Julius-Maximilians-
UNIVERSITÄT
WÜRZBURG

Module Catalogue

for the Subject

Biosciences

as a Master's with 1 major

with the degree "Master of Science"

(120 ECTS credits)

Examination regulations version: 2017
Responsible: Faculty of Biology

Contents

The subject is divided into

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Learning Outcomes

German contents and learning outcome available but not translated yet.

Wissenschaftliche Befähigung

- Die Absolventinnen und Absolventen verstehen die mathematischen, theoretischen und experimentellen Grundlagen der Biologie und können diese anwenden.
- Die Absolventinnen und Absolventen können unter Anleitung Experimente durchführen, analysieren und die erhaltenen Ergebnisse darstellen und bewerten.
- Die Absolventinnen und Absolventen sind in der Lage, naturwissenschaftliche Probleme durch Anwendung der wissenschaftlichen Arbeitsweise und unter Beachtung der Regeln guter wissenschaftlicher Praxis (Dokumentation, Fehleranalyse) zu bearbeiten.
- Die Absolventinnen und Absolventen können ihr Wissen und ihre Erkenntnisse einem Fachpublikum gegenüber darstellen und vertreten.
- Die Absolventinnen und Absolventen können ein gewisses Grundlagenwissen aus Teilgebieten der Biologie abrufen.
- Die Absolventinnen und Absolventen verstehen die wesentlichen Zusammenhänge und Konzepte der einzelnen Teilgebiete der Biologie.
- Die Absolventinnen und Absolventen sind in der Lage, sich mit Hilfe von Fachliteratur in neue Aufgabengebiete einzuarbeiten und zu bewerten.
- Die Absolventinnen und Absolventen besitzen Abstraktionsvermögen, analytisches Denken, Problemlösungskompetenz und die Fähigkeit, komplexe Zusammenhänge zu strukturieren.

Befähigung zur Aufnahme einer Erwerbstätigkeit

- Die Absolventinnen und Absolventen können ihr Wissen und ihre Erkenntnisse einem Fachpublikum gegenüber darstellen und vertreten.
- Die Absolventinnen und Absolventen sind in der Lage, konstruktiv und zielorientiert in einem heterogenen Team zusammenzuarbeiten, unterschiedliche und abweichende Ansichten produktiv zur Zielerreichung zu nutzen und auftretende Konflikte zu lösen (Teamfähigkeit).
- Die Absolventinnen und Absolventen können ihre erworbenen Kompetenzen in unterschiedlichen interkulturellen Kontexten und in international zusammengesetzten Teams anwenden.
- Die Absolventinnen und Absolventen sind in der Lage, Probleme und deren Lösungen zielgruppengerecht und auch in einer Fremdsprache aufzubereiten und darzustellen.
- Die Absolventinnen und Absolventen sind in der Lage natur- und biowissenschaftliche Methoden unter Anleitung auf konkrete experimentelle oder theoretische biologische Aufgabenstellungen anzuwenden, Lösungswege zu entwickeln und die Ergebnisse zu interpretieren und zu bewerten.
- Die Absolventinnen und Absolventen kennen die wichtigsten Anforderungen und Arbeitsweisen im industriellen Umfeld sowie in Forschung und Entwicklung.
- Die Absolventinnen und Absolventen sind befähigt, komplexere Probleme zu analysieren und zu lösen und sich sehr schnell auch in weniger vertraute Themenkomplexe einzuarbeiten.

Persönlichkeitsentwicklung

- Die Absolventinnen und Absolventen kennen die Regeln guter wissenschaftlicher Praxis und beachten sie.
- Die Absolventinnen und Absolventen können ihr Wissen und ihre Erkenntnisse einem Fachpublikum gegenüber darstellen und vertreten.

Befähigung zum gesellschaftlichen Engagement

- Die Absolventinnen und Absolventen können ansatzweise naturwissenschaftliche Entwicklungen kritisch reflektieren und deren Auswirkungen auf die Wirtschaft, Gesellschaft und die Umwelt in Ansätzen erfassen (Technikfolgenabschätzung).

- Die Absolventinnen und Absolventen haben ihr Wissen bezüglich wirtschaftlicher, gesellschaftlicher, naturwissenschaftlicher, kultureller etc. Fragestellungen erweitert und können in Ansätzen begründet Position beziehen.
- Die Absolventinnen und Absolventen entwickeln die Bereitschaft und Fähigkeit, ihre Kompetenzen in partizipative Prozesse einzubringen und aktiv an Entscheidungen mitzuwirken.

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)):

20-Apr-2017 (2017-23)

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

Compulsory Electives

(90 ECTS credits)

Subtopic 1 (Primary Topic)

(45 ECTS credits)

Subtopic 2 (Secondary Topic)

(30 ECTS credits)

Subtopics 1 and 2

(ECTS credits)

30 ECTS credits in subsidiary subject area, 45 ECTS credits in main subject area

Module Group 1

(ECTS credits)

Neuroscience

(30 ECTS credits)

Module title	Abbreviation
Neurobiology, Behavioural Physiology and Animal Ecology	07-MS1-152-m01

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

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Timing matters: Temporal organisation in the animal kingdom. Timing plays an important role in all living systems. Animals make use of endogenous clocks to predict and adapt to daily or seasonal changes in environmental parameters. To be at the right place at the right time is of great fitness relevance if -for example- a mating partner or enough food has to be found. Many mutualistic, antagonistic or social interactions can only take place if animals are at the same place at the same time and in the appropriate developmental stage. The lecture gives an introduction to the mechanisms underlying the temporal organisation in the animal kingdom. Adopting an integrative approach, the lecture goes from timing mechanisms on the neuronal level to individual behaviour and then to interactions in social groups, populations or partners in complex and variable ecosystems.

Intended learning outcomes

Students get to know the advantages of an integrative approach when analysing complex biological systems. They learn to relate and integrate different fields within biology. In the seminar, students practise the discussion of research findings.

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 is creditable for 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) 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) Biosciences (2018)
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
Molecular and Clinical Neurobiology	07-MS1N-152-m01

Module coordinator	Module offered by
Managing Director of the Institute of Clinical Neurobiology	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

Content of the lecture *Molekulare und klinische Neurobiologie* (*Molecular and Clinical Neurobiology*) - cells of the nervous system, properties of neurons and glial cells - ion channels and excitability of membranes, channelopathies - synapses, transmitter release, neuromuscular end plate, Myasthenia gravis - motor activity, anatomy of the human motor system, spinal reflexes, motor neuron diseases - cerebellum, ataxia and basal ganglia, Morbus Parkinson - muscles and muscle diseases - somatosensory system and pain - hippocampus, learning and memory, anterograde amnesia, visual agnosia - cortex, Morbus Alzheimer - sleep, EEG, epilepsy - sensory physiology, vision, diseases of the visual system; Reading: Kandel, Principles of Neural Science, 4th Edition: A detailed description of this course is also available at http://neurobiologie.uk-wuerzburg.de/lehrveranstaltungen.html. The lecture Molecular and Clinical Neurobiology (incl. seminar) and *Neuroentwicklungsbiologie* (*Neurodevelopment*; Fridays 8-9 a. m.) together form one theoretical module (10 ECTS). However, you may also complete these two modules separately and have them credited within the area of mandatory electives 2.

Intended learning outcomes

Theoretical foundations of molecular and clinical neurobiology, developmental mechanisms of neuronal diseases.

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 is creditable for 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)

Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Endogenous Clocks			07-MS1CB-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Neurobiology and Genetics		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Introduction into endogenous clocks of unicellular organisms, fungi, plants and animals, with a focus on the neuronal organisation of the clock in the brain of mammals and insects. The biological functions of endogenous clocks and the underlying mechanisms will be discussed on the molecular, cellular and organismic levels. It will be explained how clocks adjust to a 24h day with variable photoperiods. Applied aspects regarding e. g. shift work or jetlag will also be discussed.

Intended learning outcomes

The students learn fundamental principles underlying chronobiology/endogenous clocks and obtain an insight into current research in the field. In the seminar, they practise their presentation skills and the discussion of research findings in English.

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 is creditable for 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) 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) Biosciences (2018)
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
Neuromodulation and Neuronal Development	07-MS1NMND-152-m01

Module coordinator	Module offered by
holder of the Chair of Neurobiology and Genetics	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Neuromodulation: cellular and molecular biology of neuromodulators and their receptors, modulation of synaptic transmission and membrane potential, theoretical and functional aspects of neuromodulation, model systems used to study modulation of neuronal circuits. Fundamental principles of molecular developmental neurobiology. Focus is on the establishment of the neuroectoderm, pattern generation and regional specification, neuronal precursors, neuronal growth, differentiation of neurons, axonal pathfinding, neuronal connectivity.

