Julius-Maximilians-
UNIVERSITÄT
WÜRZBURG

Subdivided 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: 2018
Responsible: Faculty of Medicine
Responsible: Faculty of Biology

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)):

07-Mar-2018 (2018-6)

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.

The subject is divided into

Abbreviation	Module title	ECTS credits	Method of grading	page
Compulsory Courses (110 ECTS credits)				
Modules Biology (20 ECTS credits)				
07-ZEORG-152-m01	Basics of Biology - From Cells to Organisms	7	NUM	64
07-PHYORG-152-m01	Physiology of Organisms	5	NUM	63
07-GENEU-152-m01	Genetics and Neurobiology	4	NUM	62
07-3A3EBIOTI-152-m01	Developmental Biology of Animals	4	NUM	59
Modules Chemistry (12 ECTS credits)				
08-CH-BM-152-m01	General Chemistry for Students of Biomedicine	8	NUM	68
08-OC-BM-152-m01	Advanced Organic Chemistry for Students of Biomedicine	4	NUM	69
Modules Physics (10 ECTS credits)				
11-EFNF-152-m01	Introduction to Physics for Students of other Disciplines	7	NUM	71
11-PFNF-152-m01	Laboratory Course Physics for Students of other Disciplines	3	B/NB	77
Modules Mathematics/Statistics (5 ECTS credits)				
10-M-STAB-152-m01	Statistics for Students of natural sciences and biomedicine	5	NUM	70
Modules Biochemistry and Molecular Biology (20 ECTS credits)				
03-98-BCH-152-m01	Basic Biochemistry and Molecular Biology	10	NUM	12
03-98-BCHF-152-m01	Advanced Biochemistry and Molecular Biology	10	NUM	13
Modules Anatomy and Pathology (15 ECTS credits)				
03-98-ANA-1-152-m01	Anatomy and Cell Biology	5	NUM	8
03-98-ANA-2-152-m01	Histology	5	NUM	9
03-98-APA-152-m01	General Pathology	5	NUM	10
Modules Physiology (10 ECTS credits)				
03-98-PHY1-152-m01	Human Physiology 1	5	NUM	44
03-98-PHY2-152-m01	Human Physiology 2	5	NUM	45
Modules Pharmacology and Toxicology (5 ECTS credits)				
03-98-APT-152-m01	Pharmacology and Toxicology	5	NUM	11
Modules Microbiology, Virology and Immunology (5 ECTS credits)				
03-98-MVI-152-m01	General Microbiology, Virology, Immunology	5	NUM	40
Modules Advanced Lab Course (8 ECTS credits)				
03-98-IPP-152-m01	Project Work in a Research Laboratory	8	B/NB	39
Compulsory Electives (35 ECTS credits)				
Compulsory Electives Cell Biology, Genetics and Bioinformatics (10 ECTS credits)				
03-98-PZB1-172-m01	Cell Biology - Focus signal transduction and stem cells	5	NUM	52
03-98-PZB2-172-m01	Cell Biology - Focus cytoskeleton and microscopic imaging	5	NUM	53
03-98-PZB3-172-m01	Cell Biology - Focus immunology	5	NUM	54
03-98-PGH-152-m01	Introduction to Genetics and Human Genetics	5	NUM	42
07-BI-152-m01	Introduction to Bioinformatics	5	NUM	61
Compulsory Electives Microbiology, Virology and Immunology (10 ECTS credits)				
03-98-PIV-152-m01	Practical Course in Immunology and Virology	5	NUM	46
03-98-PMIB-152-m01	Practical Course in Molecular Infection Biology	5	NUM	48
03-98-PMoMi-182-m01	Practical Course in Molecular Microbiology	5	NUM	49
03-98-ImmK-182-m01	Concepts in Immunology	5	NUM	38

