Julius-Maximilians-
UNIVERSITÄT
WÜRZBURG

Subdivided Module Catalogue

for the Subject

Biochemistry

as a Master's with 1 major

with the degree "Master of Science"

(120 ECTS credits)

Examination regulations version: 2015
Responsible: Faculty of Medicine
Responsible: Faculty of Chemistry and Pharmacy

Learning Outcomes

German contents and learning outcome available but not translated yet.

Wissenschaftliche Befähigung

- Nach erfolgreichem Abschluss des Master-Studiums verfügen die AbsolventInnen über vertiefte Kenntnisse des wissenschaftlichen Arbeitens in der Forschung und Anwendung der Biochemie und ihrer inhaltlichen Grundlagen. Sie haben sich dabei auf einen der beiden angebotenen Schwerpunkte „Molekulare Lebenswissenschaften" oder „Molekulare Onkologie" spezialisiert, indem sie die diesen Schwerpunkten zugeordneten Module (Vorlesungen, Kurspraktika und Seminare) absolviert haben. Sie besitzen neben den vertieften fachspezifischen Kenntnissen auch Abstraktionsvermögen, analytisches Denken, Problemlösungskompetenz und die Fähigkeit, komplexe Zusammenhänge zu strukturieren. Die Grundlagen hierfür werden in den o.g. Veranstaltungen vermittelt und mittels Klausuren, Kolloquien, Protokollen oder Referaten überprüft.
- Die AbsolventInnen besitzen nach Erlangung des Masters die Kompetenzen, ein gegebenes wissenschaftliches Problem planvoll und nach den Regeln der guten wissenschaftlichen Praxis zu bearbeiten, darunter unter anderem sich unter Zuhilfenahme der Kenntnisse in der Literaturrecherche in neue Aufgabengebiete einzuarbeiten und Veröffentlichungen in internationalen Journalen im Kontext der wissenschaftlichen Literatur kritisch einzuordnen und zu bewerten. Sie sind in der Lage, das erworbene Wissen selbständig anzuwenden und auf neue Aufgabenstellungen zu übertragen, Experimente auf Grundlage biochemischer Methoden strukturiert und in vorgegebenem zeitlichem Rahmen durchzuführen und zu dokumentieren, die ermittelten Daten kritisch zu analysieren und die Ergebnisse schriftlich zusammenzufassen. Außerdem können Sie ihre selbständig durchgeführten Projekte vor einem Publikum darstellen und die gewählte Methodik in fachlicher Diskussion verteidigen. Vermittelt werden diese Fähigkeiten im Rahmen von Labor-Praktika im dritten Fachsemester und der Master-Arbeit. Die Überprüfung der Zielerreichung findet durch die Erstellung von Praktikums-Protokollen und nicht zuletzt der Master-Thesis und deren Präsentation mit anschließender Diskussion im Abschluss-Kolloquium statt.

Befähigung zur Aufnahme einer Erwerbstätigkeit

- Die AbsolventInnen besitzen Abstraktionsvermögen, Problemlösungskompetenz und die Fähigkeit, komplexe Zusammenhänge in analytischer Herangehensweise zu strukturieren. Die Grundlagen hierfür werden in Vorlesungen, Seminaren und Kurspraktika der verschiedenen Disziplinen der Lebenswissenschaften vermittelt und mittels Klausuren, Kolloquien, Referaten oder Protokollen überprüft.
- Die AbsolventInnen sind auch in der Lage, ihr theoretisches Wissen in der Praxis anzuwenden und können mit den erlernten wissenschaftlichen Methoden auch unbekannte Probleme aus unterschiedlichen fachlichen Perspektiven analysieren und bearbeiten. Sie sind es dabei gewohnt, in einem Team aus KommilitonInnen, KollegInnen und/oder WissenschaftlerInnen konstruktiv und zielorientiert zusammenzuarbeiten. Der Praxisbezug ist durch einen hohen Anteil an Laborpraktika sowohl als Kurspraktika, individuelle Forschungspraktika und nicht zuletzt der Master-Arbeit gegeben, deren erfolgreiche Absolvierung durch Protokolle bzw. die Master-Thesis überprüft wird.
- Als interdisziplinärer und internationaler Studiengang, dessen Veranstaltungen in der Regel in englischer Sprache unterrichtet werden, fördert der Master-Studiengang Biochemie von Beginn an fachübergreifendes Lernen, Denken und Verstehen, sowie durch tägliche Übung auch die Kommunikations-Kompetenz in Englisch, der international anerkannten Wissenschafts-Sprache. Diese auf dem breiten Fundament der im Bachelor Biochemie erworbenen Kompetenzen aufbauende, vertiefte und spezialisierte Wissensbasis und Methodenkompetenz, sowie die ein-

geübte Teamfähigkeit und Weltoffenheit können die AbsolventInnen gewinnbringend in ihrer Berufspraxis einsetzen.

Persönlichkeitsentwicklung

- Die AbsolventInnen sind bereit und in der Lage, Verantwortung für ihr Handeln und für andere zu übernehmen. Sie verfügen über die kommunikativen Fähigkeiten, komplexe Sachverhalte und Standpunkte im Team zu entwickeln, zielgruppengerecht darzustellen und reflektiert gegenüber abweichenden Positionen zu verteidigen und weiterzuentwickeln. Diese Fähigkeiten zur Übernahme von Verantwortung, Diskussionsbereitschaft und Teamfähigkeit sowie Eigenverantwortung und Selbständigkeit erlernen und beweisen die Studierenden in erster Linie durch die Anfertigung von Praktikums-Protokollen und der Abschlussarbeit, deren Zielerreichung mit der Bewertung der Arbeiten überprüft wird.
- Das Curriculum des Masters Biochemie ermöglicht den Studierenden, ein Erasmus-Studium oder ein Laborpraktikum an einer ausländischen Universität durchzuführen. Der Prüfungsausschuss Biochemie wacht dabei über die Einhaltung der wissenschaftlichen Standards und ein adäquates Projekt. Die Studierenden können dadurch wertvolle persönliche Erfahrungen erwerben und ihren sprachlichen und kulturellen Horizont öffnen.
- Erst die durch Einübung und Ermutigung erlangte Fähigkeit zur Kritik und Reflexion (inklusive Selbstreflexion und Selbstkritik) ermöglicht eigenständiges Denken und selbstbestimmtes Handeln, das vor sich selbst und anderen begründet ist und rational kommuniziert werden kann. Diese Kritikfähigkeit und Fähigkeit zur Selbstreflexion erlernen die Studierenden mittels Feedbacks durch Lehrende und Studierende zu ihrem Vortrag in Seminaren, die vermehrt im Masterstudium stattfinden.

Gesellschaftliches Engagement

- AbsolventInnen des Masters Biochemie werden durch ihr Studium in die Lage versetzt, zu gesellschaftlich kritisch und kontrovers diskutierten Fragen, die Themen der molekularen Biowissenschaften betreffen, wissenschaftlich fundiert begründete Position zu beziehen. Sie sind sich darüber hinaus bei ihrer Arbeit immer ihrer ethischen Verantwortung gegenüber der Gesellschaft und der Umwelt bewusst und reflektieren ihr Handeln diesbezüglich stets kritisch. Vor allem im Rahmen der individuellen, mehrwöchigen bis ganzsemestrigen Laborpraktika und der Abschlussarbeit setzen sich die Studierenden mit aktuellen Forschungsthemen selbständig und kritisch auseinander. Hierzu gehört auch die Reflexion möglicher Folgen der eigenen Arbeit für Umwelt und Gesellschaft und der daraus resultierenden ethischen Fragestellungen. Die Zielerreichung wird durch das erfolgreiche Bestehen der Praktikums-Protokolle und der Abschlussarbeit überprüft.

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)):

13-Jul-2015 (2015-20) except for mandatory elective 03-MBC-TG-161 added at two places in Fast Track procedure at a later time

15-Mar-2017 (2017-14)

13-Dec-2023 (2023-110)

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 Electives 1 (50 ECTS credits) Students must select one focus; all modules of the selected focus must be taken.				
Focus - Molecular Life-Sciences (50 ECTS credits)				
Subfield - Structural and Functional Biochemistry (30 ECTS credits)				
08-MBC-MSP-152-m01	Mass-Spectrometry and Proteomics	5	NUM	85
08-MBC-GEG-152-m01	Genomes and epigenetics	10	NUM	69
08-MBC-LIT1-152-m01	Literature seminar 1	5	NUM	73
08-MBC-MK-152-m01	Macromolecular Crystallography	10	NUM	83
08-MBC-PQK-152-m01	Protein quality control	10	NUM	87
08-MBC-RNP-152-m01	Structure and function of RNA-protein complexes	10	NUM	89
08-MCM3-152-m01	Drug design	5	NUM	92
08-MBC-RNAW-152-m01	RNA worlds	5	NUM	88
08-MBC-LCP-152-m01	Life cycle of proteins	5	NUM	72
08-MBC-GST-152-m01	Genome stability	5	NUM	70
07-MS2BT-152-m01	Biophysics and Molecular Biotechnology	10	NUM	36
08-MBC-FPV-232-m01	Functional Proteomics: Deciphering Protein Worlds	5	NUM	52
08-MBC-FPP-232-m01	The Functional Proteome: Organization, Modulation and Dynamics	10	NUM	51
Subfield - Molecular and Medical Cell Biology (20 ECTS credits)				
03-MS2HG-152-m01	Human genetics	10	NUM	21
03-98-PBG-152-m01	Bacterial genetics - Infectiology	5	NUM	19
03-MS2IM1-152-m01	Immunology 1	10	NUM	22
03-MS2IM2-152-m01	Immunology 2	10	NUM	23
03-MS2V1-152-m01	Virology 1	10	NUM	24
03-MS2V2-152-m01	Virology 2	10	NUM	25
07-MS2M1-152-m01	Microbiology 1	10	NUM	38
07-MS2M2-152-m01	Microbiology 2	10	NUM	39
08-MBC-LIT2-152-m01	Literature seminar 2	5	NUM	74
08-PH-KAC-152-m01	Clinical-analytical Chemistry	5	NUM	94
08-PH-KACP-152-m01	Practical course of clinical-analytical Chemistry	5	B/NB	95
03-98-MVKN-152-m01	Clinical Neurobiology	5	NUM	11
03-98-MVKB-152-m01	Cardiovascular Biology	5	NUM	9
03-98-MVMO-152-m01	Molecular Oncology	5	NUM	13
03-98-MVSZ-152-m01	Stem Cell Biology	5	NUM	15
03-98-MVTF-152-m01	Tissue Engineering / Functional Materials	5	NUM	17
03-ONC-CLIN-152-m01	Clinical Oncology	5	NUM	26
03-MBC-TG-161-m01	Tumor Genetics	5	NUM	20
Focus - Molecular Oncology (50 ECTS credits)				
Subfield - Tumor Biology (35 ECTS credits)				
03-ONC-LAB1-152-m01	Lab rotation Oncology	5	NUM	27
03-ONC-SEM1-152-m01	Oncology Seminar 1	5	NUM	28