Intended learning outcomes

The students learn fundamental principles underlying neuromodulation and neuronal development and obtain an insight into current research in the field. In the seminar, students practise presenting and discussing research findings in English.

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 is creditable for 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) 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) Biosciences (2018)
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
Neurogenetics of Behaviour			07-MS1NB-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Neurobiology and Genetics		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

To understand how the brain controls behaviour is at the heart of neuroscience. Both brain and behaviour can be overwhelmingly complex and plastic, yet neurogenetic methods are powerful tools to dissect the principles of how the brain controls behaviour. The lecture and seminar will give a state-of-the art view on current and important topics of behavioural neurobiology (incl. e. g. sleep, control of appetite and feeding, social behaviour, mating, mirror neurons, molecular mechanisms of auditory-guided behaviour, neurogenetic techniques) focusing on genetic model systems such as the fruit fly Drosophila, the mouse, and the nematode C. elegans.

Intended learning outcomes

In the lecture, students acquire theoretical and methodological insights into current topics in the field of neurogenetics in general and the neurogenetics of behaviour. In the seminar, students practise presenting and discussing research findings in English.

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 is creditable for 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) 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) Biosciences (2018)

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
Developmental Neurobiology and Chronobiology	07-MS1NEC-152-m01

Module coordinator	Module offered by
holder of the Chair of Neurobiology and Genetics	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Lecture and seminar *Endogenous Clocks*: Students acquire an overview of endogenous clocks in unicellular organisms, fungi, plants, and animals with a focus on the neuronal organisation of the endogenous clock in the brain of mammals and insects. Students learn about the biological purpose of endogenous clocks, their function on a molecular, cellular, and organismic level, as well as their adaptation to 24 hour days with varying hours of daylight. Related aspects of jetlag and shift-work are discussed. Lecture *Neuronal Development*: Fundamentals of neuronal development on the molecular level. Main focus is the establishment of the neuroectoderm, pattern formation, regional subdivision, neuronal progenitor cells, cell growth, differentiation of neurons, axonal navigation, and neuronal circuitry.

Intended learning outcomes

Students acquire a fundamental knowledge and understanding of endogenous clocks and neuronal development and gain an insight into current research. Students also learn to independently work on reading assignments and to research specific questions that arise in their reading. Results of the students' independent study are critically discussed in the seminar.

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 is creditable for 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) Biology (2015)
Master's degree (1 major) FOKUS Life Sciences (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)

Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)
Master's degree (1 major) FOKUS Life Sciences (2025)

Module title			Abbreviation
Neurobiology F1			07-MS1NF1-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Neurobiology and Genetics		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

A current topic in the field of neurobiology will be investigated. The practical course will be offered in different specialisations: molecular, clinical, cellular, developmental or behavioural neurobiology or in neurogenetics. In addition to a literature search, a variety of neurobiological methods (for example: electrophysiology, immunohistochemistry, molecular biological techniques, clinical and neurogenetic techniques) and different model systems are offered. The experimental results will be documented and presented in the form of a scientific talk, a publication or a seminar paper.

Intended learning outcomes

The participants are able to conduct scientific research within the field of neurobiology. They have acquired the knowledge and skills (e. g. basic and advanced knowledge, special knowledge, advanced methodological background, general and specific methods) to carry out and document neurobiological experiments according to best practice.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Neurobiology F2			07-MS1NF2-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Neurobiology and Genetics		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

The students will independently work on a smaller project within a current line of research at the Chair. Neurobiological, genetic or molecular techniques will be tested and adapted according to the research aim. The progress of the experiments and the current line of research will be documented and presented in the form of a scientific talk, a publication or a seminar paper.

Intended learning outcomes

The participants are able to independently conduct scientific research within the field of neurobiology and to adapt a research plan according to the experimental progress. They have acquired the knowledge and skills (e. g. basic and advanced knowledge, special knowledge, advanced methodological background, general and specific methods) to independently carry out, document and interpret neurobiological experiments according to best practice.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)

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) 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)

Animal Ecology and Tropical Biology

(30 ECTS credits)

Module title	Abbreviation
Neurobiology, Behavioural Physiology and Animal Ecology	07-MS1-152-m01

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

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Timing matters: Temporal organisation in the animal kingdom. Timing plays an important role in all living systems. Animals make use of endogenous clocks to predict and adapt to daily or seasonal changes in environmental parameters. To be at the right place at the right time is of great fitness relevance if -for example- a mating partner or enough food has to be found. Many mutualistic, antagonistic or social interactions can only take place if animals are at the same place at the same time and in the appropriate developmental stage. The lecture gives an introduction to the mechanisms underlying the temporal organisation in the animal kingdom. Adopting an integrative approach, the lecture goes from timing mechanisms on the neuronal level to individual behaviour and then to interactions in social groups, populations or partners in complex and variable ecosystems.

Intended learning outcomes

Students get to know the advantages of an integrative approach when analysing complex biological systems. They learn to relate and integrate different fields within biology. In the seminar, students practise the discussion of research findings.

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 is creditable for 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) 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) Biosciences (2018)
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
Animal Ecology and Tropical Biology	07-MS1TÖ-152-m01

Module coordinator	Module offered by
holder of the Chair of Animal Ecology and Tropical 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

This module consists of a lecture and a seminar. The lecture gives an overview of the theoretical foundations and current issues in animal ecology. Focus will be on biodiversity and ecosystem functions, multi-trophic interactions and food nets, evolutionary ecology, chemical ecology, tropical ecology, agricultural ecology, and global change. In the seminar, recent scientific publications within the topics mentioned above will be presented and discussed.

Intended learning outcomes

The students will acquire an advanced knowledge of ecological theories and current research issues in the field of animal ecology. They will be able to interpret scientific publications and apply the acquired knowledge to the solution of current environmental risks.

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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Animal Ecology and Tropical Biology 2	07-MS1TÖ2-152-m01

Module coordinator	Module offered by
holder of the Chair of Animal Ecology and Tropical 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

This module provides the fundamentals of the biology of tropical habitats and tropical communities. A special focus is on the global significance of tropical systems (ecosystem goods and ecosystem services), but the biological features of these highly diverse biomes are also highlighted.

Intended learning outcomes

The students will acquire deep knowledge of ecological theories and up-to-date research issues in the field of animal ecology of the tropics. They will be qualified to interpret scientific work and apply the knowledge they have acquired to the solution of current environmental risks.

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 is creditable for 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) 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) Biosciences (2018)
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
Animal Ecology F1	07-MS1TÖF1-152-m01

Module coordinator	Module offered by
holder of the Chair of Animal Ecology and Tropical 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

This module consists of several exercises and a seminar series over the course of the entire semester. The exercises can be chosen from the following electives: 1. Wild and honeybee ecology (over the course of the semester): fundamentals and techniques of beekeeping, resource utilisation, behaviour experiments, pollinator diversity and plant-pollinator-interactions. 2. Ecology and taxonomy of insects (block, 2 weeks): observation and recording in the habitat, identification and characteristics of different arthropod groups, field experiments. 3. Ecological modelling (block, 2 weeks): current methods of ecological processes modelling, simulation models, the students' own modelling project on current issues in ecology. 4. Agroecology (block, 1 week): insect communities in agroecosystems, biological pest control in landscape context, evaluation of agri-environment schemes. 5. Forest ecology (block, 1 week): arthropod communities in forest ecosystems, methods of detection, influence of management on diversity patterns and functional groups. 6. Tropical ecology (block): small projects ecological or nature conservation-related issues to be implemented in a tropical ecosystem in East Africa. In the seminar, recent scientific publications on the topics covered in the modules listed above will be presented and discussed.