Advanced Compulsory Electives (15 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").				
03-98-PPT-152-m01	Practical Course in Pharmacology and Toxicology	5	NUM	51
03-98-PPC-152-m01	Pathophysiology and Pathobiochemistry	5	NUM	50
03-98-RVZ-152-m01	Introduction to Methods in Experimental Biomedicine	5	NUM	55
03-98-PF2-152-m01	Practical Course in a Research Laboratory	5	NUM	41
08-BGV-171-m01	Imaging methods in life-sciences	5	NUM	66
03-98-PGN-182-m01	Introduction to Neurobiology	5	NUM	43
03-98-PZB1-172-m01	Cell Biology - Focus signal transduction and stem cells	5	NUM	52
03-98-PZB2-172-m01	Cell Biology - Focus cytoskeleton and microscopic imaging	5	NUM	53
03-98-PZB3-172-m01	Cell Biology - Focus immunology	5	NUM	54
03-98-PGH-152-m01	Introduction to Genetics and Human Genetics	5	NUM	42
07-BI-152-m01	Introduction to Bioinformatics	5	NUM	61
03-98-PIV-152-m01	Practical Course in Immunology and Virology	5	NUM	46
03-98-PMIB-152-m01	Practical Course in Molecular Infection Biology	5	NUM	48
03-98-PMoMi-182-m01	Practical Course in Molecular Microbiology	5	NUM	49
03-98-ImmK-182-m01	Concepts in Immunology	5	NUM	38
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)				
03-98-FSQ-GEN-152-m01	Genetic Engineering and Biosafety	1	B/NB	22
03-98-FSQ-VTK1-152-m01	Laboratory Animal Sciences 1	2	B/NB	35
03-98-FSQ-VTK2-152-m01	Laboratory Animal Sciences 2	3	B/NB	36
03-TM-BSTAT-181-m01	Biostatistics	2	B/NB	58
03-98-FSQ-MB1-182-m01	Selected Courses from Biology and Medicine 1	2	B/NB	27
03-98-FSQ-MB2-182-m01	Selected Courses from Biology and Medicine 2	2	B/NB	28
03-98-FSQ-MB3-182-m01	Selected Courses from Biology and Medicine 3	3	B/NB	29
03-98-FSQ-AF1-182-m01	Selected Courses from other Faculties with a Biomedical Focus 1	2	B/NB	14
03-98-FSQ-AF2-182-m01	Selected Courses from other Faculties with a Biomedical Focus 2	3	B/NB	15
03-98-FSQ-TUT1-182-m01	Supervising Tutorials 1	2	B/NB	32
03-98-FSQ-TUT2-182-m01	Supervising Tutorials 2	3	B/NB	33
03-98-FSQ-TUT3-182-m01	Supervising Tutorials 3	3	B/NB	34
03-98-FSQ-LIT1-152-m01	Journal Club 1	2	B/NB	25

03-98-FSQ-LIT2-152-m01	Journal Club 2	2	B/NB	26
03-98-FSQ-EXK1-152-m01	Excursion 1	1	B/NB	16
03-98-FSQ-EXK2-152-m01	Excursion 2	1	B/NB	17
03-98-FSQ-F2PR-152-m01	Orientational Laboratory course	2	B/NB	19
03-98-FSQ-F2PR1-152-m01	Laboratory Course in Biomedical Research 1	3	B/NB	18
03-98-FSQ-F2PR2-152-m01	Laboratory Course in Biomedical Research 2	4	B/NB	20
03-98-FSQ-F2PR3-152-m01	Laboratory Course in Biomedical Research 3	5	B/NB	21
03-98-FSQ-IKK-152-m01	Intercultural Competence	3	B/NB	24
03-98-FSQ-NETW1-152-m01	Personal Skills in Science	2	B/NB	30
03-98-FSQ-NETW2-152-m01	Personal Skills in Science	3	B/NB	31
Thesis (15 ECTS credits)				
03-98-TH-152-m01	Bachelor Thesis Biomedicine	12	NUM	56
03-98-TK-152-m01	Colloquium	3	NUM	57

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 can be chosen to earn a 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 can be chosen to earn a 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 can be chosen to earn a 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)

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 can be chosen to earn a 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)

Module title			Abbreviation
Basic Biochemistry and Molecular Biology			03-98-BCH-152-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**	
2 semester	undergraduate	Admission prerequisite to assessment: presentations.	