03-ONC-SEM2-152-m01	Oncology Seminar 2	5	NUM	29
03-ONC-TUMP-152-m01	Experimental Tumor Biology	10	NUM	30
03-98-MVMO-152-m01	Molecular Oncology	5	NUM	13
03-ONC-CLIN-152-m01	Clinical Oncology	5	NUM	26
Subfield - Structural and Functional Biochemistry (15 ECTS credits)				
08-MBC-MSP-152-m01	Mass-Spectrometry and Proteomics	5	NUM	85
08-MBC-GEG-152-m01	Genomes and epigenetics	10	NUM	69
08-MBC-LIT1-152-m01	Literature seminar 1	5	NUM	73
08-MBC-MK-152-m01	Macromolecular Crystallography	10	NUM	83
08-MBC-PQK-152-m01	Protein quality control	10	NUM	87
08-MBC-RNP-152-m01	Structure and function of RNA-protein complexes	10	NUM	89
08-MCM3-152-m01	Drug design	5	NUM	92
08-MBC-RNAW-152-m01	RNA worlds	5	NUM	88
08-MBC-LCP-152-m01	Life cycle of proteins	5	NUM	72
08-MBC-GST-152-m01	Genome stability	5	NUM	70
07-MS2BT-152-m01	Biophysics and Molecular Biotechnology	10	NUM	36
08-MBC-FPV-232-m01	Functional Proteomics: Deciphering Protein Worlds	5	NUM	52
08-MBC-FPP-232-m01	The Functional Proteome: Organization, Modulation and Dynamics	10	NUM	51
Compulsory Electives 2 (40 ECTS credits) Students must select one focus; all modules of the selected focus must be taken.				
Focus Expert Key Qualifications (practice oriented) (40 ECTS credits)				
Subfield Research oriented Projects (30 ECTS credits)				
08-MBC-AWA2-152-m01	Assistance in practical courses 2	5	B/NB	48
08-MBC-LP1-152-m01	Practical lab course 1	15	B/NB	76
08-MBC-LP2-152-m01	Practical lab course 2	15	B/NB	77
08-MBC-LP3-152-m01	Practical lab course 3	10	B/NB	78
08-MBC-LP4-152-m01	Practical lab course 4	10	B/NB	79
08-MBC-LP5-152-m01	Practical lab course 5	5	B/NB	80
08-MBC-LP6-152-m01	Practical lab course 6	5	B/NB	81
08-MBC-WR2-152-m01	Scientific lecturing M2	5	B/NB	91
08-MBC-AP1-152-m01	Practical course - abroad 1	30	B/NB	45
08-MBC-AP2-152-m01	Practical course - abroad 2	15	B/NB	46
08-MBC-EP1-152-m01	Practical course - external 1	15	B/NB	49
08-MBC-EP2-152-m01	Practical course - external 2	15	B/NB	50
Subfield Completive Qualifications (10 ECTS credits)				
03-VTK-152-m01	Animal science and welfare	3	B/NB	31
08-ACM2-152-m01	Bioanorganic Chemistry	5	NUM	42
08-HKM1-152-m01	Organo- and Biocatalysis	5	NUM	43
08-MBC-AWA1-152-m01	Assistance in practical courses 1	5	B/NB	47
08-MBC-LIT3-152-m01	Literature seminar 3	5	NUM	75

08-MBC-WR1-152-m01	Scientific lecturing M1	5	B/NB	90
08-OCM-NAT-152-m01	Modern aspects of natural product Chemistry and Biological Chemistry	5	NUM	93
08-SCM3-152-m01	Bioorganic Chemistry	5	NUM	96
07-MS2BI-152-m01	Bioinformatics	10	NUM	34
07-MS3S-152-m01	Systems Biology	10	NUM	40
07-MLS1-152-m01	Methods in Life Sciences	10	NUM	32
Focus - Expert Key Qualifications (40 ECTS credits)				
Subfield Research oriented Projects (20 ECTS credits)				
08-MBC-AWA2-152-m01	Assistance in practical courses 2	5	B/NB	48
08-MBC-LP1-152-m01	Practical lab course 1	15	B/NB	76
08-MBC-LP2-152-m01	Practical lab course 2	15	B/NB	77
08-MBC-LP3-152-m01	Practical lab course 3	10	B/NB	78
08-MBC-LP4-152-m01	Practical lab course 4	10	B/NB	79
08-MBC-LP5-152-m01	Practical lab course 5	5	B/NB	80
08-MBC-LP6-152-m01	Practical lab course 6	5	B/NB	81
08-MBC-WR2-152-m01	Scientific lecturing M2	5	B/NB	91
08-MBC-AP1-152-m01	Practical course - abroad 1	30	B/NB	45
08-MBC-AP2-152-m01	Practical course - abroad 2	15	B/NB	46
08-MBC-EP1-152-m01	Practical course - external 1	15	B/NB	49
08-MBC-EP2-152-m01	Practical course - external 2	15	B/NB	50
Subfield Completive Qualifications (20 ECTS credits)				
03-MS2HG-152-m01	Human genetics	10	NUM	21
03-VTK-152-m01	Animal science and welfare	3	B/NB	31
08-ACM2-152-m01	Bioanorganic Chemistry	5	NUM	42
08-HKM1-152-m01	Organo- and Biocatalysis	5	NUM	43
08-MBC-AWA1-152-m01	Assistance in practical courses 1	5	B/NB	47
08-MBC-LIT3-152-m01	Literature seminar 3	5	NUM	75
08-MBC-WR1-152-m01	Scientific lecturing M1	5	B/NB	90
08-OCM-NAT-152-m01	Modern aspects of natural product Chemistry and Biological Chemistry	5	NUM	93
08-SCM3-152-m01	Bioorganic Chemistry	5	NUM	96
03-MBC-TG-161-m01	Tumor Genetics	5	NUM	20
07-MS2BI-152-m01	Bioinformatics	10	NUM	34
07-MS3S-152-m01	Systems Biology	10	NUM	40
07-MLS1-152-m01	Methods in Life Sciences	10	NUM	32
Focus - Expert Key Qualifications (project oriented) (40 ECTS credits)				
Subfield Project attendant Modules (30 ECTS credits)				
08-MBC-FTEX1-152-m01	Excursion 1	5	B/NB	53
08-MBC-FTEX2-152-m01	Excursion 2	5	B/NB	54
08-MBC-FTKP1-152-m01	Conference participation with poster presentation 1	5	B/NB	55

08-MBC-FTKP2-152-m01	Conference participation with poster presentation 2	5	B/NB	56
08-MBC-FTKV1-152-m01	Conference participation with lecture 1	10	B/NB	57
08-MBC-FTKV2-152-m01	Conference participation with lecture 2	10	B/NB	58
08-MBC-FT-PB1-152-m01	Assistance in practical courses 1	5	B/NB	59
08-MBC-FT-PB2-152-m01	Assistance in practical courses 2	5	B/NB	60
08-MBC-FT-SE1-152-m01	Seminar 1	5	B/NB	61
08-MBC-FT-SE2-152-m01	Seminar 2	5	B/NB	62
08-MBC-FT-SE3-152-m01	Seminar 3	5	B/NB	63
08-MBC-FTSV1-152-m01	Special lectures 1	5	B/NB	64
08-MBC-FTSV2-152-m01	Special lectures 2	5	B/NB	65
08-MBC-FTWS1-152-m01	Workshop 1	5	B/NB	66
08-MBC-FTWS2-152-m01	Workshop 2	5	B/NB	67
08-MBC-FTWS3-152-m01	Workshop 3	5	B/NB	68
Subfield Completive Qualifications (10 ECTS credits)				
03-VTK-152-m01	Animal science and welfare	3	B/NB	31
08-ACM2-152-m01	Bioanorganic Chemistry	5	NUM	42
08-HKM1-152-m01	Organo- and Biocatalysis	5	NUM	43
08-MBC-AWA1-152-m01	Assistance in practical courses 1	5	B/NB	47
08-MBC-LIT3-152-m01	Literature seminar 3	5	NUM	75
08-MBC-WR1-152-m01	Scientific lecturing M1	5	B/NB	90
08-OCM-NAT-152-m01	Modern aspects of natural product Chemistry and Biological Chemistry	5	NUM	93
08-SCM3-152-m01	Bioorganic Chemistry	5	NUM	96
07-MS2BI-152-m01	Bioinformatics	10	NUM	34
07-MS3S-152-m01	Systems Biology	10	NUM	40
07-MLS1-152-m01	Methods in Life Sciences	10	NUM	32
Thesis Area (30 ECTS credits)				
08-MBC-KOLL-152-m01	Final Colloquium	5	NUM	71
08-MBC-MA-152-m01	Master-Thesis	25	NUM	82

Module title			Abbreviation
Cardiovascular Biology			03-98-MVKB-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	graduate	--	

Contents

Becoming familiar with the basics of the cardiovascular system by means of a lecture series. The first section comprises the anatomical, physiological and biochemical basis. In the second section these fundamentals will be deepened based on relevant cardiovascular diseases of platelets, the vasculature and the heart. In the context of these disorders, current and future targets for adequate therapies will be discussed.

Intended learning outcomes

Students have developed the ability to understand the molecular and physiological basics relevant for cardiovascular biology, with the focus on developmental biology, platelets and coagulation. These will be exemplified by stroke, myocardial disorders, metabolic syndrome, vasculitides and genetic causes. After attending the lecture series, students will be able to understand, describe and assign pathological and pathophysiological changes affecting the cardiovascular system.

