(not) successfully completed	--

Duration	Module level	Other prerequisites
1 semester	undergraduate	--

Contents

According to the Animal Welfare Regulation Govering Experimental Animals (TierSchVersV), animal experiments on vertebrates and cephalopods may only be carried out by persons who possess the required knowledge and skills. This means that both theoretical and practical expertise must be acquired.
In the lecture Animal Welfare and Laboratory Animal Science, the theoretical knowledge is taught, which is listed in Annex 1 Chapter 3 TierSchVersV.
In terms of content, the module is based on EU Directive 2010/63 for acquiring expertise in animal welfare (formerly FELASA Cat. B). Based on the background of the specific biology, anatomy and physiology of the animal species mouse, optionally also of the rat, which are recapitulated in the module in an application-oriented manner, the students* learn and practice exemplary essential animal experimental techniques with a focus on keeping and handling the animals, administration of substances, sampling of biological probes, anesthesia and analgesia through to surgical interventions and the painless and low-stress euthanasia of animals. In addition to the methodological and experimental principles, the module also focuses on acquiring in-depth knowledge of the german animal protection law and the TSchVersVO as well as the ability for an ethical consideration of animal experiments in the area of conflict between animal protection and medical-translational research.

Intended learning outcomes

Students acquire the expertise for the theoretical part for conducting animal experiments, which is certified by passing the exam. Raising awareness of ethical issues related to the relationship between humans and animals, intrinsic value of life, and arguments for and against the use of animals for scientific purposes.
The formal objective is the acquisition of animal welfare expertise based on the EU directive in consultation with the local authorities. The course enables you to handle laboratory animals in an animal welfare-friendly manner, conveys core competencies in animal experiments, taking into account the complexity of the entire organism, and methodological requirements for planning and conducting your own animal experiments. It teaches the legal animal welfare principles for applying for your own experimental projects. A special concern is the raising of awareness for the respect of the experimental model as a pain-sensitive living being while maintaining objective experimental principles.

Courses (type, number of weekly contact hours, language — if other than German)

V (2) + P (1)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (approx. 90 minutes)

Allocation of places

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Additional information

Equivalent to animal welfare qualification (GV-SOLAS (Society of Laboratory Animals) / FELASA category B).

Workload

90 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module appears in
Bachelor's degree (1 major) Biomedicine (2015) Master's degree (1 major) Experimental medicine (2015) Supplementary course Translational Medicine (2018) Bachelor's degree (1 major) Biomedicine (2018) Master's degree (1 major) Translational Medicine (2018) Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Biostatistics			03-TM-BSTAT-202-m01
Module coordinator		**Module offered by**	
Institute of Clinical Epidemiology and Biometry (ICE-B)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
2	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	May not be combined with 03-TM-BIOM.	

Contents

Working with the statistical software SPSS; preparation of data; descriptive statistics; common methods of statistical testing.

Intended learning outcomes

The students are able to prepare data tables, import, export, merge, transform and recode data. They can describe data by numerical measures and present them graphically. They are familiar with basic tests of significance.

Courses (type, number of weekly contact hours, language — if other than German)

V (0.5) + S (0.5)
Module taught in: German/English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

oral examination in groups of up to 4 candidates (approx. 15 to 20 minutes per candidate)
Language of assessment: German or English

Allocation of places

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Additional information

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Workload

60 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Selected Courses from Biology and Medicine 1			03-98-FSQ-MB1-202-m01
Module coordinator		**Module offered by**	
Dean of Studies Biomedizin (Biomedicine)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
2	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Prior approval from degree programme coordinator required.	

Contents

Courses offered by the Faculties of Biology or Medicine that contribute to further professional qualification.

Intended learning outcomes

The students acquire a broader range of knowledge that enables them to enhance their interdisciplinary thinking skills, serves for personal orientation and development of interests in the area of life sciences and improves their professional qualification.

Courses (type, number of weekly contact hours, language — if other than German)

V (2)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) Written examination (30 to 60 minutes) or
b) Log (5 to 10 pages) or
c) oral examination of one candidate each (15 to 30 minutes)

Allocation of places

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Additional information

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Workload

60 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Selected Courses from Biology and Medicine 2			03-98-FSQ-MB2-202-m01
Module coordinator		**Module offered by**	
Dean of Studies Biomedizin (Biomedicine)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
2	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Prior approval from degree programme coordinator required.	