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 can be chosen to earn a bonus)

written examination (45 to 90 minutes)
creditable for bonus

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

Module title			Abbreviation
Advanced Biochemistry and Molecular Biology			03-98-BCHF-152-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: presentations.	

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/or English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (60 to 90 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).
creditable for bonus

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

Module title			Abbreviation
Selected Courses from other Faculties with a Biomedical Focus 1			03-98-FSQ-AF1-182-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

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 can be chosen to earn a 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) or
d) oral examination in groups of up to 3 candidates (approx. 20 minutes per candidate) or
e) presentation (20 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 (2018)

Module title			Abbreviation
Selected Courses from other Faculties with a Biomedical Focus 2			03-98-FSQ-AF2-182-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

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 can be chosen to earn a 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) or
d) oral examination in groups of up to 3 candidates (approx. 20 minutes per candidate) or
e) presentation (20 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 (2018)

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 can be chosen to earn a bonus)

report (1 to 2 pages)

Allocation of places

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Additional information

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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 (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 can be chosen to earn a bonus)

report (1 to 2 pages)

Allocation of places

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Additional information

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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 (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 can be chosen to earn a 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)

--

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 can be chosen to earn a bonus)

Log (5 to 10 pages)

Allocation of places

--

Additional information

Additional information on module duration: 2 weeks

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 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 can be chosen to earn a 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 can be chosen to earn a 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
Genetic Engineering and Biosafety	03-98-FSQ-GEN-152-m01

Module coordinator	Module offered by
Institute of Molecular Infection Biology and Graduate School of Life Sciences	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	--

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 can be chosen to earn a 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) or
d) oral examination in groups of up to 3 candidates (approx. 20 minutes per candidate) or
e) presentation (20 to 30 minutes)
Students will be informed about the type and length of assessment at the beginning of the course.

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 (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)

Module title			Abbreviation
Intercultural Competence			03-98-FSQ-IKK-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	--	

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 can be chosen to earn a 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) or
d) oral examination in groups of up to 3 candidates (approx. 20 minutes per candidate) or
e) presentation (20 to 30 minutes)
Students will be informed about the type and length of assessment at the beginning of the course.

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)

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 can be chosen to earn a 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 can be chosen to earn a 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)

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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
Selected Courses from Biology and Medicine 1			03-98-FSQ-MB1-182-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

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 can be chosen to earn a 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) or
d) oral examination in groups of up to 3 candidates (approx. 20 minutes per candidate) or
e) presentation (20 to 30 minutes)

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)

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Module appears in

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

Module title			Abbreviation
Selected Courses from Biology and Medicine 2			03-98-FSQ-MB2-182-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

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 can be chosen to earn a 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) or
d) oral examination in groups of up to 3 candidates (approx. 20 minutes per candidate) or
e) presentation (20 to 30 minutes)

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)

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Module appears in

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

Module title			Abbreviation
Selected Courses from Biology and Medicine 3			03-98-FSQ-MB3-182-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

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 can be chosen to earn a 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) or
d) oral examination in groups of up to 3 candidates (approx. 20 minutes per candidate) or
e) presentation (20 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 (2018)

Module title			Abbreviation
Personal Skills in Science			03-98-FSQ-NETW1-152-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

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 can be chosen to earn a 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) or
d) oral examination in groups of up to 3 candidates (approx. 20 minutes per candidate) or
e) presentation (20 to 30 minutes)
Students will be informed about the type and length of assessment at the beginning of the course.

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)

Module title			Abbreviation
Personal Skills in Science			03-98-FSQ-NETW2-152-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	--	

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 can be chosen to earn a 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) or
d) oral examination in groups of up to 3 candidates (approx. 20 minutes per candidate) or
e) presentation (20 to 30 minutes)
Students will be informed about the type and length of assessment at the beginning of the course.