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

V (2)
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 (30 to 60 minutes) or
b) log (approx. 10 to 20 pages) or
c) oral examination of one candidate each (30 to 60 minutes) or
d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or
e) presentation (20 to 45 minutes)
Students will be informed about the method, length and scope of the assessment prior to the course.
Language of assessment: German or English
Assessment offered: Once a year, winter semester

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biomedicine (2015)
Master's degree (1 major) Experimental medicine (2015)
Master's degree (1 major) Biochemistry (2017)
Supplementary course Translational Medicine (2018)

Master's degree (1 major) Biomedicine (2018)
Master's degree (1 major) Translational Medicine (2018)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Clinical Neurobiology			03-98-MVKN-152-m01
Module coordinator		**Module offered by**	
Managing Director of the Institute 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	graduate	--	

Contents

Students will get a theoretical introduction and amplification of topics in clinical neurobiology. The following topics will be discussed: introduction to neurons and glia, ion channels and membrane potential, ion channelopathies, synapses, transmitter release, NMJ, myasthenia gravis, cerebellum, basal ganglia, ataxia and Morbus Parkinson, somatosensory system, touch, pain, schizophrenia and autism spectrum disorders, disorders of cognition, muscle and muscle diseases, anatomy and function of the motor system, spinal reflexes, motoneuron diseases, hippocampus, learning and memory, anterograde amnesia, visual agnosia, cortex and the limbic system, emotions, disorders of conscious and unconscious mental processes, attention, smell and taste and hearing , sleep, EEG, epilepsy, vision and diseases of the visual system. The accompanied literature seminars are based on fundamental and current literature on lecture-relevant topics to discuss experimental and methodological approaches and with this promoting translational thinking. Using student presentations of current research results, the earned knowledge in neurobiology is recessed.

Intended learning outcomes

Students who successfully completed this module are able to remind and understand the current theoretical concepts in neurobiology. Furthermore, students are able to classify clinical aspects of neurobiology with the focus to disease mechanisms at molecular, cellular, and physiological levels. Based on current experimental data evaluation, students are able to critical read and evaluate current publications in neurobiology as well as extract relevant information from recent publications.

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

V (2) + S (2)
Module taught in: 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 (30 to 60 minutes) or
b) oral examination of one candidate each (30 to 60 minutes) or
c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or
d) presentation (20 to 45 minutes)
Students will be informed about the method, length and scope of the assessment prior to the course.
Language of assessment: English

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

--

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

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Module appears in

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biomedicine (2015)
Master's degree (1 major) Experimental medicine (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biomedicine (2018)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Molecular Oncology			03-98-MVMO-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Biochemistry and Molecular Biology			
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Molecular mechanisms of tumourigenesis; experimental dissection of tumours; metabolic reprogramming in cancer; visualising in vivo tumour progression and response to therapy; targeting Myc for tumour therapy; Wnt signalling and colorectal cancer; cell cycle and tumour suppressor genes; protein turnover in normal and cancer cells; molecular mechanisms of melanoma development; tumour immunology; stem cells and epigenetics; signal transduction and personalised cancer therapy; molecular pathology; infections and tumour development.

Intended learning outcomes

Students understand the current topics and challenges in tumour research and the methods used to address such challenges.

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

V (2)
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 (30 to 60 minutes) or
b) log (approx. 10 to 20 pages) or
c) oral examination of one candidate each (30 to 60 minutes) or
d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or
e) presentation (20 to 45 minutes)
Students will be informed about the method, length and scope of the assessment prior to the course.
Language of assessment: German or English
Assessment offered: Once a year, winter semester

Allocation of places

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Additional information

--

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biomedicine (2015)
Master's degree (1 major) Experimental medicine (2015)
Master's degree (1 major) Biochemistry (2017)
Supplementary course Translational Medicine (2018)
Master's degree (1 major) Biomedicine (2018)
Master's degree (1 major) Translational Medicine (2018)

Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Stem Cell Biology			03-98-MVSZ-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Developmental Biochemistry		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

In this module, selected current problems from the fields of stem cell biology, cellular differentiation and regenerative medicine are used to provide basic knowledge as well as analytical approaches. The current state of research is considered on the basis of the historical context. Selected examples are used to learn about topic-specific contexts. Special emphasis is placed on the methodology used to study and characterize stem cells at the molecular level in vivo and in vitro. Bioethical and legal frameworks are discussed in the course of the lecture.

Intended learning outcomes

Necessary basic knowledge to work on, analyze and critically interpret questions from stem cell biology, cellular differentiation and regenerative medicine on the basis of current literature. A basic methodological competence for independent scientific work in the field of stem cell biology. Development of an ethical awareness in relation to the application of stem cells in biomedicine.

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

V (2)
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 (30 to 60 minutes) or
b) log (approx. 10 to 20 pages) or
c) oral examination of one candidate each (30 to 60 minutes) or
d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or
e) presentation (20 to 45 minutes)
Students will be informed about the method, length and scope of the assessment prior to the course.
Language of assessment: German or English
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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biomedicine (2015)
Master's degree (1 major) Experimental medicine (2015)
Master's degree (1 major) Biochemistry (2017)
Supplementary course Translational Medicine (2018)

Master's degree (1 major) Biomedicine (2018)
Master's degree (1 major) Translational Medicine (2018)
Master's degree (1 major) Biochemistry (2019)

Module title	Abbreviation
Tissue Engineering / Functional Materials	03-98-MVTF-152-m01

Module coordinator	Module offered by
holder of the Chair of Tissue Engineering and Regenerative 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	graduate	--

Contents

Cell culture technology, basics of tissue engineering, test systems as an alternative to animal experiments skin, intestine, lung, trachea, blood-brain barrier, tumors and other diseases. The development of cell-based transplants is discussed, as well as the regulatory basis for the approval of these and of medical devices and drugs. In detail, these are REACH (Registration, Evaluation, Restriction and Authorization of Chemicals), the Medical Devices and Drugs Act, GLP (Good Laboratory Practice), GMP (Good Manufacturing Practice) and GCP (Good Clinical Practice).

Intended learning outcomes

The student has expertise in tissue engineering, regenerative medicine, bioprocess engineering, test systems and basic relationships in the field of cell biology, metabolism, differentiation, adhesion to surfaces and mechanobiology. The student has methodological competence in quality management. The contents taught in the course lead to a deeper understanding of these competence fields and enable the application, which allows an independent assessment by analyzing publications or questions. For this purpose, the student should be able to understand a scientific publication in this field, to acquire additional background knowledge independently and, after analyzing the experimental results, to evaluate and discuss them critically.

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

V (2)
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 (30 to 60 minutes) or
b) log (approx. 10 to 20 pages) or
c) oral examination of one candidate each (30 to 60 minutes) or
d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or
e) presentation (20 to 45 minutes)
Students will be informed about the method, length and scope of the assessment prior to the course.
Language of assessment: German or English
Assessment offered: Once a year, winter semester

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biomedicine (2015)
Master's degree (1 major) Experimental medicine (2015)
Master's degree (1 major) Biochemistry (2017)
Supplementary course Translational Medicine (2018)
Master's degree (1 major) Biomedicine (2018)
Master's degree (1 major) Translational Medicine (2018)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Bacterial genetics - Infectiology			03-98-PBG-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

Foundations and analytical approaches of bacterial genetics are taught based on selected questions from molecular microbiology. Genetic processes are analysed with the help of examples of gene transfer. Molecular genetic and functional biochemical pathways are presented using examples from microbiology.

Intended learning outcomes

Students have developed the ability to approach, analyse and interpret general problems in bacterial genetics based on individually assigned tasks, using techniques of modern molecular biology, microbiology and genetics. They also have developed skills in experimental design, bench work, data analysis and the presentation of scientific results both orally and in writing.

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

V (1) + S (1) + 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 (approx. 45 to 90 minutes) or
b) log (20 to 30 pages) or
c) oral examination of one candidate each (20 to 30 minutes) or
d) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate) or
e) presentation (20 to 40 minutes)
Language of assessment: German and/or English

Allocation of places

Biochemie (Biochemistry), Master's: 4 places. Places will be allocated according to the number of subject semesters. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Tumor Genetics			03-MBC-TG-161-m01
Module coordinator		**Module offered by**	
holder of the Professorship Human Genetics at Institute for Human Genetics		Institute of Human Genetics	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Basics on human genetics (inheritance patterns, mutation types, etc.), hereditary cancer (breast & ovarian cancer, HNPCC, FAP, etc.), cancer syndromes, tumor cytogenetics, animal models in cancer genetics, genetic techniques (NGS, genome engineering, etc.)

Intended learning outcomes

The students acquired broad knowledge in the field of tumor genetics. Exemplify pathomechanisms in hereditary cancer. Name and illustrate genetic methods. Apply the acquired knowledge to scientific questions in the field of tumor genetics. Independent preparation and presentation of scientific articles. Acquire the ability to critically discuss latest developments in tumor genetics.

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

V (1) + S (1)
Module taught in: 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 (approx. 45 to 90 minutes) or
b) log (20 to 30 pages) or
c) oral examination of one candidate each (20 to 30 minutes) or
d) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate) or
e) presentation (20 to 40 minutes)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biomedicine (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biomedicine (2018)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Human genetics			03-MS2HG-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of of Human Genetics		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
2 semester	graduate	--	

Contents

This module will discuss current topics in human genetics.

Intended learning outcomes

Students have developed the ability to understand relevant questions in human genetics and to discuss these in detail.

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

V (2) + S (2)
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)

a) written examination (approx. 45 to 90 minutes) or
b) oral examination of one candidate each (20 to 30 minutes) or
c) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate)
Language of assessment: German and/or English

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Immunology 1			03-MS2IM1-152-m01
Module coordinator		**Module offered by**	
holder of the Professorship of Immunogenetics		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Familiarity with the fundamentals of molecular and cellular immunology that allow a deeper understanding of immune-mediated defence mechanisms. This incorporates common literature readings, presentations and tests on selected immunology book chapters and recent original literature in English language.

Intended learning outcomes

Students will gain a knowledge of fundamental concepts and methods in molecular and cellular immunology and will be able to present and discuss these.

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

V (1) + S (2)
Module taught in: 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 (approx. 45 to 90 minutes) or
b) log (20 to 30 pages) or
c) oral examination of one candidate each (20 to 30 minutes) or
d) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate) or
e) presentation (20 to 40 minutes)
Language of assessment: German and/or English
Assessment offered: Once a year, winter semester

Allocation of places

Biochemie (Biochemistry), Master's: 3 places. Places will be allocated according to the number of subject semesters. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)
exchange program Biosciences (2022)

Module title			Abbreviation
Immunology 2			03-MS2IM2-152-m01
Module coordinator		**Module offered by**	
holder of the Professorship of Immunogenetics		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Recent progress in molecular and cellular immunology. Deeper insights into selected immunology chapters , such as autoimmunity and immune modulation, development of the immune system, immunogenetics, evolution, infection immunology, and more. This incorporates common literature readings, presentations and tests on selected immunology book chapters and recent original literature.

Intended learning outcomes

Students are able to understand current problems in immunology and to discuss these in detail.