Contents

Courses offered by the Faculties of Biology or Medicine that contribute to further professional qualification.

Intended learning outcomes

The students acquire a broader range of knowledge that enables them to enhance their interdisciplinary thinking skills, serves for personal orientation and development of interests in the area of life sciences and improves their professional qualification.

Courses (type, number of weekly contact hours, language — if other than German)

V (2)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) Written examination (30 to 60 minutes) or
b) Log (5 to 10 pages) or
c) oral examination of one candidate each (15 to 30 minutes)

Allocation of places

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Additional information

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Workload

60 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Selected Courses from Biology and Medicine 3			03-98-FSQ-MB3-202-m01
Module coordinator		**Module offered by**	
Dean of Studies Biomedizin (Biomedicine)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Prior approval from degree programme coordinator required.	

Contents

Courses offered by the Faculties of Biology or Medicine that contribute to further professional qualification.

Intended learning outcomes

The students acquire a broader range of knowledge that enables them to enhance their interdisciplinary thinking skills, serves for personal orientation and development of interests in the area of life sciences and improves their professional qualification.

Courses (type, number of weekly contact hours, language — if other than German)

V (3)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) Written examination (30 to 60 minutes) or
b) Log (5 to 10 pages) or
c) oral examination of one candidate each (15 to 30 minutes)

Allocation of places

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Additional information

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Workload

90 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Selected Courses from other Faculties with a Biomedical Focus 1			03-98-FSQ-AF1-202-m01

Module coordinator	Module offered by
Dean of Studies Biomedizin (Biomedicine)	Faculty of Biology

ECTS	Method of grading	Only after succ. compl. of module(s)
2	(not) successfully completed	--

Duration	Module level	Other prerequisites
1 semester	undergraduate	Prior approval from degree programme coordinator required.

Contents

Courses, in particular in the area of natural sciences, offered by other Faculties that contribute to further professional qualification.

Intended learning outcomes

The students acquire a broader range of knowledge that enables them to enhance their interdisciplinary thinking skills, opens up the opportunity to deepen personal interests and supports their professional qualification.

Courses (type, number of weekly contact hours, language — if other than German)

V (2)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) Written examination (30 to 60 minutes) or
b) Log (5 to 10 pages) or
c) oral examination of one candidate each (15 to 30 minutes)

Allocation of places

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Additional information

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Workload

60 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Selected Courses from other Faculties with a Biomedical Focus 2			03-98-FSQ-AF2-202-m01
Module coordinator		**Module offered by**	
Dean of Studies Biomedizin (Biomedicine)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Prior approval from degree programme coordinator required.	

Contents

Courses, in particular in the area of natural sciences, offered by other Faculties that contribute to further professional qualification.

Intended learning outcomes

The students acquire a broader range of knowledge that enables them to enhance their interdisciplinary thinking skills, opens up the opportunity to deepen personal interests and supports their professional qualification.

Courses (type, number of weekly contact hours, language — if other than German)

V (3)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) Written examination (30 to 60 minutes) or
b) Log (5 to 10 pages) or
c) oral examination of one candidate each (15 to 30 minutes)

Allocation of places

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Additional information

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Workload

90 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Supervising Tutorials 1			03-98-FSQ-TUT1-182-m01
Module coordinator		**Module offered by**	
Dean of Studies Biomedizin (Biomedicine)		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
2	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Prior approval from degree programme coordinator required.	

Contents

Students work as tutors. They support other students, in particular in the context of courses and study planning, and they participate as assistants in the organisation and carrying out of exercises and practical courses.

Intended learning outcomes

Tutors are able to communicate complex technical facts in a clear and structured way. They have the ability to explain methods and execution of experiments to other students. They gained experience in the supervision and motivation of groups, and they practiced applying conflict resolution strategies. Promotion of self-confidence in own knowledge and communication. From their own experience, they supervise students in various matters and assist with the organisation within the study programme.