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

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 can be chosen to earn a bonus)

Log (2 to 3 pages)

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 (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 can be chosen to earn a bonus)

Log (2 to 3 pages)

Allocation of places

--

Additional information

--

Workload

90 h

Teaching cycle

--

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

--

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 can be chosen to earn a bonus)

Log (2 to 3 pages)

Allocation of places

--

Additional information

--

Workload

90 h

Teaching cycle

--

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

--

Module appears in

Bachelor's degree (1 major) Biomedicine (2018)
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 can be chosen to earn a bonus)

written examination (approx. 90 minutes)

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
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 can be chosen to earn a 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
Concepts in Immunology			03-98-ImmK-182-m01
Module coordinator		**Module offered by**	
Institute of Virology and Immunobiology		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	03-98-MVI	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Becoming familiar with and discussion of current immunological concepts and research findings as well as their importance in basic and clinical research and clinical practice.

Intended learning outcomes

Students who have successfully completed this module will have a basic understanding of current concepts related to the structure and function of the immune system. Furthermore, students learn to discuss current experimental approaches and their results in the context of the scientific field through oral presentation of current scientific literature.

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

V (1) + S (2.5)
Module taught in: German/English
Course type: alternatively S instead of Ü

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

a) written examination (45 to 90 minutes) or
b) log (10 to 20 pages)
Language of assessment: German and/or English

Allocation of places

Biomedizin (Biomedicine) Bachelor's: 16 places.

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 (2018)

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 can be chosen to earn a 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)

Module title			Abbreviation
General Microbiology, Virology, Immunology			03-98-MVI-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Microbiology, holder of the Chair of Virology, holder of the Chair of Immunology		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 virology, microbiology, immunology - part virology: virus families and selected topics; part microbiology: bacteriology, mycology and parasitology; part immunology: tasks, principles and components of the immune system, evolution.

Intended learning outcomes

The students will be introduced to scientific questions in virology, microbiology and immunology. They will acquire fundamental knowledge in these three subjects.

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

V (1.5) + V (1.5) + V (1.5)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (approx. 90 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)

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 can be chosen to earn a 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
Introduction to Genetics and Human Genetics	03-98-PGH-152-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 can be chosen to earn a bonus)

written examination (30 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 (2015)
Bachelor's degree (1 major) Biomedicine (2018)

Module title			Abbreviation
Introduction to Neurobiology			03-98-PGN-182-m01
Module coordinator		**Module offered by**	
holder of the Chair of Clinical Neurobiology		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

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)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

written examination (90 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 (2018)

Module title			Abbreviation
Human Physiology 1			03-98-PHY1-152-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 (2)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a 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 (2015)
Bachelor's degree (1 major) Biomedicine (2018)

Module title			Abbreviation
Human Physiology 2			03-98-PHY2-152-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 (2)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a 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 (2015)
Bachelor's degree (1 major) Biomedicine (2018)

Module title			Abbreviation
Practical Course in Immunology and Virology			03-98-PIV-152-m01
Module coordinator		**Module offered by**	
Institute of Virology and Immunobiology		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 can be chosen to earn a 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) or
d) oral examination in groups of up to 3 candidates (approx. 20 minutes per candidate) or
e) presentation (20 to 30 minutes)
Students will be informed about the type and length of assessment at the beginning of the course.

Allocation of places

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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)

Module title			Abbreviation
Practical Course in Molecular Infection Biology			03-98-PMIB-152-m01
Module coordinator		**Module offered by**	
Institute of Molecular Infection 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

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 can be chosen to earn a 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) or
d) oral examination in groups of up to 3 candidates (approx. 20 minutes per candidate) or
e) presentation (20 to 30 minutes)
Students will be informed about the type and length of assessment at the beginning of the course.