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

V (1) + S (2)
Module taught in: 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 (approx. 45 to 90 minutes) or
b) log (20 to 30 pages) or
c) oral examination of one candidate each (20 to 30 minutes) or
d) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate) or
e) presentation (20 to 40 minutes)
Language of assessment: German and/or English
Assessment offered: Once a year, summer semester

Allocation of places

Biochemie (Biochemistry), Master's: 3 places. Places will be allocated according to the number of subject semesters. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Virology 1			03-MS2V1-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Virology		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This module will discuss contemporary topics in virology.

Intended learning outcomes

Students are able to understand current problems in virology and to discuss these in detail.

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

V (1) + S (2)
Module taught in: 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 (approx. 45 to 90 minutes) or
b) oral examination of one candidate each (20 to 30 minutes) or
c) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate)
Language of assessment: German and/or English
Assessment offered: Once a year, winter semester

Allocation of places

Biochemie (Biochemistry), Master's: 3 places. Places will be allocated according to the number of subject semesters. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Virology 2			03-MS2V2-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Virology		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This module will discuss contemporary topics in virology.

Intended learning outcomes

Students are able to understand current problems in virology and to discuss these in detail.

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

V (1) + S (2)
Module taught in: 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 (approx. 45 to 90 minutes) or
b) oral examination of one candidate each (20 to 30 minutes) or
c) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate)
Language of assessment: German and/or English
Assessment offered: Once a year, summer semester

Allocation of places

Biochemie (Biochemistry), Master's: 3 places. Places will be allocated according to the number of subject semesters. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Clinical Oncology			03-ONC-CLIN-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Translational Oncology		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

In the module "Klinische Onkologie" ("Clinical Oncology"), various clinicians will present a current view of the disease "cancer". Topics will include an overview of different tumour entities (including cancers of the blood, skin, breast, lung, liver, colon, endocrine system), treatment modalities (e. g. immunotherapy, radiation-based therapy, personalised medicine), diagnostics, pathology, clinical studies.

Intended learning outcomes

An understanding of the biological commonalities and particularities of different tumour types. An understanding of the needs, possibilities and limitations of clinical approaches.

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

V (2)
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)

a) written examination (30 to 60 minutes) or
c) oral examination of one candidate each (30 to 60 minutes) or
d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)
Students will be informed about the method, length and scope of the assessment prior to the course.
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biomedicine (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biomedicine (2018)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Lab rotation Oncology			03-ONC-LAB1-152-m01
Module coordinator		**Module offered by**	
lecturers Medicine		Faculty of Chemistry and Pharmacy	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Under the guidance of experienced scientists, students will work on an ongoing project in cancer research in a research laboratory.

Intended learning outcomes

Hands-on experience with experimental cancer research.

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

P (6)
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)

a) Log (20 to 30 pages) or
b) presentation (20 to 40 minutes)
Language of assessment: German and/or English

Allocation of places

Biochemie (Biochemistry), Master's: 18 places. Places will be allocated according to the number of subject semesters. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Oncology Seminar 1			03-ONC-SEM1-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Biochemistry and Molecular Biology			
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

In the module "Seminare in Onkologie" ("Oncology Seminar 1"), selected original publications in cancer research are read and critically discussed. Participants are strongly advised to concurrently attend the lecture "Molecular Oncology" (03-ONC-MOLO).

Intended learning outcomes

Critical reading and understanding of primary literature in molecular biology and cancer research.

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

S (1)
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)

a) written examination (approx. 45 to 90 minutes) or
b) presentation (20 to 40 minutes)
Language of assessment: German and/or English

Allocation of places

Biochemie (Biochemistry), Master's: 18 places. Places will be allocated according to the number of subject semesters. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Oncology Seminar 2			03-ONC-SEM2-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Translational Oncology		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

In the module "Seminare in Onkologie 2" ("Oncology Seminar 2"), selected original publications in cancer research are read and critically discussed. Participants are strongly advised to concurrently attend the lecture "Clinical Oncology" (03-ONC-CLIN).

Intended learning outcomes

Critical reading and understanding of primary literature in molecular biology and cancer research.

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

S (1)
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)

a) written examination (approx. 45 to 90 minutes) or
b) presentation (20 to 40 minutes)
Language of assessment: German and/or English

Allocation of places

Biochemie (Biochemistry), Master's: 18 places. Places will be allocated according to the number of subject semesters. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Experimental Tumor Biology			03-ONC-TUMP-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Biochemistry and Molecular Biology			
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

In the practical course "Tumorbiologie-Praktikum" ("Experimental Tumour Biology"), students learn about various model systems (tissue culture and animal models) and experimental approaches in cancer research (e. g. flow cytometry, tissue staining & microscopy, quantitative expression analysis, metabolic analyses). Prior (or concurrent) attendance of the lecture "Molekulare Onkologie" ("Molecular Oncology") and the course "Seminare in Onkologie" ("Seminars in Oncology") 1 or 2 is required.

Intended learning outcomes

Knowledge of selected tumour models and techniques for experimental tumour research. Ability to read and understand relevant primary literature.

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

P (8)
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)

a) Log (20 to 30 pages) or
b) presentation (20 to 40 minutes)
Language of assessment: German and/or English

Allocation of places

Biochemie (Biochemistry), Master's: 18 places. Places will be allocated according to the number of subject semesters. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Animal science and welfare			03-VTK-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)**	
3	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Regular attendance of practical course (as specified at the beginning of the course).	

Contents

Theoretical and practical basic knowledge of animal welfare legislation, animal welfare ethics and laboratory animal science.

Intended learning outcomes

Students have the expertise to carry out or participate in animal experiments according to the guidelines of FELASA (Cat. B).

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)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Methods in Life Sciences			07-MLS1-152-m01
Module coordinator		**Module offered by**	
degree programme coordinator Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Versioned molecular techniques, lipid research methods, microscopic methods, immunohistochemistry, mouse models and gene-knockout approaches, protein and molecular biology techniques, PCR, advanced protein biochemistry, methods in bioinformatics and computational biology.

Intended learning outcomes

Students are able to review and expand their knowledge of standard molecular techniques and are able to choose methods and techniques to design experiments in a specific research area.

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

V (3)
Module taught in: 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 (30 to 60 minutes, including multiple choice questions) or
c) oral examination of one candidate each (30 to 60 minutes) or
d) oral examination in groups of up to 3 candidates (30 to 60 minutes)
Students will be informed about the method, length and scope of the assessment prior to the course.
Language of assessment: English

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biology (2015)
Master's degree (1 major) FOKUS Life Sciences (2015)
Master's degree (1 major) Biosciences (2016)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biochemistry (2019)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Master's degree (1 major) Biosciences (2021)

Module title			Abbreviation
Bioinformatics			07-MS2BI-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)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Advances and current results of bioinformatics are explained and discussed, this includes results from genome and sequence analysis, protein domains and protein families, large-scale data analysis (e. g. net generation sequences, proteomics data), analysis of different functional RNAs (e. g. miRNAs, lncRNAs).

Intended learning outcomes

Understand recent results in bioinformatics. Discuss their implications. Have an advanced (Master) level knowledge of typical technologies and research questions in bioinformatics.

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

V (2) + S (1)
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)

a) written examination (30 to 60 minutes, including multiple choice questions) or
c) oral examination of one candidate each (30 to 60 minutes) or
d) oral examination in groups of up to 3 candidates (30 to 60 minutes)
Language of assessment: German and/or English

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biology (2015)
Master's degree (1 major) Mathematics (2016)
Master's degree (1 major) Computational Mathematics (2016)
Master's degree (1 major) Biosciences (2016)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Computational Mathematics (2019)
Master's degree (1 major) Mathematics (2019)

Master's degree (1 major) Biochemistry (2019)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Computational Mathematics (2022)
Master's degree (1 major) Mathematics (2022)
exchange program Biosciences (2022)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Computer Science (2023)
Master's degree (1 major) Biosciences (2024)
Master's degree (1 major) Computational Mathematics (2024)
Master's degree (1 major) Mathematics (2024)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Master's degree (1 major) Computer Science (2025)

Module title			Abbreviation
Biophysics and Molecular Biotechnology			07-MS2BT-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Biotechnology and Biophysics		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This lecture provides a broad overview of biophysical techniques and their applications. The first part of the lecture discusses fundamental aspects of thermodynamics, kinetics and molecular interactions. The course then moves on to discuss biophysical methods that facilitate the investigation of individual cells down to the level of single molecules. Focus is on electromanipulation and dielectric spectroscopy of cells, biomembranes, electrophysiology, ion channels, protein folding, single-molecule fluorescence methods and high-resolution as well as dynamic microscopy.

Intended learning outcomes

Students will have acquired a knowledge of fundamental biophysical methods and their applications that will enable them to independently review relevant literature. In addition, they will have become acquainted with - or, where necessary, will be able to independently acquaint themselves with - biophysical mechanisms.

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

V (2) + S (1)
Module taught in: 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 (30 to 60 minutes, including multiple choice questions) or
c) oral examination of one candidate each (30 to 60 minutes) or
d) oral examination in groups of up to 3 candidates (30 to 60 minutes)
Students will be informed about the method, length and scope of the assessment prior to the course.
Language of assessment: German and/or English

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biology (2015)
Master's degree (1 major) FOKUS Life Sciences (2015)
Master's degree (1 major) Biosciences (2016)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biochemistry (2017)

Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biochemistry (2019)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Master's degree (1 major) Biosciences (2021)
exchange program Biosciences (2022)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Master's degree (1 major) FOKUS Life Sciences (2025)

Module title			Abbreviation
Microbiology 1			07-MS2M1-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Microbiology		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Fundamentals of molecular microbiology and infection biology, mechanisms of adherence and invasion, bacterial pathogenicity factors, regulation of virulence, mechanisms of host defence and pathogen interference, current methods in infection biology.

Intended learning outcomes

The students are able to understand fundamental theories of molecular microbiology and infection biology, emergence of infectious diseases.

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) oral examination of one candidate each (20 to 30 minutes) or
c) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate)
Language of assessment: German and/or English

Allocation of places

Biochemie (Biochemistry), Master's: 15 places. Places will be allocated according to the number of subject semesters. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)

Module title			Abbreviation
Microbiology 2			07-MS2M2-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Microbiology		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Fundamental principles of the mode of action of microbial pathogenicity factors will be presented using selected prokaryotic and eukaryotic pathogens as model organisms. In addition, current research methods in infection biology will be presented.

Intended learning outcomes

Students have gained fundamental knowledge in infection biology and pathogenicity research and the mechanisms behind infectious diseases.

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) oral examination of one candidate each (20 to 30 minutes) or
c) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate)
Language of assessment: German and/or English

Allocation of places

Biochemie (Biochemistry), Master's: 15 places. Places will be allocated according to the number of subject semesters. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)

Module title			Abbreviation
Systems Biology			07-MS3S-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)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Advances and current results of computational systems biology are explained and discussed, this includes results from functional genomics, dynamics of the transcriptome, of metabolism and metabolic networks as well as regulatory networks.