Courses (type, number of weekly contact hours, language — if other than German)

T (2)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Log (2 to 3 pages)

Allocation of places

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Additional information

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Workload

60 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Supervising Tutorials 2			03-98-FSQ-TUT2-182-m01
Module coordinator		**Module offered by**	
Dean of Studies Biomedizin (Biomedicine)		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Prior approval from degree programme coordinator required.	

Contents

Students work as tutors. They support other students, in particular in the context of courses and study planning, and they participate as assistants in the organisation and carrying out of exercises and practical courses.

Intended learning outcomes

Tutors are able to communicate complex technical facts in a clear and structured way. They have the ability to explain methods and execution of experiments to other students. They gained experience in the supervision and motivation of groups, and they practiced applying conflict resolution strategies. Promotion of self-confidence in own knowledge and communication. From their own experience, they supervise students in various matters and assist with the organisation within the study programme.

Courses (type, number of weekly contact hours, language — if other than German)

T (3)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Log (2 to 3 pages)

Allocation of places

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Additional information

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Workload

90 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Supervising Tutorials 3			03-98-FSQ-TUT3-182-m01
Module coordinator		**Module offered by**	
Dean of Studies Biomedizin (Biomedicine)		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Prior approval from degree programme coordinator required.	

Contents

Students work as tutors. They support other students, in particular in the context of courses and study planning, and they participate as assistants in the organisation and carrying out of exercises and practical courses.

Intended learning outcomes

Tutors are able to communicate complex technical facts in a clear and structured way. They have the ability to explain methods and execution of experiments to other students. They gained experience in the supervision and motivation of groups, and they practiced applying conflict resolution strategies. Promotion of self-confidence in own knowledge and communication. From their own experience, they supervise students in various matters and assist with the organisation within the study programme.

Courses (type, number of weekly contact hours, language — if other than German)

T (3)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Log (2 to 3 pages)

Allocation of places

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Additional information

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Workload

90 h

Teaching cycle

--

Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Journal Club 1			03-98-FSQ-LIT1-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Experimental Biomedicine		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
2	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Students present selected primary publications written in English and discuss their contents, methods and results in the group.

Intended learning outcomes

Students learn the structure of scientific articles and the appropriate approaches to answer a specific question. They possess the ability to read scientific articles critically, to extract relevant information for a presentation, to evaluate results and face them to critical discussion in the group regarding their interpretation. They develop the ability to place the contents of an article in the broader context of a specific subject area, also in relation to clinically relevant aspects.

Courses (type, number of weekly contact hours, language — if other than German)

S (1)
Module taught in: German/English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

presentation (approx. 15 minutes)
Language of assessment: German or English

Allocation of places

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Additional information

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Workload

60 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Journal Club 2			03-98-FSQ-LIT2-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Experimental Biomedicine		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
2	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
2 semester	undergraduate	--	

Contents

Students present selected primary publications written in English and discuss their contents, methods and results in the group.

Intended learning outcomes

Students learn the structure of scientific articles and the appropriate approaches to answer a specific question. They possess the ability to read scientific articles critically, to extract relevant information for a presentation, to evaluate results and face them to critical discussion in the group regarding their interpretation. They develop the ability to place the contents of an article in the broader context of a specific subject area, also in relation to clinically relevant aspects.

Courses (type, number of weekly contact hours, language — if other than German)

S (1)
Module taught in: German/English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

presentation (approx. 15 minutes)
Language of assessment: German or English

Allocation of places

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Additional information

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Workload

60 h

Teaching cycle

--

Referred to in LPO I (examination regulations for teaching-degree programmes)

--

Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Excursion 1			03-98-FSQ-EXK1-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biomedizin (Biomedicine)		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
1	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Prior approval from degree programme coordinator required.	

Contents

Field trip to selected institutions or companies that are relevant to the life sciences to deepen knowledge of the studies.

Intended learning outcomes

Students make contact with industry and other potential employers and get the opportunity for personal contacts and networking. Knowing new subject-related occupational fields and their perspectives and comparing them with one's own interests. Students broaden their scientific knowledge to deepen their qualifications. This special qualification option supports individual topics.