Intended learning outcomes

Students will have expanded their knowledge on ecological theories and current research issues in animal ecology. They will be able to design, perform, statistically analyse and interpret scientific research. They will be familiar with animal ecological methods and possible sources of error in data interpretation. They will have deepened their knowledge of the biology and ecology of important functional taxa of arthropods. Students will have acquired the knowledge and skills necessary to perform scientific activities in the context of an F2 practical course or a Master's thesis.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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) 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)

Module title	Abbreviation
Animal Ecology and Tropical Biology F2	07-MS1TÖF2-152-m01

Module coordinator	Module offered by
holder of the Chair of Animal Ecology and Tropical Biology	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

In the F2 practical course, students will explore a scientific question as independently as possible. They will develop hypotheses, prepare a work schedule, collect data, perform experiments in the field, greenhouse or laboratory and will statistically analyse data. Students will document the results of their work in a log similar to a short scientific paper, including an introduction, material and methods, findings and a discussion of these. Students will also be required to present their findings during a wrap-up seminar. The various research groups at the Chair of Animal Ecology and Tropical Biology offer a wide variety of opportunities for students to complete an F2 practical course in Germany, another country in Europe or in the tropics. F2 practical courses may be completed in the context of an ongoing research project of the Institute or in cooperation with other institutions. For more detailed information on the F2 practical course as well as current topics or appointments for consultations, please refer to WueCampus, check out the notice board of the Chair or contact the research groups directly.

Intended learning outcomes

Students have gained knowledge on experimental setups and methods used in the fields of animal ecology and tropical ecology. They are qualified to design scientific research and are able to collect data and interpret them statistically. They have developed knowledge and skills that allow them to set up a scientific project for their Master's thesis.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)
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) 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)

Behavioural Physiology and Sociobiology

(30 ECTS credits)

Module title	Abbreviation
Neurobiology, Behavioural Physiology and Animal Ecology	07-MS1-152-m01

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

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Timing matters: Temporal organisation in the animal kingdom. Timing plays an important role in all living systems. Animals make use of endogenous clocks to predict and adapt to daily or seasonal changes in environmental parameters. To be at the right place at the right time is of great fitness relevance if -for example- a mating partner or enough food has to be found. Many mutualistic, antagonistic or social interactions can only take place if animals are at the same place at the same time and in the appropriate developmental stage. The lecture gives an introduction to the mechanisms underlying the temporal organisation in the animal kingdom. Adopting an integrative approach, the lecture goes from timing mechanisms on the neuronal level to individual behaviour and then to interactions in social groups, populations or partners in complex and variable ecosystems.

Intended learning outcomes

Students get to know the advantages of an integrative approach when analysing complex biological systems. They learn to relate and integrate different fields within biology. In the seminar, students practise the discussion of research findings.

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 is creditable for 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) 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) Biosciences (2018)
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
Animal Communication			07-MS1K-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Behavioral Physiology and Sociobiology		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

The lectures deal with physiological and neurobiological principles of the different communication channels used by animals, but also highlight adaptive values and evolutionary aspects of animal signalling. In a follow-up seminar session, students will deepen their knowledge by presenting and discussing current papers related to the topic of the lecture.

Intended learning outcomes

Students understand the value of an integrative approach when looking at complex issues in biology. They have learned to connect findings from different research areas, such as physiology, neurobiology, behaviour and ecological conditions, in order to gain a more complete picture of a topic. In addition, students have learned to present and discuss current scientific publications within a broader theoretical framework.

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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (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) Biosciences (2018)

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)

Module title	Abbreviation
Experimental Sociobiology	07-MS1ES-152-m01

Module coordinator	Module offered by
holder of the Chair of Behavioral Physiology and Sociobiology	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

The lecture covers the diversity and the development of social behaviour as well as the behavioural physiology and mechanisms of neurobiology that are the basis of the organisation of social groups. A special focus is on current research in the Faculty. With the help of selected publications, the seminar will discuss and explore in more detail the topics covered in the lecture.

Intended learning outcomes

Students understand the value of an integrative approach when looking at complex correlations in behavioural biology. Students are able to recognise and interpret relationships between various aspects of sociobiology. They are able to formulate scientific questions in the context of sociobiology and are able to discuss cutting edge literature in depth.

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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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)

Module title			Abbreviation
Neurogenetics of Behaviour			07-MS1NB-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Neurobiology and Genetics		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

To understand how the brain controls behaviour is at the heart of neuroscience. Both brain and behaviour can be overwhelmingly complex and plastic, yet neurogenetic methods are powerful tools to dissect the principles of how the brain controls behaviour. The lecture and seminar will give a state-of-the art view on current and important topics of behavioural neurobiology (incl. e. g. sleep, control of appetite and feeding, social behaviour, mating, mirror neurons, molecular mechanisms of auditory-guided behaviour, neurogenetic techniques) focusing on genetic model systems such as the fruit fly Drosophila, the mouse, and the nematode C. elegans.

Intended learning outcomes

In the lecture, students acquire theoretical and methodological insights into current topics in the field of neurogenetics in general and the neurogenetics of behaviour. In the seminar, students practise presenting and discussing research findings in English.

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 is creditable for 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) 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) Biosciences (2018)

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
Behavioural Physiology and Sociobiology F1			07-MS1VF1-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Behavioral Physiology and Sociobiology		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

Students will be integrated into one of the research groups at the Chair and will independently work on one of the current topics in the field of behavioural physiology and sociobiology. They will gain an insight into the latest physiological, neurobiological and behavioural methods. The results obtained will be graphically and statistically analysed, summarised in a scientific report and presented in a talk. Please contact the research groups at the Chair for available topics and opportunities.

Intended learning outcomes

The students are able to independently perform scientific experiments in the field of behavioural physiology and sociobiology. In addition, they are able to process and document the results obtained and to present them to a scientific audience.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Behavioural Physiology and Sociobiology F2			07-MS1VF2-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Behavioral Physiology and Sociobiology		Faculty of Biology	
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 will be integrated into one of the research groups at the Chair and will independently work on one of the current topics in the field of behavioural physiology and sociobiology. They will learn to plan experimental series and to apply the latest physiological, neurobiological and behavioural methods. The results obtained will be graphically and statistically analysed, summarised in a scientific report and presented in a talk. Please contact the research groups at the Chair for available topics and opportunities.

Intended learning outcomes

The students are able to independently perform scientific experiments in the field of behavioural physiology and sociobiology. In addition, they have learned to interpret the results obtained, taking into account current literature, and to place them in the context of other research in the field.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)

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) 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)

Module Group 2

(ECTS credits)

Molecular Cell- and Developmental Biology

(30 ECTS credits)

Module title			Abbreviation
Molecular Biology			07-MS2-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Molecular biology of the eukaryotic and prokaryotic cell. The lecture is a joint activity of the Chairs of Cell- and Developmental Biology, Microbiology, Biophysics and Bioinformatics and deals with concepts of modern molecular biology from the point of view of these different disciplines. Participants are recommended to read the textbook "Essential Cell Biology". The section on cell biology (app. a quarter of the lecture) mainly discusses the eukaryotic cell and intends to elucidate the vast diversity in structure and function of molecules, organelles and cells in addition to fundamental principles of modern molecular cell biology. The bioinformatics section (app. a quarter of the lecture) contains a large amount of examples for applications which allow the investigation of the molecular biology of a cell with bioinformatic tools. We closely adhere to the contents of the book "Essential Cell Biology" and present many clear and useful examples for the application of our tools when working on the topics of the other three Chairs. Our vision: bioinformatics essentially is molecular biology based on computing technology (time consuming "wet" experiments can be planned more easily and thus bioinformatics saves precious time). The microbiological section (app. a quarter of the lecture) deals with fundamental molecular aspects of prokaryotic cells. Key aspects include the organisation of the bacterial genome, the transcription and translation machinery, mechanisms of regulation of gene expression, transport of small molecules and macromolecules, cell division and differentiation, bacterial motility and chemotaxis, signal transduction and bacterial communication mechanisms. Recommended reading: (a) Allgemeine Mikrobiologie (Fuchs) and (b) Biology of Microorganisms (Brock).

Intended learning outcomes

Master level knowledge about the molecular biology of the eukaryotic and prokaryotic cell.

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

V (3)
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 is creditable for 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) 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) Biosciences (2018)
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
Cell and Developmental Biology Master 1	07-MS2ZE1-152-m01

Module coordinator	Module offered by
holder of the Chair of Cell Biology and Developmental 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

The module consists of the lecture *Zellpathologie* (*Cytopathology*) and the seminar *Zellbiologie-Meilensteine und Perspektiven* (*Milestones and Perspectives of Cell Biology*). The lecture describes pathological states of the cell and unravels their biological causes and consequences, such as infection, apoptosis, senescence, metabolic disorders and cancer. In the seminar *Milestones and Perspectives of Cell Biology*, classic ground-breaking publications in the field of cell biology are discussed from an unusual point of view.

Intended learning outcomes

Students possess a knowledge of the theoretical principles underlying cell pathology and are able to put this into the broader context of cell biology research.