Intended learning outcomes

Understand recent results in systems biology. Discuss their implications. Have an advanced (Master) level knowledge of typical technologies and research questions of systems biology.

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

V (2) + S (1)
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)

a) written examination (30 to 60 minutes, including multiple choice questions) or
c) oral examination of one candidate each (30 to 60 minutes) or
d) oral examination in groups of up to 3 candidates (30 to 60 minutes)
Language of assessment: German and/or English

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biology (2015)
Master's degree (1 major) Mathematics (2016)
Master's degree (1 major) Computational Mathematics (2016)
Master's degree (1 major) Biosciences (2016)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Computational Mathematics (2019)
Master's degree (1 major) Mathematics (2019)

Master's degree (1 major) Biochemistry (2019)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Computational Mathematics (2022)
Master's degree (1 major) Mathematics (2022)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)
Master's degree (1 major) Computational Mathematics (2024)
Master's degree (1 major) Mathematics (2024)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

Module title	Abbreviation
Bioanorganic Chemistry	08-ACM2-152-m01

Module coordinator	Module offered by
lecturer of seminar "Anorganische Aspekte der Biochemie and Medizinischen Chemie" (Inorganic Aspects of Biochemistry and Medicinal Chemistry)	Institute of Inorganic Chemistry

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

This module introduces students to the fundamental principles of bioinorganic chemistry (BIC). It discusses the methods of BIC, structures and effects of metalliferous enzymes and applications of BIC in the fields of diagnosis and therapy.

Intended learning outcomes

Students are able to describe the principles of, and methods in, BIC. They can explain the structure and effects of metalliferous enzymes and describe applications of BIC in biochemistry and medicine.

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 (approx. 45 to 90 minutes) or
b) oral examination of one candidate each (20 to 30 minutes) or
c) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)

Module title			Abbreviation
Organo- and Biocatalysis			08-HKM1-152-m01
Module coordinator		**Module offered by**	
lecturer of the seminar "Organo- and Biokatalyse"		Faculty of Chemistry and Pharmacy	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This module provides students with deeper insights into topics in organic compounds and enzymes in catalytic processes. Organocatalysis: enantioselective implementation, principles, green chemistry, substance classes and application areas. Biocatalysis: effects of enzymes in view of different aspects, especially regarding organic synthesis.

Intended learning outcomes

Students are able to categorise organocatalysts and explain their effects and areas of application. They can describe the structure and applications of enzymes in organic synthesis. They are able to mechanistically describe and analyse the effects of enzymes.

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 (approx. 45 to 90 minutes) or
b) oral examination of one candidate each (20 to 30 minutes) or
c) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Chemistry (2016)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Chemistry (2018)
Master's degree (1 major) Biochemistry (2019)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Master's degree (1 major) Chemistry (2024)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

Module title			Abbreviation
Practical course - abroad 1			08-MBC-AP1-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
30	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
	graduate	--	

Contents

Practical course to be completed at universities abroad. Students may complete this course in the context of exchange programmes such as Erasmus etc. The contents of the course should correspond to the contents of a lab course offered in the context of the Master's programme in Biochemistry (120 ECTS credits); please consult with the competent coordinator in advance.

Intended learning outcomes

Students are familiar with procedures and processes used at universities in countries other than Germany. They have acquired subject-specific skills as well as language and interpersonal skills.

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

No courses assigned to module

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) log (approx. 20 pages) or
b) oral examination of one candidate each (approx. 20 minutes) or
c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or
d) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

Allocation of places

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Additional information

Duration of practical course: no less than 15 weeks.

Workload

900 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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Practical course - abroad 2			08-MBC-AP2-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Practical course to be completed at universities abroad. Students may complete this course in the context of exchange programmes such as Erasmus etc. The contents of the course should correspond to the contents of a lab course offered in the context of the Master's programme in Biochemistry (120 ECTS credits); please consult with the competent coordinator in advance.

Intended learning outcomes

Students are familiar with procedures and processes used at universities in countries other than Germany. They have acquired subject-specific skills as well as language and interpersonal skills.

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

No courses assigned to module

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) log (approx. 20 pages) or
b) oral examination of one candidate each (approx. 20 minutes) or
c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or
d) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

Allocation of places

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Additional information

Duration of practical course: no less than 8 weeks.

Workload

450 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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Assistance in practical courses 1			08-MBC-AWA1-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This module gives students the opportunity to guide students in earlier stages of their degrees through a practical experiment and learn how to organise scientific experiments, perform those experiments in a responsible manner and instruct others in the lab.

Intended learning outcomes

Students are able to guide students in earlier stages of their degrees through practical experiments and have learned how to instruct others in the lab.

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

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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)

Preparing and supervising student lab courses, wrap-up report (approx. 1 page)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Assistance in practical courses 2			08-MBC-AWA2-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This module gives students the opportunity to guide students in earlier stages of their degrees through a practical experiment and learn how to organise scientific experiments, perform those experiments in a responsible manner and instruct others in the lab.

Intended learning outcomes

Students are able to guide students in earlier stages of their degrees through practical experiments and have learned how to instruct others in the lab.

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

No courses assigned to module

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)

Preparing and supervising student lab courses: assessment to be successfully completed (type and length of assessment to be specified 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

--

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

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Module appears in

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Practical course - external 1			08-MBC-EP1-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Students complete a placement at a non-university research/diagnostic institution or a business. Contents to be determined by the host institution. The contents of the placement should correspond to the contents of a lab course offered in the context of the Master's programme in Biochemistry (180 ECTS credits); please consult with the competent coordinator in advance.

Intended learning outcomes

Students have become familiar with the structures of non-university research institutions and have developed skills which qualify them to work in their profession.

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

No courses assigned to module

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) log (approx. 20 pages) or
b) oral examination of one candidate each (approx. 20 minutes) or
c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or
d) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

Allocation of places

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Additional information

Duration of practical course: no less than 8 weeks.

Workload

450 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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Practical course - external 2			08-MBC-EP2-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Students complete a placement at a non-university research/diagnostic institution or a business. Contents to be determined by the host institution. The contents of the placement should correspond to the contents of a lab course offered in the context of the Master's programme in Biochemistry (180 ECTS credits); please consult with the competent coordinator in advance.

Intended learning outcomes

Students have become familiar with the structures of non-university research institutions and have developed skills which qualify them to work in their profession.

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

No courses assigned to module

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) log (approx. 20 pages) or
b) oral examination of one candidate each (approx. 20 minutes) or
c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or
d) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

Allocation of places

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Additional information

Duration of practical course: no less than 8 weeks.

Workload

450 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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
The Functional Proteome: Organization, Modulation and Dynamics			08-MBC-FPP-232-m01
Module coordinator		**Module offered by**	
holder of the Chair of Biochemistry II		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Students are highly recommended to complete module 08-MBC-FPV in the same semester.	

Contents

The module enables in-depth familiarization with current scientific methods and working techniques in the field of the study of the proteome as well as its organization, dynamics and modulation within the framework of practical experiments. The focus is on functional proteome analyses using biochemical and mass spectrometric methods including bioinformatic data analysis, visualization and evaluation of the obtained results.

Intended learning outcomes

After participating in the module, students will be proficient in the techniques used. They are able to explain and critically reflect on the experiments carried out and to present and discuss the results in a scientifically correct and appropriate manner.

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

Ü (6)
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)

a) log (approx. 10 to 20 pages) or
b) oral examination of one candidate each (30 to 60 minutes) or
c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or
d) presentation (20 to 45 minutes)
Students will be informed about the method, length and scope of the assessment prior to the course.
Language of assessment: German and/or English
Assessment offered: Once a year, winter semester

Allocation of places

12
Should the number of applications exceed the number of available places, places will be allocated according to the number of subject semesters. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

Additional information

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Workload

300 h

Teaching cycle

Teaching cycle: Once a year, winter semester

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

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Module appears in

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Functional Proteomics: Deciphering Protein Worlds			08-MBC-FPV-232-m01
Module coordinator		**Module offered by**	
holder of the Chair of Biochemistry II		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

The module provides in lecture and seminar the current state of the art in the field of functional proteomics as well as the theoretical basis of state-of-the-art methods of biomolecular mass spectrometry for the study of organization, dynamics and modulation of the proteome of eukaryotic cells. Emphasis is placed on quantitative strategies for the functional analysis of metabolic cell organelles, protein machines, and signaling and proteostasis networks.

Intended learning outcomes

After participation in the module events, the students are familiar with the contents taught. They can explain advantages and disadvantages of protein mass spectrometry methods, know a wide range of applications of the key methods and can use them to address new biological questions.

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

V (1) + S (1)
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)

a) written examination (30 to 60 minutes; also multiple choice) or
b) oral examination of one candidate each (30 to 60 minutes) or
c) oral examination in groups of up to 3 candidates (30 to 60 minutes) or
d) presentation (20 to 45 minutes)
Students will be informed about the method, length and scope of the assessment prior to the course.
Language of assessment: German and/or English
Assessment offered: Once a year, winter semester

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

Teaching cycle: Once a year, winter semester

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

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Module appears in

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Excursion 1			08-MBC-FTEX1-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with degree programme coordinator in advance.	

Contents

This module gives students the opportunity to participate in a field trip that is related to a topic that is relevant to the field they have selected as their focus. The module equips students with advanced knowledge in the natural sciences that is related to their field. The module may be offered by the University of Würzburg or by external institutions. Decision on credit transfer to be made by examination committee.

Intended learning outcomes

Students have developed an improved scientific knowledge and have thus enhanced their specific qualifications. They have acquired additional expertise that will help them specialise in their field.

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

E (1)
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)

a) written examination (approx. 45 to 90 minutes) or
b) log (20 to 30 pages) or
c) oral examination of one candidate each (20 to 30 minutes) or
d) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate) or
e) presentation (20 to 40 minutes)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Excursion 2			08-MBC-FTEX2-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with degree programme coordinator in advance.	

Contents

This module gives students the opportunity to participate in a field trip that is related to a topic that is relevant to the field they have selected as their focus. The module equips students with advanced knowledge in the natural sciences that is related to their field. The module may be offered by the University of Würzburg or by external institutions. Decision on credit transfer to be made by examination committee.

Intended learning outcomes

Students have developed an improved scientific knowledge and have thus enhanced their specific qualifications. They have acquired additional expertise that will help them specialise in their field.