Courses (type, number of weekly contact hours, language — if other than German)

E (1)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

report (1 to 2 pages)

Allocation of places

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Additional information

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Workload

30 h

Teaching cycle

--

Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Excursion 2			03-98-FSQ-EXK2-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biomedizin (Biomedicine)		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
1	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Prior approval from degree programme coordinator required.	

Contents

Field trip to selected institutions or companies that are relevant to the life sciences to deepen knowledge of the studies.

Intended learning outcomes

Students make contact with industry and other potential employers and get the opportunity for personal contacts and networking. Knowing new subject-related occupational fields and their perspectives and comparing them with one's own interests. Students broaden their scientific knowledge to deepen their qualifications. This special qualification option supports individual topics.

Courses (type, number of weekly contact hours, language — if other than German)

E (1)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

report (1 to 2 pages)

Allocation of places

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Additional information

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Workload

30 h

Teaching cycle

--

Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Orientational Laboratory course			03-98-FSQ-F2PR-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biomedizin (Biomedicine)		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
2	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Students spend 2 weeks at an internal or external laboratory and can actively participate in in a project.

Intended learning outcomes

The students gain first insights into daily laboratory work, the structuring of work processes, the application of methods to answer a question and they acquire new practical skills. They experience ranking and communication within a team.

Courses (type, number of weekly contact hours, language — if other than German)

P (2)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Log (5 to 10 pages)

Allocation of places

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Additional information

Additional information on module duration: 2 weeks

Workload

60 h

Teaching cycle

--

Referred to in LPO I (examination regulations for teaching-degree programmes)

--

Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Laboratory Course in Biomedical Research 1			03-98-FSQ-F2PR1-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biomedizin (Biomedicine)		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	May be combined neither with 03-98-FSQ-F2PR2 nor with 03-98-FSQ-F2PR3.	

Contents

Students spend 2 weeks working on a small, well-defined scientific lab project at an internal or external lab.

Intended learning outcomes

Students reinforce previously acquired lab skills, acquire new lab techniques and learn how to apply theoretical knowledge under supervision in the lab. Students gain expertise in the analysis and documentation presentation of raw data. The students are able to link their work to the relevant literature and to derive first questions for their own work from it.

Courses (type, number of weekly contact hours, language — if other than German)

P (4)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Log (5 to 10 pages)

Allocation of places

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Additional information

Additional information on module duration: 2 weeks, full time.

Workload

90 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Laboratory Course in Biomedical Research 2			03-98-FSQ-F2PR2-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biomedizin (Biomedicine)		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
4	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	May be combined neither with 03-98-FSQ-F2PR1 nor with 03-98-FSQ-F2PR3.	

Contents

Students spend 3 weeks working on a small, well-defined scientific lab project at an internal or external lab.

Intended learning outcomes

Students reinforce previously acquired lab skills, acquire new lab techniques and learn how to apply theoretical knowledge under supervision in the lab. Students gain expertise in the analysis and documentation presentation of raw data. The students are able to link their work to the relevant literature and to derive first questions for their own work from it.

Courses (type, number of weekly contact hours, language — if other than German)

P (6)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Log (10 to 15 pages) and talk (approx. 10 minutes)

Allocation of places

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Additional information

Additional information on module duration: 3 weeks, full time.

Workload

120 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Laboratory Course in Biomedical Research 3			03-98-FSQ-F2PR3-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biomedizin (Biomedicine)		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	May be combined neither with 03-98-FSQ-F2PR1 nor with 03-98-FSQ-F2PR2.	

Contents

Students spend 4 weeks working on a small, well-defined scientific lab project at an internal or external lab.

Intended learning outcomes

Students reinforce previously acquired lab skills, acquire new lab techniques and learn how to apply theoretical knowledge under supervision in the lab. Students gain expertise in the analysis and documentation presentation of raw data. The students are able to link their work to the relevant literature and to derive first questions for their own work from it.

Courses (type, number of weekly contact hours, language — if other than German)

P (8)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Log (10 to 15 pages) and talk (approx. 10 minutes)

Allocation of places

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Additional information

Additional information on module duration: 4 weeks, full time.

Workload

150 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Intercultural Competence			03-98-FSQ-IKK-202-m01
Module coordinator		**Module offered by**	
Dean of Studies Biomedizin (Biomedicine)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

The students expand their competences and foundations of intercultural communication and culture-related communication problems, pathways to successful collaboration, international team building and conflict management.