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

V (1) + S (2)
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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Cell and Developmental Biology Master 2	07-MS2ZE2-152-m01

Module coordinator	Module offered by
holder of the Chair of Cell Biology and Developmental 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

The module consists of the lecture *Signale und Differenzierung* (Signals and Differentiation) and the seminar *Entwicklungsbiologie - Meilensteine und Perspektiven* (*Milestones and Perspectives of Developmental Biology*). The lecture *Signals and Differentiation* does not attempt to impart pure textbook knowledge. Instead, historically important as well as particularly interesting and important trend-setting topics in developmental biology are presented. The topics range from classical developmental subjects such as tissue regeneration and morphogenetic cell migration to molecular stem cell biology, epigenetic plasticity, origins of multicellularity and development within changing environments. In the seminar *Milestones and Perspectives of Developmental Biology*, classic ground-breaking publications in the field of developmental biology are discussed from an unusual point of view.

Intended learning outcomes

Participants possess a knowledge of the theoretical and molecular biological principles underlying developmental biology and are able to put this into the broader context of cell and developmental biology research.

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 is creditable for 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) 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) Biosciences (2018)
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
Cell and Developmental Biology F1			07-MS2ZEF1-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Cell Biology and Developmental 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

This 5 week full-time practical course provides an introduction to modern cell and developmental biology-related methods with a focus on bio-imaging techniques. A broad variety of model organisms is covered and the participants are encouraged to independently design and perform their own experiments. Participants use their acquired technological skills to analyse important basic biological processes. Large parts of this practical course are devoted to small projects, which should provide sustained insights into current research activities of the Chair. Interactions with Master's students, doctoral researchers and post-docs prepare participants for a working in a team-based environment.

Intended learning outcomes

The participants are able to approach complex scientific questions in the fields of cell and developmental biology and to independently implement acquired methodological tools to answer these questions. They are able to perform and document cell and developmental biology-related experiments, adhering to a generally accepted code of scientific practice.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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) 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)

Module title	Abbreviation
Cell and Developmental Biology F2	07-MS2ZEF2-152-m01

Module coordinator	Module offered by
holder of the Chair of Cell Biology and Developmental Biology	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Well-defined aspects of scientific projects are addressed with independently designed experiments in the context of current research projects in the field of cell and developmental biology. The techniques applied are evaluated on the basis of the results obtained and modified where necessary. The results of all experiments as well as the impact on the research project are presented and discussed in a progress report seminar within the research group.

Intended learning outcomes

The participants are able to independently carry out scientific experiments in the fields of cell and developmental biology and to modify them according to the outcome. They are able to independently approach current scientific topics and to perform, interpret and document experiments, adhering to accepted rules of scientific practice.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)

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) 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)

Molecular Parasitology

(30 ECTS credits)

Students who selected this subject area must take module 07-MSPAR. The second theoretical module in this subject area may be selected from the list below.

Module title			Abbreviation
Molecular Parasitology			07-MSPAR-171-m01
Module coordinator		**Module offered by**	
holder of the Chair of Cell Biology and Developmental 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

The lecture *Molecular Parasitology* discusses molecular and genetic aspects of parasitic diseases in humans and animals. Special emphasis is on neglected tropical diseases.

Intended learning outcomes

Participants possess a knowledge of the theoretical principles underlying parasitology and are able to put this into the broader context of molecular cell biology research.

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

V (1) + S (2)
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 is creditable for 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) FOKUS Life Sciences (2015)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
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)

Module title			Abbreviation
Molecular Biology			07-MS2-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Molecular biology of the eukaryotic and prokaryotic cell. The lecture is a joint activity of the Chairs of Cell- and Developmental Biology, Microbiology, Biophysics and Bioinformatics and deals with concepts of modern molecular biology from the point of view of these different disciplines. Participants are recommended to read the textbook "Essential Cell Biology". The section on cell biology (app. a quarter of the lecture) mainly discusses the eukaryotic cell and intends to elucidate the vast diversity in structure and function of molecules, organelles and cells in addition to fundamental principles of modern molecular cell biology. The bioinformatics section (app. a quarter of the lecture) contains a large amount of examples for applications which allow the investigation of the molecular biology of a cell with bioinformatic tools. We closely adhere to the contents of the book "Essential Cell Biology" and present many clear and useful examples for the application of our tools when working on the topics of the other three Chairs. Our vision: bioinformatics essentially is molecular biology based on computing technology (time consuming "wet" experiments can be planned more easily and thus bioinformatics saves precious time). The microbiological section (app. a quarter of the lecture) deals with fundamental molecular aspects of prokaryotic cells. Key aspects include the organisation of the bacterial genome, the transcription and translation machinery, mechanisms of regulation of gene expression, transport of small molecules and macromolecules, cell division and differentiation, bacterial motility and chemotaxis, signal transduction and bacterial communication mechanisms. Recommended reading: (a) Allgemeine Mikrobiologie (Fuchs) and (b) Biology of Microorganisms (Brock).

Intended learning outcomes

Master level knowledge about the molecular biology of the eukaryotic and prokaryotic cell.

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

V (3)
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 is creditable for 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) 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) Biosciences (2018)
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
Methods in Life Sciences			07-MLS1-171-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 is creditable for 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) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
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
Molecular Parasitology F1	07-MSPARF1-171-m01

Module coordinator	Module offered by
holder of the Chair of Cell Biology and Developmental 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

This 5-week full-time practical course provides an introduction to modern methods and concepts in molecular parasitology. It introduces participants to a variety of parasites and encourages them to design and perform experiments of their own. Participants use the skills they have developed to analyse important biomedical processes.

Intended learning outcomes

The participants are able to perform scientific experiments in the field of molecular parasitology and to apply appropriate methods. They are able to address and document fundamental scientific questions, adhering to the rules of good scientific practice.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) FOKUS Life Sciences (2015)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title	Abbreviation
Molecular Parasitology F2	07-MSPARF2-171-m01

Module coordinator	Module offered by
holder of the Chair of Cell Biology and Developmental Biology	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Well-defined aspects of scientific projects are addressed with independently designed experiments in the context of current research projects in the field of molecular parasitology. The techniques applied are evaluated on the basis of the results obtained and modified where necessary. The results of all experiments as well as the impact on the research project are presented and discussed in a concluding progress report.

Intended learning outcomes

The participants are able to independently carry out scientific experiments in the field of molecular parasitology and to modify them according to the outcome. They are able to independently approach current scientific topics and to perform, interpret and document experiments, adhering to accepted rules of scientific practice.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Microbiology and Infection Biology

(30 ECTS credits)

Module title			Abbreviation
Molecular Biology			07-MS2-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Molecular biology of the eukaryotic and prokaryotic cell. The lecture is a joint activity of the Chairs of Cell- and Developmental Biology, Microbiology, Biophysics and Bioinformatics and deals with concepts of modern molecular biology from the point of view of these different disciplines. Participants are recommended to read the textbook "Essential Cell Biology". The section on cell biology (app. a quarter of the lecture) mainly discusses the eukaryotic cell and intends to elucidate the vast diversity in structure and function of molecules, organelles and cells in addition to fundamental principles of modern molecular cell biology. The bioinformatics section (app. a quarter of the lecture) contains a large amount of examples for applications which allow the investigation of the molecular biology of a cell with bioinformatic tools. We closely adhere to the contents of the book "Essential Cell Biology" and present many clear and useful examples for the application of our tools when working on the topics of the other three Chairs. Our vision: bioinformatics essentially is molecular biology based on computing technology (time consuming "wet" experiments can be planned more easily and thus bioinformatics saves precious time). The microbiological section (app. a quarter of the lecture) deals with fundamental molecular aspects of prokaryotic cells. Key aspects include the organisation of the bacterial genome, the transcription and translation machinery, mechanisms of regulation of gene expression, transport of small molecules and macromolecules, cell division and differentiation, bacterial motility and chemotaxis, signal transduction and bacterial communication mechanisms. Recommended reading: (a) Allgemeine Mikrobiologie (Fuchs) and (b) Biology of Microorganisms (Brock).

Intended learning outcomes

Master level knowledge about the molecular biology of the eukaryotic and prokaryotic cell.

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

V (3)
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 is creditable for 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) 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) Biosciences (2018)
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
Infection Biology			07-MS2INF-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)
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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Pathogenicity of Microorganisms			07-MS2PA-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)
Module taught in: English

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

a) written examination (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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Microbiology F1	07-MS2MF1-152-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

Participants will work independently on a current research project dealing with microbial pathogens and their interactions with the host. Participants will employ a variety of state-of-the-art methods within the fields of molecular biology, microbiology, cellular biology, and immunology as well as data analysis and literature research techniques. Results will be documented and discussed in a seminar paper or an oral presentation.