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

E (1)
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)

a) written examination (approx. 45 to 90 minutes) or
b) log (20 to 30 pages) or
c) oral examination of one candidate each (20 to 30 minutes) or
d) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate) or
e) presentation (20 to 40 minutes)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Conference participation with poster presentation 1			08-MBC-FTKP1-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with degree programme coordinator in advance.	

Contents

This module gives students the opportunity to attend a national or international conference covering a topic that is relevant to the field they have selected as their focus and to present their own findings in poster format. Decision on credit transfer to be made by examination committee.

Intended learning outcomes

Students gain a wider overview of recent findings and developments in the field they have selected as their focus. They have the opportunity to meet other researchers working in the field. They have the opportunity to enhance their ability to reflect critically on their own work, present it to the scientific community and defend it against criticism.

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

R (0)
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)

Poster (1 page)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Conference participation with poster presentation 2			08-MBC-FTKP2-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with degree programme coordinator in advance.	

Contents

This module gives students the opportunity to attend a national or international conference covering a topic that is relevant to the field they have selected as their focus and to present their own findings in poster format. Decision on credit transfer to be made by examination committee.

Intended learning outcomes

Students gain a wider overview of recent findings and developments in the field they have selected as their focus. They have the opportunity to meet other researchers working in the field. They have the opportunity to enhance their ability to reflect critically on their own work, present it to the scientific community and defend it against criticism.

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

R (0)
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)

Poster (1 page)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Conference participation with lecture 1			08-MBC-FTKV1-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with degree programme coordinator in advance.	

Contents

This module gives students the opportunity to attend a national or international conference covering a topic that is relevant to the field they have selected as their focus and to deliver a presentation on their own findings. Decision on credit transfer to be made by examination committee.

Intended learning outcomes

Students gain a wider overview of recent findings and developments in the field they have selected as their focus. They have the opportunity to meet other researchers working in the field. They have the opportunity to enhance their ability to reflect critically on their own work, present it to the scientific community and defend it against criticism.

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

R (0)
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)

presentation (20 to 40 minutes)
Language of assessment: German and/or English

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Conference participation with lecture 2			08-MBC-FTKV2-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with degree programme coordinator in advance.	

Contents

This module gives students the opportunity to attend a national or international conference covering a topic that is relevant to the field they have selected as their focus and to deliver a presentation on their own findings. Decision on credit transfer to be made by examination committee.

Intended learning outcomes

Students gain a wider overview of recent findings and developments in the field they have selected as their focus. They have the opportunity to meet other researchers working in the field. They have the opportunity to enhance their ability to reflect critically on their own work, present it to the scientific community and defend it against criticism.

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

R (0)
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)

presentation (20 to 40 minutes)
Language of assessment: German and/or English

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Assistance in practical courses 1			08-MBC-FTPB1-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This module gives students the opportunity to guide students in earlier stages of their degrees through a practical experiment and learn how to organise scientific experiments, perform those experiments in a responsible manner and instruct others in the lab.

Intended learning outcomes

Students are able to guide students in earlier stages of their degrees through practical experiments and have learned how to instruct others in the lab.

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

T (0)
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)

Preparing and supervising student lab courses, wrap-up report (approx. 1 page)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Assistance in practical courses 2			08-MBC-FTPB2-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This module gives students the opportunity to guide students in earlier stages of their degrees through a practical experiment and learn how to organise scientific experiments, perform those experiments in a responsible manner and instruct others in the lab.

Intended learning outcomes

Students are able to guide students in earlier stages of their degrees through practical experiments and have learned how to instruct others in the lab.

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

T (0)
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)

Preparing and supervising student lab courses, wrap-up report (approx. 1 page)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Seminar 1			08-MBC-FTSE1-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with degree programme coordinator in advance.	

Contents

This module gives students the opportunity to attend a seminar exploring a topic that is relevant to the field they have selected as their focus. The module enhances and consolidates the students' knowledge of the field and topic covered. The seminar may be offered by the University of Würzburg or by external institutions. Decision on credit transfer to be made by examination committee.

Intended learning outcomes

Students gain a wider overview of recent findings and developments in the field they have selected as their focus. They have acquired additional expertise that will help them specialise in their field.

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

S (2)
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)

a) written examination (approx. 45 to 90 minutes) or
b) log (20 to 30 pages) or
c) oral examination of one candidate each (20 to 30 minutes) or
d) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate) or
e) presentation (20 to 40 minutes)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Seminar 2			08-MBC-FTSE2-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with degree programme coordinator in advance.	

Contents

This module gives students the opportunity to attend a seminar exploring a topic that is relevant to the field they have selected as their focus. The module enhances and consolidates the students' knowledge of the field and topic covered. The seminar may be offered by the University of Würzburg or by external institutions. Decision on credit transfer to be made by examination committee.

Intended learning outcomes

Students gain a wider overview of recent findings and developments in the field they have selected as their focus. They have acquired additional expertise that will help them specialise in their field.

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

S (2)
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)

a) written examination (approx. 45 to 90 minutes) or
b) log (20 to 30 pages) or
c) oral examination of one candidate each (20 to 30 minutes) or
d) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate) or
e) presentation (20 to 40 minutes)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Seminar 3			08-MBC-FTSE3-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with degree programme coordinator in advance.	

Contents

This module gives students the opportunity to attend a seminar exploring a topic that is relevant to the field they have selected as their focus. The module enhances and consolidates the students' knowledge of the field and topic covered. The seminar may be offered by the University of Würzburg or by external institutions. Decision on credit transfer to be made by examination committee.

Intended learning outcomes

Students gain a wider overview of recent findings and developments in the field they have selected as their focus. They have acquired additional expertise that will help them specialise in their field.

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

S (2)
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)

a) written examination (approx. 45 to 90 minutes) or
b) log (20 to 30 pages) or
c) oral examination of one candidate each (20 to 30 minutes) or
d) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate) or
e) presentation (20 to 40 minutes)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Special lectures 1			08-MBC-FTSV1-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with degree programme coordinator in advance.	

Contents

This module gives students the opportunity to attend a lecture discussing a topic that is relevant to the field they have selected as their focus. The module equips students with advanced knowledge in the natural sciences that is related to their field. The lecture may be offered by the University of Würzburg or by external institutions. Decision on credit transfer to be made by examination committee.

Intended learning outcomes

Students have developed an improved scientific knowledge and have thus enhanced their specific qualifications. They have acquired additional expertise that will help them specialise in their field.

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

V (2)
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)

a) written examination (approx. 45 to 90 minutes) or
b) log (20 to 30 pages) or
c) oral examination of one candidate each (20 to 30 minutes) or
d) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate) or
e) presentation (20 to 40 minutes)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Special lectures 2			08-MBC-FTSV2-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with degree programme coordinator in advance.	

Contents

This module gives students the opportunity to attend a lecture discussing a topic that is relevant to the field they have selected as their focus. The module equips students with advanced knowledge in the natural sciences that is related to their field. The lecture may be offered by the University of Würzburg or by external institutions. Decision on credit transfer to be made by examination committee.

Intended learning outcomes

Students have developed an improved scientific knowledge and have thus enhanced their specific qualifications. They have acquired additional expertise that will help them specialise in their field.

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

V (2)
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)

a) written examination (approx. 45 to 90 minutes) or
b) log (20 to 30 pages) or
c) oral examination of one candidate each (20 to 30 minutes) or
d) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate) or
e) presentation (20 to 40 minutes)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Workshop 1			08-MBC-FTWS1-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with degree programme coordinator in advance.	

Contents

This module gives students the opportunity to attend a workshop covering a topic that is relevant to the field they have selected as their focus. The module equips students with advanced methodological skills and advanced knowledge in the natural sciences that is related to their field. The workshop may be offered by the University of Würzburg or by external institutions. Decision on credit transfer to be made by examination committee.

Intended learning outcomes

Students have developed an improved scientific knowledge as well as enhanced methodological skills and have thus enhanced their specific qualifications. They have developed additional skills that will help them specialise in their field.

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

R (0)
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)

Wrap-up report (approx. 2 pages)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Workshop 2			08-MBC-FTWS2-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with degree programme coordinator in advance.	

Contents

This module gives students the opportunity to attend a workshop covering a topic that is relevant to the field they have selected as their focus. The module equips students with advanced methodological skills and advanced knowledge in the natural sciences that is related to their field. The workshop may be offered by the University of Würzburg or by external institutions. Decision on credit transfer to be made by examination committee.

Intended learning outcomes

Students have developed an improved scientific knowledge as well as enhanced methodological skills and have thus enhanced their specific qualifications. They have developed additional skills that will help them specialise in their field.

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

R (0)
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)

Wrap-up report (approx. 2 pages)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Workshop 3			08-MBC-FTWS3-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with degree programme coordinator in advance.	

Contents

This module gives students the opportunity to attend a workshop covering a topic that is relevant to the field they have selected as their focus. The module equips students with advanced methodological skills and advanced knowledge in the natural sciences that is related to their field. The workshop may be offered by the University of Würzburg or by external institutions. Decision on credit transfer to be made by examination committee.

Intended learning outcomes

Students have developed an improved scientific knowledge as well as enhanced methodological skills and have thus enhanced their specific qualifications. They have developed additional skills that will help them specialise in their field.

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

R (0)
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)

Wrap-up report (approx. 2 pages)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Genomes and epigenetics			08-MBC-GEG-152-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)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Performing practical experiments, students will actively engage with scientific methods and lab techniques for the investigation of epigenetic modifications, DNA structures and genome stability.

Intended learning outcomes

Students master the techniques used in the practical course. They are able to explain and critically reflect upon the experiments they have performed as well as to present and discuss their findings in a written report.

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

Ü (6)
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)

a) log (20 to 30 pages) or
b) oral examination of one candidate each (20 to 30 minutes) or
c) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate) or
d) presentation (20 to 40 minutes)
Language of assessment: German and/or English
Assessment offered: Once a year, summer semester

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

Master's degree (1 major) Biochemistry (2015)

Module title			Abbreviation
Genome stability			08-MBC-GST-152-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	graduate	--	

Contents

This module comprises a lecture and a seminar. It provides a detailed and in-depth exploration of the current state of research on the stability of genomes in dependence of certain structural and epigenetic factors.

Intended learning outcomes

Students have become familiar with the topics discussed in the module and are able to transfer what they have learned to new problems. They are able to situate new research findings within the context of existing knowledge as well as to determine the significance of those findings.

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

V (1) + S (1)
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)

a) written examination (30 to 60 minutes) or
b) log (approx. 10 to 20 pages) or
c) oral examination of one candidate each (30 to 60 minutes) or
d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or
e) presentation (20 to 45 minutes)
Students will be informed about the method, length and scope of the assessment prior to the course.
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biomedicine (2015)

Module title			Abbreviation
Final Colloquium			08-MBC-KOLL-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (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	graduate	--	

Contents

Students deliver a presentation on the findings of their Master's thesis and critically discuss them with their audience.