Allocation of places

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Additional information

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

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

Module title			Abbreviation
Practical Course in Molecular Microbiology			03-98-PMoMi-182-m01
Module coordinator		**Module offered by**	
Institute of Molecular Infection 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

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 can be chosen to earn a 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) or
d) oral examination in groups of up to 3 candidates (approx. 20 minutes per candidate) or
e) presentation (20 to 30 minutes)
Language of assessment: German or English

Allocation of places

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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 (2018)

Module title			Abbreviation
Pathophysiology and Pathobiochemistry			03-98-PPC-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)**	
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 can be chosen to earn a 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) or
d) oral examination in groups of up to 3 candidates (approx. 20 minutes per candidate) or
e) presentation (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 or English

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)

Module title			Abbreviation
Practical Course in Pharmacology and Toxicology			03-98-PPT-152-m01
Module coordinator		**Module offered by**	
holder of the Chair 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

Fundamental pharmacological and toxicological techniques: membrane preparation, radioligand binding, pharmacology of the heart, cell culture and transfection, assessment of DNA damage by micro adducts, comet-assay etc.

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.

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 can be chosen to earn a bonus)

presentation of practical work (approx. 30 minutes) and application (preparing a scientific publication; approx. 1.5 hours), weighted 7:3

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)

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 can be chosen to earn a 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-PZB2-172-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 can be chosen to earn a 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: 8 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)

Module title			Abbreviation
Cell Biology - Focus immunology			03-98-PZB3-172-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 can be chosen to earn a 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: 12 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)

Module title			Abbreviation
Introduction to Methods in Experimental Biomedicine			03-98-RVZ-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)**	
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

Students have developed the ability to approach, analyse and interpret experimental data obtained with the help of monoclonal antibodies, in particular in the field of platelet physiology. They also have developed skills in experimental design, bench work, data analysis and the interpretation of scientific literature as well as the presentation of scientific results in English.

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 can be chosen to earn a 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) or
d) oral examination in groups of up to 3 candidates (approx. 20 minutes per candidate) or
e) presentation (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 or English

Allocation of places

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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)

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 can be chosen to earn a 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 can be chosen to earn a 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)

Module title			Abbreviation
Biostatistics			03-TM-BSTAT-181-m01
Module coordinator		**Module offered by**	
Institute of Clinical Epidemiology and Biometry (ICE-B)		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	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 or English

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

oral examination (approx. 30 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

Supplementary course Translational Medicine (2018)
Bachelor's degree (1 major) Biomedicine (2018)
Master's degree (1 major) Translational Medicine (2018)

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 can be chosen to earn a 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)

§ 61 I Nr. 5

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)

Module title			Abbreviation
Introduction to Bioinformatics			07-BI-152-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 can be chosen to earn a 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) or
d) oral examination in groups of up to 3 candidates (approx. 20 minutes per candidate) or
e) presentation (20 to 30 minutes)
Students will be informed about the type and length of assessment at the beginning of the course.

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)

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 can be chosen to earn a 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
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 can be chosen to earn a 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
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 can be chosen to earn a 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
Imaging methods in life-sciences	08-BGV-171-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 can be chosen to earn a bonus)

a) written examination (approx. 45 to 90 minutes) or
b) log (10 to 20 pages) or
c) oral examination of one candidate each (20 to 30 minutes) or
d) oral examination in groups of up to 3 candidates (approx. 15 to 20 minutes per candidate) or
e) presentation (20 to 30 minutes) or
f) practical examination (on average approx. 2 hours; time to complete will vary according to subject area but will not exceed a maximum of 4 hours)
Language of assessment: German and/or English
Assessment offered: Once a year, winter semester

Allocation of places

Biochemie (Biochemistry) Bachelor's: 25 places.

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) Biochemistry (2015) Bachelor's degree (1 major) Biomedicine (2015) Bachelor's degree (1 major) Biochemistry (2017) Bachelor's degree (1 major) Biomedicine (2018)

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 can be chosen to earn a 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 can be chosen to earn a 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)

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 can be chosen to earn a bonus)

written examination (90 to 120 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 (2015)
Bachelor's degree (1 major) Biomedicine (2018)
Bachelor's degree (1 major) Biomedicine (2020)
exchange program Mathematics (2023)

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 can be chosen to earn a 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
Qualification goal: scientific competences

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)

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 can be chosen to earn a 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
Qualification goal: scientific competences

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) 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)
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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)
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Bachelor's degree (1 major) Computer Science (2015)
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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)
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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)
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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)
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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)
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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)