Intended learning outcomes

Participants will acquire the skills to experimentally address scientific questions in molecular biology and infection biology, properly document experimental results and adhere to the standards of good scientific practice.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

The internship must be completed full-time within a period of 5 to 6 weeks.

Workload

300 h

Teaching cycle

Teaching cycle: Ongoing, after consultation with the supervisor and registration for both winter and summer semesters.

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

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Module appears in

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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Microbiology F2			07-MS2MF2-152-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)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Participants will work independently on a current research project dealing with microbiology and infection biology. They will apply advanced experimental techniques in microbiology, cell biology and molecular biology according to the project requirements. Progress of the research project will be reported in a seminar paper, a research paper or an oral presentation.

Intended learning outcomes

The participants will acquire the skills to independently perform basic research on microbiology and infection biology according to the standards of good scientific practice and to properly document, interpret and present experimental results.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

The internship must be completed full-time within a period of 10 to 12 weeks.

Workload

450 h

Teaching cycle

Teaching cycle: Ongoing, after consultation with the supervisor and registration for both winter and summer semesters.

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

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Module appears in

Master's degree (1 major) Biology (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) Biosciences (2018)
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) 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)

Cellular and Molecular Biotechnology

(30 ECTS credits)

Module title			Abbreviation
Molecular Biology			07-MS2-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Molecular biology of the eukaryotic and prokaryotic cell. The lecture is a joint activity of the Chairs of Cell- and Developmental Biology, Microbiology, Biophysics and Bioinformatics and deals with concepts of modern molecular biology from the point of view of these different disciplines. Participants are recommended to read the textbook "Essential Cell Biology". The section on cell biology (app. a quarter of the lecture) mainly discusses the eukaryotic cell and intends to elucidate the vast diversity in structure and function of molecules, organelles and cells in addition to fundamental principles of modern molecular cell biology. The bioinformatics section (app. a quarter of the lecture) contains a large amount of examples for applications which allow the investigation of the molecular biology of a cell with bioinformatic tools. We closely adhere to the contents of the book "Essential Cell Biology" and present many clear and useful examples for the application of our tools when working on the topics of the other three Chairs. Our vision: bioinformatics essentially is molecular biology based on computing technology (time consuming "wet" experiments can be planned more easily and thus bioinformatics saves precious time). The microbiological section (app. a quarter of the lecture) deals with fundamental molecular aspects of prokaryotic cells. Key aspects include the organisation of the bacterial genome, the transcription and translation machinery, mechanisms of regulation of gene expression, transport of small molecules and macromolecules, cell division and differentiation, bacterial motility and chemotaxis, signal transduction and bacterial communication mechanisms. Recommended reading: (a) Allgemeine Mikrobiologie (Fuchs) and (b) Biology of Microorganisms (Brock).

Intended learning outcomes

Master level knowledge about the molecular biology of the eukaryotic and prokaryotic cell.

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

V (3)
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 is creditable for 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) 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) Biosciences (2018)
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
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 is creditable for 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
Biophysics and Biochemistry			07-MS3BB-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology 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

The module imparts theoretical and methodological knowledge of plant membrane transport, structural biology and biochemistry which is illustrated with specific examples from current research. Depending on the number of participants and their interests, practical demonstrations of methods that are currently used give students an opportunity to experience the practical aspects of biophysical and biochemical research.

Intended learning outcomes

Students are able to use methods dealing with soluble proteins or membrane proteins in the fields of biophysics, structural biology and biochemistry. They are able to interpret the data and to discuss the results within the context of current knowledge.

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 is creditable for 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) 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) Biosciences (2018)
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
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 is creditable for 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 F1			07-MS2BTF1-152-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 practical course provides students with an insight into different biotechnological and biophysical topics and methods. Under expert guidance, students will perform selected experiments on the following topics: cellular and molecular biotechnology, nano and microsystems biotechnology, biomaterials and biosensors, high-resolution fluorescence microscopy, fluorescence spectroscopy, analysis and electromanipulation of cells.

Intended learning outcomes

Students will have acquired a knowledge of fundamental biotechnological and 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. Students will have acquired practical experience performing experiments, using a variety of scientific tools. In the seminar, students will have acquired detailed theoretical knowledge on these experiments and will have delivered a short presentation (15 minutes) on one of the experiments they performed.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Biophysics and Molecular Biotechnology F2			07-MS2BTF2-152-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)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This practical course provides students with an insight into different biotechnological and biophysical topics and is close to laboratory research. Under expert guidance, students will perform selected experiments on one of the following topics: cellular and molecular biotechnology, nano and microsystems biotechnology, biomaterials and biosensors, high-resolution fluorescence microscopy, fluorescence spectroscopy, analysis and electromanipulation of cells. Performing experiments under expert guidance, students will become acquainted with techniques and instruments. Over the duration of the course, students will then be required to work increasingly independently on current research topics. Work on current research topics will spark the students' interest in topics and will help them select a topic for their Master's thesis.

Intended learning outcomes

Students will become acquainted with modern biophysical methods and their applications in biotechnology. They will be able to independently work on scientific problems, to independently study relevant literature and to develop a quantitative understanding of biophysical mechanisms. In the seminar, students will acquire further theoretical knowledge on experiments and will give short presentations on experiments performed.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)
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) 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)

Tissue Engineering and regenerative Medicine

(30 ECTS credits)

Students who selected this subject area must take module 03-MSTE. The second theoretical module in this subject area may be selected from the list below.

Module title			Abbreviation
Tissue Engineering			03-MSTE-171-m01
Module coordinator		**Module offered by**	
unknown		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	unknown	--	

Contents

No information on contents available.

Intended learning outcomes

No information on intended learning outcomes available.

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

V (1) + S (2)
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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Molecular Biology			07-MS2-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Molecular biology of the eukaryotic and prokaryotic cell. The lecture is a joint activity of the Chairs of Cell- and Developmental Biology, Microbiology, Biophysics and Bioinformatics and deals with concepts of modern molecular biology from the point of view of these different disciplines. Participants are recommended to read the textbook "Essential Cell Biology". The section on cell biology (app. a quarter of the lecture) mainly discusses the eukaryotic cell and intends to elucidate the vast diversity in structure and function of molecules, organelles and cells in addition to fundamental principles of modern molecular cell biology. The bioinformatics section (app. a quarter of the lecture) contains a large amount of examples for applications which allow the investigation of the molecular biology of a cell with bioinformatic tools. We closely adhere to the contents of the book "Essential Cell Biology" and present many clear and useful examples for the application of our tools when working on the topics of the other three Chairs. Our vision: bioinformatics essentially is molecular biology based on computing technology (time consuming "wet" experiments can be planned more easily and thus bioinformatics saves precious time). The microbiological section (app. a quarter of the lecture) deals with fundamental molecular aspects of prokaryotic cells. Key aspects include the organisation of the bacterial genome, the transcription and translation machinery, mechanisms of regulation of gene expression, transport of small molecules and macromolecules, cell division and differentiation, bacterial motility and chemotaxis, signal transduction and bacterial communication mechanisms. Recommended reading: (a) Allgemeine Mikrobiologie (Fuchs) and (b) Biology of Microorganisms (Brock).

Intended learning outcomes

Master level knowledge about the molecular biology of the eukaryotic and prokaryotic cell.

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

V (3)
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 is creditable for 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) 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) Biosciences (2018)
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
Methods in Life Sciences			07-MLS1-171-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 is creditable for 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) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
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
Tissue engineering and regenerative Medicine F1			03-MSTEF1-171-m01
Module coordinator		**Module offered by**	
unknown		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	unknown	--	

Contents

No information on contents available.

Intended learning outcomes

No information on intended learning outcomes available.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Tissue engineering and regenerative Medicine F2			03-MSTEF2-171-m01
Module coordinator		**Module offered by**	
unknown		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	unknown	--	

Contents

No information on contents available.

Intended learning outcomes

No information on intended learning outcomes available.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Bioinformatics

(30 ECTS credits)

Students who selected this subject area must take module 07-MS2BI. The second theoretical module in this subject area may be selected from the list below.