Intended learning outcomes

Students are able to present the findings of their projects. They can defend their choice of experimental methods, their findings as well as the evaluation and interpretation of those findings in a scientific discussion.

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

K (0)

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)

final colloquium (approx. 45 minutes)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Life cycle of proteins			08-MBC-LCP-152-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	graduate	--	

Contents

This module comprises a lecture and a seminar. It provides a detailed and in-depth exploration of the current state of research on the regulation and control of the entire life cycle of proteins.

Intended learning outcomes

Students have become familiar with the topics discussed in the module and are able to transfer what they have learned to new problems. They are able to situate new research findings within the context of existing knowledge as well as to determine the significance of those findings.

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

V (1) + S (1)
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)

a) written examination (30 to 60 minutes) or
b) log (approx. 10 to 20 pages) or
c) oral examination of one candidate each (30 to 60 minutes) or
d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or
e) presentation (20 to 45 minutes)
Students will be informed about the method, length and scope of the assessment prior to the course.
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biomedicine (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biomedicine (2018)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Literature seminar 1			08-MBC-LIT1-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (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	graduate	--	

Contents

Students read assigned biochemistry-related publications on a particular topic in the life sciences and deliver presentations on those publications to their classmates. Those presentations will be followed by critical discussions of the relevant topics. Please contact the module coordinator in advance to find out if you can use this module in the Master's programme in Biochemistry.

Intended learning outcomes

Students have enhanced their ability to read and critically engage with current biochemistry-related literature in the field of the life sciences. They have enhanced their skills in the presentation and discussion of scientific information.

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

S (2)
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)

presentation (20 to 40 minutes)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Literature seminar 2			08-MBC-LIT2-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (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	graduate	--	

Contents

Students read assigned biochemistry-related publications on a particular topic in the life sciences and deliver presentations on those publications to their classmates. Those presentations will be followed by critical discussions of the relevant topics. Please contact the module coordinator in advance to find out if you can use this module in the Master's programme in Biochemistry.

Intended learning outcomes

Students have enhanced their ability to read and critically engage with current biochemistry-related literature in the field of the life sciences. They have enhanced their skills in the presentation and discussion of scientific information.

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

S (2)
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)

presentation (20 to 40 minutes)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Literature seminar 3			08-MBC-LIT3-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (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	graduate	--	

Contents

Students read assigned biochemistry-related publications on a particular topic in the life sciences and deliver presentations on those publications to their classmates. Those presentations will be followed by critical discussions of the relevant topics. Please contact the module coordinator in advance to find out if you can use this module in the Master's programme in Biochemistry.

Intended learning outcomes

Students have enhanced their ability to read and critically engage with current biochemistry-related literature in the field of the life sciences. They have enhanced their skills in the presentation and discussion of scientific information.

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

S (2)
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)

presentation (20 to 40 minutes)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Practical lab course 1			08-MBC-LP1-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This lab course is based in a biochemistry and/or molecular biology research group at the University of Würzburg. Please consult with the competent coordinator in advance regarding contents to be covered. The course gives students the opportunity to actively engage with methods in biochemistry, molecular biology and/or bioinformatics. Students will be expected to write a lab report documenting their experiments and findings.

Intended learning outcomes

Students have consolidated and enhanced their proficiency in research methods. They have developed the ability to apply those methods to new problems and to determine whether they are suitable for those problems. They have learned how to document and discuss experimental procedures and findings according to best scientific practice.

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

No courses assigned to module

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) log (approx. 20 pages) or
b) oral examination of one candidate each (approx. 20 minutes) or
c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or
d) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

Allocation of places

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Additional information

Duration of practical course: no less than 8 weeks.

Workload

450 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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Practical lab course 2			08-MBC-LP2-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This lab course is based in a biochemistry and/or molecular biology research group at the University of Würzburg. Please consult with the competent coordinator in advance regarding contents to be covered. The course gives students the opportunity to actively engage with methods in biochemistry, molecular biology and/or bioinformatics. Students will be expected to write a lab report documenting their experiments and findings.

Intended learning outcomes

Students have consolidated and enhanced their proficiency in research methods. They have developed the ability to apply those methods to new problems and to determine whether they are suitable for those problems. They have learned how to document and discuss experimental procedures and findings according to best scientific practice.

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

No courses assigned to module

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) log (approx. 20 pages) or
b) oral examination of one candidate each (approx. 20 minutes) or
c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or
d) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

Allocation of places

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Additional information

Duration of practical course: no less than 8 weeks.

Workload

450 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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Practical lab course 3			08-MBC-LP3-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This lab course is based in a biochemistry and/or molecular biology research group at the University of Würzburg. Please consult with the competent coordinator in advance regarding contents to be covered. The course gives students the opportunity to actively engage with methods in biochemistry, molecular biology and/or bioinformatics. Students will be expected to write a lab report documenting their experiments and findings.

Intended learning outcomes

Students have consolidated and enhanced their proficiency in research methods. They have developed the ability to apply those methods to new problems and to determine whether they are suitable for those problems. They have learned how to document and discuss experimental procedures and findings according to best scientific practice.

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

No courses assigned to module

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) log (approx. 20 pages) or
b) oral examination of one candidate each (approx. 20 minutes) or
c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or
d) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

Allocation of places

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Additional information

Duration of practical course: no less than 6 weeks.

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Practical lab course 4			08-MBC-LP4-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This lab course is based in a biochemistry and/or molecular biology research group at the University of Würzburg. Please consult with the competent coordinator in advance regarding contents to be covered. The course gives students the opportunity to actively engage with methods in biochemistry, molecular biology and/or bioinformatics. Students will be expected to write a lab report documenting their experiments and findings.

Intended learning outcomes

Students have consolidated and enhanced their proficiency in research methods. They have developed the ability to apply those methods to new problems and to determine whether they are suitable for those problems. They have learned how to document and discuss experimental procedures and findings according to best scientific practice.

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

No courses assigned to module

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) log (approx. 20 pages) or
b) oral examination of one candidate each (approx. 20 minutes) or
c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or
d) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

Allocation of places

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Additional information

Duration of practical course: no less than 6 weeks.

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Practical lab course 5			08-MBC-LP5-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This lab course is based in a biochemistry and/or molecular biology research group at the University of Würzburg. Please consult with the competent coordinator in advance regarding contents to be covered. The course gives students the opportunity to actively engage with methods in biochemistry, molecular biology and/or bioinformatics. Students will be expected to write a lab report documenting their experiments and findings.

Intended learning outcomes

Students have consolidated and enhanced their proficiency in research methods. They have developed the ability to apply those methods to new problems and to determine whether they are suitable for those problems. They have learned how to document and discuss experimental procedures and findings according to best scientific practice.

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

No courses assigned to module

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) log (approx. 20 pages) or
b) oral examination of one candidate each (approx. 20 minutes) or
c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or
d) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

Allocation of places

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Additional information

Duration of practical course: no less than 3 weeks.

Workload

150 h

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Practical lab course 6			08-MBC-LP6-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This lab course is based in a biochemistry and/or molecular biology research group at the University of Würzburg. Please consult with the competent coordinator in advance regarding contents to be covered. The course gives students the opportunity to actively engage with methods in biochemistry, molecular biology and/or bioinformatics. Students will be expected to write a lab report documenting their experiments and findings.

Intended learning outcomes

Students have consolidated and enhanced their proficiency in research methods. They have developed the ability to apply those methods to new problems and to determine whether they are suitable for those problems. They have learned how to document and discuss experimental procedures and findings according to best scientific practice.

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

No courses assigned to module

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) log (approx. 20 pages) or
b) oral examination of one candidate each (approx. 20 minutes) or
c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or
d) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

Allocation of places

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Additional information

Duration of practical course: no less than 3 weeks.

Workload

150 h

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Master-Thesis			08-MBC-MA-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
25	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This module gives students the opportunity to research and write on a defined problem within a given time frame and using the scientific methods they have learned during the programme.

Intended learning outcomes

Students are able to familiarise themselves with the current state of research on a particular topic with the help of scientific literature. They are able to conduct research on a defined problem/topic adhering to the principles of good scientific practice, to write up, evaluate and interpret their findings as well as to situate those findings within the context of scientific literature.

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

No courses assigned to module

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)

Master's thesis (approx. 60 pages)
Language of assessment: German or English

Allocation of places

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Additional information

Time to complete: 6 months.

Workload

750 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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Macromolecular Crystallography			08-MBC-MK-152-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)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This module comprises a lecture, exercises and a lab course. The lecture will discuss the following topics: biophysical characterisation of protein samples prior to crystallisation; manual and high-throughput methods for protein crystallisation; X-ray generators and synchrotrons, properties of X-rays; data collection using different detector systems; symmetry properties of molecules, point groups and space groups; the phase problem and solution of that problem using multiple isomorphous replacement, anomalous diffraction and molecular replacement; improvement of experimental phases by solvent flattening and molecular averaging; manual and automated model building; refinement procedures and analysis of the experimentally determined structures. The exercises will give students the opportunity to explore the topics discussed in the lecture in more depth. In the lab course, students will carry out all of the steps involved in protein structure analysis that were discussed in the lecture. They will use lysozyme as an example enzyme and will carry out the following steps autonomously: crystallisation of the purified protein, data collection on the Institute's diffractometer, solution of the phase problem using the anomalous signal from intrinsic sulphur atoms, model building, structure refinement, analysis of the refined structure.

Intended learning outcomes

Students will develop a thorough knowledge of modern macromolecular crystallographic methods. The lecture will provide an in-depth exploration of those methods, the exercise will give students the opportunity to engage with the most intellectually challenging aspects in more detail, and the lab course will give them practice in using the methods. At the end of the module, students will be able to perform crystallographic structure analyses for their Master's or doctoral thesis.