Intended learning outcomes

Students sensitize to intercultural issues and are able to reflect on their own culture. They have developed a sensitivity towards cultural differences and potential points of friction.

Courses (type, number of weekly contact hours, language — if other than German)

S (3)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) presentation (15 to 30 minutes) or
b) term paper (10 to 15 pages) or
c) oral examination (approx. 30 minutes)

Allocation of places

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Additional information

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Workload

90 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Personal Skills in Science			03-98-FSQ-NETW1-202-m01

Module coordinator	Module offered by
Dean of Studies Biomedizin (Biomedicine)	Faculty of Biology

ECTS	Method of grading	Only after succ. compl. of module(s)
2	(not) successfully completed	--

Duration	Module level	Other prerequisites
1 semester	undergraduate	--

Contents

Identifying and formulating questions that are scientifically approachable, describing and explaining scientific phenomena and interpreting scientific evidence are key competences that are required, in addition to purely technical skills, to answer or solve scientific problems. Based on concrete examples, students interactively practise the respective skills in small groups and present their results.

Intended learning outcomes

In addition to training their professional and methodological skills, the students develop and improve their individual personal and interactive skills. With this they deepen methodological competences and extend analysis competences. Students are also able to argue professionally, to express different opinions, e.g. on ethical aspects, and are sensitised to scientific misconduct.

Courses (type, number of weekly contact hours, language — if other than German)

V (2)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) log (approx. 5 pages) or
b) talk (approx. 10 minutes) or
c) oral examination in groups of up to 3 candidates (approx. 10 minutes per candidate)

Allocation of places

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Additional information

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Workload

60 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Personal Skills in Science			03-98-FSQ-NETW2-202-m01
Module coordinator		**Module offered by**	
Dean of Studies Biomedizin (Biomedicine)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Identifying and formulating questions that are scientifically approachable, describing and explaining scientific phenomena and interpreting scientific evidence are key competences that are required, in addition to purely technical skills, to answer or solve scientific problems. Based on concrete examples, students interactively practise the respective skills in small groups and present their results.

Intended learning outcomes

In addition to training their professional and methodological skills, the students develop and improve their individual personal and interactive skills. With this they deepen methodological competences and extend analysis competences. Students are also able to argue professionally, to express different opinions, e.g. on ethical aspects, and are sensitised to scientific misconduct.

Courses (type, number of weekly contact hours, language — if other than German)

V (3)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) log (approx. 10 pages) or
b) talk (approx. 10 minutes) or
c) oral examination in groups of up to 3 candidates (approx. 10 minutes per candidate)

Allocation of places

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Additional information

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Workload

90 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2020)

Thesis

(15 ECTS credits)

Module title			Abbreviation
Bachelor Thesis Biomedicine			03-98-TH-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biomedizin (Biomedicine)		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
12	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Conduct a defined and focused research project under supervision within a limited time frame and its presentation in a written thesis.

Intended learning outcomes

Students demonstrate their ability to solve a defined problem within a chosen area within a given time frame by applying scientific research methods. Under supervision, independent work and integration of own ideas are encouraged. In the written thesis they show that they are able to formulate a defined aim, explain the applied methodology in a reproducible manner, evaluate and present results according to scientific standards, subject them to a critical evaluation, place them in the context of the known literature and derive further work from them.

Courses (type, number of weekly contact hours, language — if other than German)

No courses assigned to module
Module taught in: German/English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written thesis (20 to 40 pages)
Language of assessment: German or English

Allocation of places

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Additional information

Time to complete: 10 weeks.

Workload

360 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)

Module title			Abbreviation
Colloquium			03-98-TK-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biomedizin (Biomedicine)		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Students present the results of their thesis projects in a scientific colloquium.

Intended learning outcomes

Students are able to present and defend the data from their thesis project in front of a professional audience.

Courses (type, number of weekly contact hours, language — if other than German)

K (0)
Module taught in: German/English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

oral examination of one candidate each (20 to 30 minutes)
Language of assessment: German or English

Allocation of places

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Additional information

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Workload

90 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

Bachelor's degree (1 major) Biomedicine (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)