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 is creditable for 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
Neurobiology, Behavioural Physiology and Animal Ecology	07-MS1-152-m01

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

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Timing matters: Temporal organisation in the animal kingdom. Timing plays an important role in all living systems. Animals make use of endogenous clocks to predict and adapt to daily or seasonal changes in environmental parameters. To be at the right place at the right time is of great fitness relevance if -for example- a mating partner or enough food has to be found. Many mutualistic, antagonistic or social interactions can only take place if animals are at the same place at the same time and in the appropriate developmental stage. The lecture gives an introduction to the mechanisms underlying the temporal organisation in the animal kingdom. Adopting an integrative approach, the lecture goes from timing mechanisms on the neuronal level to individual behaviour and then to interactions in social groups, populations or partners in complex and variable ecosystems.

Intended learning outcomes

Students get to know the advantages of an integrative approach when analysing complex biological systems. They learn to relate and integrate different fields within biology. In the seminar, students practise the discussion of research findings.

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 is creditable for 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) 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) Biosciences (2018)
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
Molecular and Clinical Neurobiology	07-MS1N-152-m01

Module coordinator	Module offered by
Managing Director of the Institute of Clinical Neurobiology	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

Content of the lecture *Molekulare und klinische Neurobiologie* (*Molecular and Clinical Neurobiology*) - cells of the nervous system, properties of neurons and glial cells - ion channels and excitability of membranes, channelopathies - synapses, transmitter release, neuromuscular end plate, Myasthenia gravis - motor activity, anatomy of the human motor system, spinal reflexes, motor neuron diseases - cerebellum, ataxia and basal ganglia, Morbus Parkinson - muscles and muscle diseases - somatosensory system and pain - hippocampus, learning and memory, anterograde amnesia, visual agnosia - cortex, Morbus Alzheimer - sleep, EEG, epilepsy - sensory physiology, vision, diseases of the visual system; Reading: Kandel, Principles of Neural Science, 4th Edition: A detailed description of this course is also available at http://neurobiologie.uk-wuerzburg.de/lehrveranstaltungen.html. The lecture Molecular and Clinical Neurobiology (incl. seminar) and *Neuroentwicklungsbiologie* (*Neurodevelopment*; Fridays 8-9 a. m.) together form one theoretical module (10 ECTS). However, you may also complete these two modules separately and have them credited within the area of mandatory electives 2.

Intended learning outcomes

Theoretical foundations of molecular and clinical neurobiology, developmental mechanisms of neuronal diseases.

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 is creditable for 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)

Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title	Abbreviation
Animal Ecology and Tropical Biology	07-MS1TÖ-152-m01

Module coordinator	Module offered by
holder of the Chair of Animal Ecology and Tropical 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

This module consists of a lecture and a seminar. The lecture gives an overview of the theoretical foundations and current issues in animal ecology. Focus will be on biodiversity and ecosystem functions, multi-trophic interactions and food nets, evolutionary ecology, chemical ecology, tropical ecology, agricultural ecology, and global change. In the seminar, recent scientific publications within the topics mentioned above will be presented and discussed.

Intended learning outcomes

The students will acquire an advanced knowledge of ecological theories and current research issues in the field of animal ecology. They will be able to interpret scientific publications and apply the acquired knowledge to the solution of current environmental risks.

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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Animal Communication	07-MS1K-152-m01

Module coordinator	Module offered by
holder of the Chair of Behavioral Physiology and Sociobiology	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

The lectures deal with physiological and neurobiological principles of the different communication channels used by animals, but also highlight adaptive values and evolutionary aspects of animal signalling. In a follow-up seminar session, students will deepen their knowledge by presenting and discussing current papers related to the topic of the lecture.

Intended learning outcomes

Students understand the value of an integrative approach when looking at complex issues in biology. They have learned to connect findings from different research areas, such as physiology, neurobiology, behaviour and ecological conditions, in order to gain a more complete picture of a topic. In addition, students have learned to present and discuss current scientific publications within a broader theoretical framework.

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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (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) Biosciences (2018)

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)

Module title			Abbreviation
Molecular Biology			07-MS2-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Molecular biology of the eukaryotic and prokaryotic cell. The lecture is a joint activity of the Chairs of Cell- and Developmental Biology, Microbiology, Biophysics and Bioinformatics and deals with concepts of modern molecular biology from the point of view of these different disciplines. Participants are recommended to read the textbook "Essential Cell Biology". The section on cell biology (app. a quarter of the lecture) mainly discusses the eukaryotic cell and intends to elucidate the vast diversity in structure and function of molecules, organelles and cells in addition to fundamental principles of modern molecular cell biology. The bioinformatics section (app. a quarter of the lecture) contains a large amount of examples for applications which allow the investigation of the molecular biology of a cell with bioinformatic tools. We closely adhere to the contents of the book "Essential Cell Biology" and present many clear and useful examples for the application of our tools when working on the topics of the other three Chairs. Our vision: bioinformatics essentially is molecular biology based on computing technology (time consuming "wet" experiments can be planned more easily and thus bioinformatics saves precious time). The microbiological section (app. a quarter of the lecture) deals with fundamental molecular aspects of prokaryotic cells. Key aspects include the organisation of the bacterial genome, the transcription and translation machinery, mechanisms of regulation of gene expression, transport of small molecules and macromolecules, cell division and differentiation, bacterial motility and chemotaxis, signal transduction and bacterial communication mechanisms. Recommended reading: (a) Allgemeine Mikrobiologie (Fuchs) and (b) Biology of Microorganisms (Brock).

Intended learning outcomes

Master level knowledge about the molecular biology of the eukaryotic and prokaryotic cell.

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

V (3)
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 is creditable for 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) 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) Biosciences (2018)
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
Cell and Developmental Biology Master 1	07-MS2ZE1-152-m01

Module coordinator	Module offered by
holder of the Chair of Cell Biology and Developmental 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

The module consists of the lecture *Zellpathologie* (*Cytopathology*) and the seminar *Zellbiologie-Meilensteine und Perspektiven* (*Milestones and Perspectives of Cell Biology*). The lecture describes pathological states of the cell and unravels their biological causes and consequences, such as infection, apoptosis, senescence, metabolic disorders and cancer. In the seminar *Milestones and Perspectives of Cell Biology*, classic ground-breaking publications in the field of cell biology are discussed from an unusual point of view.

Intended learning outcomes

Students possess a knowledge of the theoretical principles underlying cell pathology and are able to put this into the broader context of cell biology research.

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

V (1) + S (2)
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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Cell and Developmental Biology Master 2	07-MS2ZE2-152-m01

Module coordinator	Module offered by
holder of the Chair of Cell Biology and Developmental 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

The module consists of the lecture *Signale und Differenzierung* (Signals and Differentiation) and the seminar *Entwicklungsbiologie - Meilensteine und Perspektiven* (*Milestones and Perspectives of Developmental Biology*). The lecture *Signals and Differentiation* does not attempt to impart pure textbook knowledge. Instead, historically important as well as particularly interesting and important trend-setting topics in developmental biology are presented. The topics range from classical developmental subjects such as tissue regeneration and morphogenetic cell migration to molecular stem cell biology, epigenetic plasticity, origins of multicellularity and development within changing environments. In the seminar *Milestones and Perspectives of Developmental Biology*, classic ground-breaking publications in the field of developmental biology are discussed from an unusual point of view.

Intended learning outcomes

Participants possess a knowledge of the theoretical and molecular biological principles underlying developmental biology and are able to put this into the broader context of cell and developmental biology research.

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 is creditable for 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) 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) Biosciences (2018)
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
Infection Biology			07-MS2INF-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)
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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Pathogenicity of Microorganisms			07-MS2PA-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)
Module taught in: English

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

a) written examination (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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Immunology 1	07-MS2IM1-152-m01

Module coordinator	Module offered by
Managing Director of the Institute of Virology and Immunobiology	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 concepts of modern cellular and molecular immunology. More information is available at http://www.virologie.uni-wuerzburg.de/lehrveranstaltungen/vorlesungen_und_praktika/immunologie/immunologie_biologen_master/.

Intended learning outcomes

Students will gain knowledge about, and will be able to present and discuss basic concepts and methods in molecular and cellular immunology.

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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English
Assessment offered: Winter semester only

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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Immunology 2			07-MS2IM2-152-m01
Module coordinator			**Module offered by**
Managing Director of the Institute of Virology and Immunobiology			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

Recent progress in molecular and cellular immunology. Deeper insights into selected immunology chapters, such as autoimmunity and immunomodulation, development of the immune system, immunogenetics, evolution of the immune system, infection immunology, and more.