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

V (2) + Ü (1) + P (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)

a) written examination (approx. 45 to 90 minutes) or
b) log (20 to 30 pages) or
c) oral examination of one candidate each (20 to 30 minutes) or
d) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate) or
e) presentation (20 to 40 minutes)
Language of assessment: German and/or English
Assessment offered: Once a year, summer semester

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
Master's degree (1 major) Biochemistry (2015) Master's degree (1 major) Biochemistry (2017) Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Mass-Spectrometry and Proteomics			08-MBC-MSP-152-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	graduate	--	

Contents

This module comprises a lecture, a seminar and a lab course. The lecture discusses the fundamental principles of the mass spectrometry of biomolecules. Topics to be covered in the lecture include ESI and MALDI ionisation techniques as well as the operating principles of TOF, Orbitrap and other mass analysers. The lecture also provides an introduction to CID and ETD fragmentation techniques, peptide and protein separation methods as well as the analysis of mass spectrometric data (protein databases, FDR, GO terms, etc.). It gives an overview of quantitative proteomics with a special focus on different stable isotope quantification methods (e.g. SILAC, N15 labelling, iTRAQ) and provides an insight into the mass spectrometric analysis of post-translational modifications. The seminar covers the fundamental principles of the analysis of mass spectrometric data. It introduces students to different software packages and gives them the opportunity to independently develop solutions to a range of problems. In the lab course, students will use affinity purification to isolate a protein complex from yeast. They will then use 1D-SDS-PAGE to separate that complex and will proteolytically cleave it in the gel. Afterwards, students will use nano-LC-MS/MS to analyse the peptides thus obtained and will conduct a data analysis to identify specific interaction partners and post-translational modifications.

Intended learning outcomes

Students have learned the theoretical foundations of mass spectrometry protein and proteomic analysis. They have learned how to use proteomic data analysis software tools. Students have become proficient in the affinity purification of protein complexes and have learned the steps involved in the preparation of samples for mass spectrometry protein analysis, e.g. SDS-PAGE and in-gel digestion. They have gained an insight into how to operate a nanoHPLC-coupled mass spectrometer.

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

V (2) + S (1) + P (2)
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)

a) written examination (approx. 45 to 90 minutes) or
b) log (20 to 30 pages) or
c) oral examination of one candidate each (20 to 30 minutes) or
d) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate) or
e) presentation (20 to 40 minutes)
Language of assessment: German and/or English
Assessment offered: Once a year, winter semester

Allocation of places

Biochemie (Biochemistry), Master's: 6 places. Places will be allocated according to the number of subject semesters. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

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
Master's degree (1 major) Biochemistry (2015) Master's degree (1 major) Biochemistry (2017)

Module title			Abbreviation
Protein quality control			08-MBC-PQK-152-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)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Performing practical experiments, students will actively engage with scientific methods and lab techniques in the field of protein degradation in eukaryotes.

Intended learning outcomes

Students master the techniques used in the practical course. They are able to explain and critically reflect upon the experiments they have performed as well as to present and discuss their findings in a written report.

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

Ü (6)
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)

a) log (20 to 30 pages) or
b) oral examination of one candidate each (20 to 30 minutes) or
c) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate) or
d) presentation (20 to 40 minutes)
Language of assessment: German and/or English
Assessment offered: Once a year, summer semester

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
RNA worlds			08-MBC-RNAW-152-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	graduate	--	

Contents

This module comprises a lecture and a seminar. It provides a detailed and in-depth exploration of the current state of research on RNA-protein complexes, their structures and functions as well as the theoretical principles of cutting-edge RNA-based research methods.

Intended learning outcomes

Students have become familiar with the topics discussed in the module and are able to transfer what they have learned to new problems. They are able to situate new research findings within the context of existing knowledge as well as to determine the significance of those findings.

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

V (1) + S (1)
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)

a) written examination (30 to 60 minutes) or
b) log (approx. 10 to 20 pages) or
c) oral examination of one candidate each (30 to 60 minutes) or
d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or
e) presentation (20 to 45 minutes)
Students will be informed about the method, length and scope of the assessment prior to the course.
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biomedicine (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biomedicine (2018)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Structure and function of RNA-protein complexes			08-MBC-RNP-152-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)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Performing practical experiments, students will actively engage with scientific methods and lab techniques for the investigation of RNA-protein complexes.

Intended learning outcomes

Students master the techniques used in the practical course. They are able to explain and critically reflect upon the experiments they have performed as well as to present and discuss their findings in a written report.

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

Ü (6)
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)

a) log (20 to 30 pages) or
b) oral examination of one candidate each (20 to 30 minutes) or
c) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate) or
d) presentation (20 to 40 minutes)
Language of assessment: German and/or English
Assessment offered: Once a year, winter semester

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Scientific lecturing M1			08-MBC-WR1-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This module gives students the opportunity to teach a tutorial accompanying a lecture offered by the Faculty of Chemistry and Pharmacy and learn how to present and teach topics in an appropriate manner.

Intended learning outcomes

Students are able to teach students in earlier stages of their degrees and tailor their teaching to those students' needs.

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

T (0)

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)

Preparing and supervising study groups, wrap-up report (approx. 2 pages)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title			Abbreviation
Scientific lecturing M2			08-MBC-WR2-152-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biochemie (Biochemistry)		Chair of Biochemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This module gives students the opportunity to teach a tutorial accompanying a lecture offered by the Faculty of Chemistry and Pharmacy and learn how to present and teach topics in an appropriate manner.

Intended learning outcomes

Students are able to teach students in earlier stages of their degrees and tailor their teaching to those students' needs.

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

No courses assigned to module

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)

Preparing and supervising study groups: assessment to be successfully completed (type and length of assessment to be specified 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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Biochemistry (2019)

Module title	Abbreviation
Drug design	08-MCM3-152-m01

Module coordinator	Module offered by
lecturers Pharmazeutische Chemie (Pharmaceutical Chemistry)	Institute of Pharmacy and Food Chemistry

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Fundamentals: drug targets (types and classification), target validation, effect mechanisms, protein-ligand interactions, lead finding; lead optimisation. Experimental methods: bioassays, HTS, combinatorial chemistry, naturally occurring substances. Theoretical methods: molecular modelling, structure-based drug design, pharmacophore models, docking, virtual screening, simulation methods, de novo design. Ligand-based drug design. QSAR. Predictions of pharmacokinetic and toxicological components (ADME). Case examples, prodrug strategies, bioisosterism, SAR.

Intended learning outcomes

Students master the theoretical and experimental methods and aspects of drug design.

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

S (2) + Ü (1)
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)

presentation with discussion (approx. 30 minutes)
Language of assessment: German and/or English

Allocation of places

20 places. 4 places for students of the Master's degree programme Chemie (Chemistry): Places will be allocated according to the same number of subject semesters; students who have chosen Medizinische Chemie (Medicinal Chemistry) as their focus will be given preferential consideration; among applicants with the same number of subject semesters, places will be allocated by lot.; 6 places for students of the Master's degree programme Biochemie (Biochemistry): Places will be allocated according to the number of subject semesters; among applicants with the same number of subject semesters, places will be allocated by lot; a waiting list will be maintained and places re-allocated by lot as they become available.

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Chemistry (2016)
Master's degree (1 major) Biochemistry (2017)

Module title			Abbreviation
Modern aspects of natural product Chemistry and Biological Chemistry			08-OCM-NAT-152-m01
Module coordinator		**Module offered by**	
lecturer of the seminar		Institute of Organic Chemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This module discusses advanced topics in natural product chemistry and biological chemistry.

Intended learning outcomes

Students are able to discuss advanced topics in natural product chemistry and biological chemistry.

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 (approx. 45 to 90 minutes) or
b) oral examination of one candidate each (20 to 30 minutes) or
c) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate)
Language of assessment: German and/or English

Allocation of places

Biochemie (Biochemistry), Master's: 20 places. Places will be allocated according to the number of subject semesters. Among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available.

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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Biochemistry (2017)

Module title			Abbreviation
Clinical-analytical Chemistry			08-PH-KAC-152-m01
Module coordinator		**Module offered by**	
lecturer of lecture "Klinisch-analytische Chemie" (Clinical and Analytical Chemistry)		Institute of Pharmacy and Food Chemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This module discusses advanced topics in clinical analytical chemistry.

Intended learning outcomes

Students have developed an advanced knowledge of molecular biology.

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)

written examination (approx. 120 minutes)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Chemistry (2016)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Chemistry (2018)
Master's degree (1 major) Biochemistry (2019)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Master's degree (1 major) Chemistry (2024)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

Module title			Abbreviation
Practical course of clinical-analytical Chemistry			08-PH-KACP-152-m01
Module coordinator		**Module offered by**	
lecturer of lecture "Klinisch-analytische Chemie" (Clinical and Analytical Chemistry)		Institute of Pharmacy and Food Chemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module covers practical topics in clinical chemistry and clinical diagnostics as well as the related analytical methods.

Intended learning outcomes

Students have developed a knowledge of clinical analytical chemistry and are able to apply it to practical experiments.

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

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)

Vortestate/Nachtestate (pre and post-experiment examination talks approx. 15 minutes each, log approx. 5 to 10 pages each) and assessment of practical performance (2 to 4 random examinations)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Chemistry (2016)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Chemistry (2018)
Master's degree (1 major) Biochemistry (2019)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)

Module title			Abbreviation
Bioorganic Chemistry			08-SCM3-152-m01
Module coordinator		**Module offered by**	
lecturer of lecture "Bioorganische Chemie" (Bioorganic Chemistry)		Institute of Organic Chemistry	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Bioorganic chemistry unites the central questions of organic chemistry, biochemistry, medicinal chemistry and spectroscopy with a focus on biomolecules. At the core of bioorganic chemistry is the synthesis and purposeful manipulation of biomolecules, such as nucleic acids, peptides, proteins, carbohydrates and lipids. This includes the framework of structure-function relationships and the fundamental understanding of biological mechanisms, to enable applications towards biomaterials, biosensing, bioimaging, clinical diagnostics and therapeutics.

Key concepts covered in the course are nucleic acid chemistry, peptide chemistry, carbohydrate chemistry, bioorthogonal reactions, molecular diversity, solid-phase synthesis, molecular recognition and interactions (ligand-receptor interactions, signal transduction)

Intended learning outcomes

The students will have a molecular understanding of the structure and reactivity of biomolecules. The students obtain knowledge of modern synthetic methods in bioorganic chemistry and can explain principles of molecular interactions and recognition mechanisms. They can describe modern aspects of nucleic acids, proteins, carbohydrates and lipids.

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 (approx. 45 to 90 minutes) or
b) oral examination of one candidate each (20 to 30 minutes) or
c) oral examination in groups of up to 3 candidates (15 to 30 minutes per candidate)
Language of assessment: German and/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

Master's degree (1 major) Biochemistry (2015)
Master's degree (1 major) Chemistry (2016)
Master's degree (1 major) Functional Materials (2016)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)

Master's degree (1 major) Biochemistry (2017)
Master's degree (1 major) Chemistry (2018)
Master's degree (1 major) Biochemistry (2019)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)
Master's degree (1 major) Functional Materials (2022)
Master's degree (1 major) Chemistry (2024)
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)
Master's degree (1 major) Functional Materials (2025)