Intended learning outcomes

Students are able to understand current topics 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English
Assessment offered: Summer semester only

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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Molecular Virology			03-MSMV-171-m01
Module coordinator		**Module offered by**	
unknown		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	unknown	--	

Contents

No information on contents available.

Intended learning outcomes

No information on intended learning outcomes available.

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

V (1) + S (2)
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 is creditable for bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 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) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
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)

Module title			Abbreviation
Human Genetics			07-MS2HG-152-m01
Module coordinator		**Module offered by**	
Managing Director of the Institute of Human Genetics		Faculty of Biology	
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 will have gained the ability to understand current issues in human genetics and to discuss these in depth.

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 is creditable for 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
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)

Module title			Abbreviation
Current Methods in Biology			07-MS31-152-m01

Module coordinator	Module offered by
holder of the Chair of Plant Physiology 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 series imparts the theoretical background of fundamental and up-to-date molecular biological methods in plant sciences. Special emphasis is placed on analytical tools, large-scale data analysis and their application.

Intended learning outcomes

At the end of the lecture series, students will (I) be able to qualitatively evaluate results acquired with analytical and molecular biological methods and to integrate them into the context of the current scientific knowledge in this field (II) have gained an overview of the advantages/disadvantages of analytical and molecular biological approaches (III) be able to apply the knowledge they have acquired to design their own experimental strategies for addressing a specific research question.

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

V (3)
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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Plant Ecology	07-MS31POEK-152-m01

Module coordinator	Module offered by
holder of the Chair of Ecophysiology and Vegetation Ecology	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

The lecture will deal with the ecological and environmental constraints under which plants grow and develop (biogeography, biodiversity) and with the interactions of plants with abiotic and biotic environmental factors (e. g. plant-insect, plant-fungus interactions). The evolutionary adaptations on the physiological and organismic level will be emphasised in particular (stress and defence reactions, carnivory, plant protection). Corresponding experimental approaches will be illustrated. Based on selected examples from current research, the seminar will address the topics covered in the lecture in more detail. It will be complemented by topic-related guided tours in the Botanical Garden of the University of Würzburg.

Intended learning outcomes

Participants are able to identify and interpret ecological and ecophysiological interrelations and to discuss them in the context of the current state of knowledge in these fields.

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 is creditable for 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) 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) Biosciences (2018)

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)

Module title			Abbreviation
Plant Immunobiology and Pharmaceutical Biology			07-MS31PIP-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Ecophysiology and Vegetation Ecology		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 addresses topics of pathogen recognition and signal transduction in plants, molecular and organismic defence and the pharmaceutical relevance of plant-derived bioactive compounds. Plant immunobiology: interactions between plants and pathogens comprise evolutionary dynamic and complex systems. Different strategies of the pathogens - bacteria, fungi and viruses - as well as defence mechanisms of the host plants will be discussed. The molecular mechanisms of pathogen recognition, signal transduction, regulation of gene expression and activation of local and systemic defence responses are in the focus of this lecture. Differences and similarities between plant and human immune systems will be pointed out. Understanding plant-pathogen-interactions and molecular mechanisms determining susceptibility and defence is fundamental for the development of strategies in plant protection. Evolution, function and pharmaceutical relevance of plant secondary metabolites: Secondary metabolites are part of effective plant defence strategies against microorganisms and herbivores and are often essential for survival. The evolution of secondary metabolism will be discussed and general as well as specific defence strategies will be explained. Pharmacological mechanisms of action and molecular targets of important classes of plant bioactive compounds will be presented. A high proportion of currently used drugs have been developed from plant secondary metabolites that have been used as lead structures to generate potent drugs with improved pharmaceutical properties. Examples of therapies with very potent plant pharmaceuticals (evidence-based medicine) as well as possibilities and limitations of phytotherapy (traditional medicine) will be discussed.

Intended learning outcomes

Students are able to understand the interaction between plants and the environment on a molecular level and to discuss the topic in the context of the scientific state of the art.

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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Biophysics and Biochemistry			07-MS3BB-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology 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

The module imparts theoretical and methodological knowledge of plant membrane transport, structural biology and biochemistry which is illustrated with specific examples from current research. Depending on the number of participants and their interests, practical demonstrations of methods that are currently used give students an opportunity to experience the practical aspects of biophysical and biochemical research.

Intended learning outcomes

Students are able to use methods dealing with soluble proteins or membrane proteins in the fields of biophysics, structural biology and biochemistry. They are able to interpret the data and to discuss the results within the context of current knowledge.

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 is creditable for 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) 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) Biosciences (2018)
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
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 is creditable for 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
Bioinformatics F1	07-MS2BIF1-152-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

Detailed insight into methods in bioinformatics; depending on the topic selected, fields covered include: genomics (sequence-, domain analysis and annotation), omics data analysis (NGS, transcriptomics, metabolomics, proteomics), topological and structural analysis of biological interactions including statistical methods, phylogenetic analysis, protein structure analysis. Results are documented in the form of a presentation, a publication or a term paper.

Intended learning outcomes

Students have gained knowledge on experimental setups and methods used in the field of bioinformatics. They are able to design experiments, collect data and interpret them statistically, adhering to the principles of good scientific practice.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
Master's degree (1 major) Computational Mathematics (2019)
Master's degree (1 major) Mathematics (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
Bioinformatics F2	07-MS2BIF2-152-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)
15	(not) successfully completed	--

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Advanced insight into methods in bioinformatics; depending on the topic selected, fields covered include: genomics (sequence-, domain analysis and annotation), omics data analysis (NGS, transcriptomics, metabolomics, proteomics), topological and structural analysis of biological interactions including statistical methods, phylogenetic analysis, protein structure analysis. The techniques applied are evaluated on the basis of the results obtained and are modified where necessary. Results are documented in the form of a presentation, a publication or a term paper.

Intended learning outcomes

Proficiency in one or more methods in bioinformatics that allows students to independently perform and organise a scientific project in the field of bioinformatics and to document the results obtained. Students are able to design a research project and are prepared for working on a scientific question for their thesis.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) 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) Biosciences (2018)
Master's degree (1 major) Computational Mathematics (2019)
Master's degree (1 major) Mathematics (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)

Immunology

(30 ECTS credits)

Module title	Abbreviation
Immunology 1	07-MS2IM1-152-m01

Module coordinator	Module offered by
Managing Director of the Institute of Virology and Immunobiology	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 concepts of modern cellular and molecular immunology. More information is available at http://www.virologie.uni-wuerzburg.de/lehrveranstaltungen/vorlesungen_und_praktika/immunologie/immunologie_biologen_master/.

Intended learning outcomes

Students will gain knowledge about, and will be able to present and discuss basic concepts and methods in molecular and cellular immunology.

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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English
Assessment offered: Winter semester only

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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Immunology 2			07-MS2IM2-152-m01
Module coordinator			**Module offered by**
Managing Director of the Institute of Virology and Immunobiology			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

Recent progress in molecular and cellular immunology. Deeper insights into selected immunology chapters, such as autoimmunity and immunomodulation, development of the immune system, immunogenetics, evolution of the immune system, infection immunology, and more.

Intended learning outcomes

Students are able to understand current topics 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English
Assessment offered: Summer semester only

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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title	Abbreviation
Immunology F1	07-MS2IMF1-152-m01

Module coordinator	Module offered by
Managing Director of the Institute of Virology and Immunobiology	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

Students will complete a 2-week lab course at the Institute of Virology and Immunobiology during which they will become familiar with fundamental methods in cellular and molecular immunology. Afterwards, students will select a laboratory at the Institute or one of the participating institutions (e. g. clinics, Virchow Center, molecular infection immunology and others) and will spend three weeks working on a defined project. Results of the lab course and lab project will be documented in a log and will be presented at the end of the course.

Intended learning outcomes

The students learn to apply experimental procedures and methods in immunology, to independently address scientific questions and to appropriately document their experimental work.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title	Abbreviation
Immunology F2	07-MS2IMF2-152-m01

Module coordinator	Module offered by
Managing Director of the Institute of Virology and Immunobiology	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Critically reading and presenting original research papers (in English language), participants will independently investigate current problems in immunology. They will be involved in the development of a research plan and will independently apply advanced techniques in cellular and/or molecular immunology.

Intended learning outcomes

The participants acquire skills allowing them to work independently in the field of cellular and molecular immunology. This includes competence to address immunological problems on their own and to conduct, document and interpret their research according to good research practice.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Molecular Virology

(30 ECTS credits)

Students who selected this subject area must take module 07-MSMV. The second theoretical module in this subject area may be selected from the list below.

Module title			Abbreviation
Molecular Virology			03-MSMV-171-m01
Module coordinator		**Module offered by**	
unknown		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	unknown	--	

Contents

No information on contents available.

Intended learning outcomes

No information on intended learning outcomes available.

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

V (1) + S (2)
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 is creditable for bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 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) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
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)

Module title			Abbreviation
Molecular Biology			07-MS2-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Molecular biology of the eukaryotic and prokaryotic cell. The lecture is a joint activity of the Chairs of Cell- and Developmental Biology, Microbiology, Biophysics and Bioinformatics and deals with concepts of modern molecular biology from the point of view of these different disciplines. Participants are recommended to read the textbook "Essential Cell Biology". The section on cell biology (app. a quarter of the lecture) mainly discusses the eukaryotic cell and intends to elucidate the vast diversity in structure and function of molecules, organelles and cells in addition to fundamental principles of modern molecular cell biology. The bioinformatics section (app. a quarter of the lecture) contains a large amount of examples for applications which allow the investigation of the molecular biology of a cell with bioinformatic tools. We closely adhere to the contents of the book "Essential Cell Biology" and present many clear and useful examples for the application of our tools when working on the topics of the other three Chairs. Our vision: bioinformatics essentially is molecular biology based on computing technology (time consuming "wet" experiments can be planned more easily and thus bioinformatics saves precious time). The microbiological section (app. a quarter of the lecture) deals with fundamental molecular aspects of prokaryotic cells. Key aspects include the organisation of the bacterial genome, the transcription and translation machinery, mechanisms of regulation of gene expression, transport of small molecules and macromolecules, cell division and differentiation, bacterial motility and chemotaxis, signal transduction and bacterial communication mechanisms. Recommended reading: (a) Allgemeine Mikrobiologie (Fuchs) and (b) Biology of Microorganisms (Brock).

Intended learning outcomes

Master level knowledge about the molecular biology of the eukaryotic and prokaryotic cell.

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

V (3)
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 is creditable for 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) 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) Biosciences (2018)
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
Methods in Life Sciences			07-MLS1-171-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 is creditable for 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) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
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
Molecular Virology F1			03-MSMVF1-172-m01
Module coordinator		**Module offered by**	
unknown		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	unknown	--	

Contents

No information on contents available.

Intended learning outcomes

No information on intended learning outcomes available.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Molecular Virology F2			03-MSMVF2-172-m01
Module coordinator		**Module offered by**	
unknown		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	unknown	--	

Contents

No information on contents available.

Intended learning outcomes

No information on intended learning outcomes available.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Human Genetics

(30 ECTS credits)

Students who selected this subject area must take module 07-MS2HG. The second theoretical module in this subject area may be selected from the list below.

Module title			Abbreviation
Human Genetics			07-MS2HG-152-m01
Module coordinator		**Module offered by**	
Managing Director of the Institute of Human Genetics		Faculty of Biology	
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 will have gained the ability to understand current issues in human genetics and to discuss these in depth.

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 is creditable for 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
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)

Module title			Abbreviation
Molecular Biology			07-MS2-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Molecular biology of the eukaryotic and prokaryotic cell. The lecture is a joint activity of the Chairs of Cell- and Developmental Biology, Microbiology, Biophysics and Bioinformatics and deals with concepts of modern molecular biology from the point of view of these different disciplines. Participants are recommended to read the textbook "Essential Cell Biology". The section on cell biology (app. a quarter of the lecture) mainly discusses the eukaryotic cell and intends to elucidate the vast diversity in structure and function of molecules, organelles and cells in addition to fundamental principles of modern molecular cell biology. The bioinformatics section (app. a quarter of the lecture) contains a large amount of examples for applications which allow the investigation of the molecular biology of a cell with bioinformatic tools. We closely adhere to the contents of the book "Essential Cell Biology" and present many clear and useful examples for the application of our tools when working on the topics of the other three Chairs. Our vision: bioinformatics essentially is molecular biology based on computing technology (time consuming "wet" experiments can be planned more easily and thus bioinformatics saves precious time). The microbiological section (app. a quarter of the lecture) deals with fundamental molecular aspects of prokaryotic cells. Key aspects include the organisation of the bacterial genome, the transcription and translation machinery, mechanisms of regulation of gene expression, transport of small molecules and macromolecules, cell division and differentiation, bacterial motility and chemotaxis, signal transduction and bacterial communication mechanisms. Recommended reading: (a) Allgemeine Mikrobiologie (Fuchs) and (b) Biology of Microorganisms (Brock).

Intended learning outcomes

Master level knowledge about the molecular biology of the eukaryotic and prokaryotic cell.

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

V (3)
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 is creditable for 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) 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) Biosciences (2018)
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
Cell and Developmental Biology Master 1	07-MS2ZE1-152-m01

Module coordinator	Module offered by
holder of the Chair of Cell Biology and Developmental 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

The module consists of the lecture *Zellpathologie* (*Cytopathology*) and the seminar *Zellbiologie-Meilensteine und Perspektiven* (*Milestones and Perspectives of Cell Biology*). The lecture describes pathological states of the cell and unravels their biological causes and consequences, such as infection, apoptosis, senescence, metabolic disorders and cancer. In the seminar *Milestones and Perspectives of Cell Biology*, classic ground-breaking publications in the field of cell biology are discussed from an unusual point of view.

Intended learning outcomes

Students possess a knowledge of the theoretical principles underlying cell pathology and are able to put this into the broader context of cell biology research.

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

V (1) + S (2)
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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Cell and Developmental Biology Master 2	07-MS2ZE2-152-m01

Module coordinator	Module offered by
holder of the Chair of Cell Biology and Developmental 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

The module consists of the lecture *Signale und Differenzierung* (Signals and Differentiation) and the seminar *Entwicklungsbiologie - Meilensteine und Perspektiven* (*Milestones and Perspectives of Developmental Biology*). The lecture *Signals and Differentiation* does not attempt to impart pure textbook knowledge. Instead, historically important as well as particularly interesting and important trend-setting topics in developmental biology are presented. The topics range from classical developmental subjects such as tissue regeneration and morphogenetic cell migration to molecular stem cell biology, epigenetic plasticity, origins of multicellularity and development within changing environments. In the seminar *Milestones and Perspectives of Developmental Biology*, classic ground-breaking publications in the field of developmental biology are discussed from an unusual point of view.

Intended learning outcomes

Participants possess a knowledge of the theoretical and molecular biological principles underlying developmental biology and are able to put this into the broader context of cell and developmental biology research.

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 is creditable for 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) 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) Biosciences (2018)
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
Infection Biology			07-MS2INF-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)
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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Pathogenicity of Microorganisms			07-MS2PA-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)
Module taught in: English

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

a) written examination (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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Immunology 1	07-MS2IM1-152-m01

Module coordinator	Module offered by
Managing Director of the Institute of Virology and Immunobiology	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 concepts of modern cellular and molecular immunology. More information is available at http://www.virologie.uni-wuerzburg.de/lehrveranstaltungen/vorlesungen_und_praktika/immunologie/immunologie_biologen_master/.

Intended learning outcomes

Students will gain knowledge about, and will be able to present and discuss basic concepts and methods in molecular and cellular immunology.

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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English
Assessment offered: Winter semester only

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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Immunology 2			07-MS2IM2-152-m01
Module coordinator			**Module offered by**
Managing Director of the Institute of Virology and Immunobiology			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

Recent progress in molecular and cellular immunology. Deeper insights into selected immunology chapters, such as autoimmunity and immunomodulation, development of the immune system, immunogenetics, evolution of the immune system, infection immunology, and more.

Intended learning outcomes

Students are able to understand current topics 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English
Assessment offered: Summer semester only

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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Molecular Virology			03-MSMV-171-m01
Module coordinator		**Module offered by**	
unknown		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	unknown	--	

Contents

No information on contents available.

Intended learning outcomes

No information on intended learning outcomes available.

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

V (1) + S (2)
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 is creditable for bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 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) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
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)

Module title			Abbreviation
Human Genetics F1			07-MS2HGF1-152-m01
Module coordinator		**Module offered by**	
Managing Director of the Institute of Human Genetics		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

Practical course on a topic in human genetics. Students spend five weeks working on a small, well-defined scientific lab project and learn how to present their data. They learn to discuss their data in a seminar. The students learn to apply experimental procedures and methods of human genetics, to independently address scientific questions and to document their experimental work in an appropriate way.

Intended learning outcomes

Students are able to independently investigate a topic in human genetics as well as to document, interpret and discuss their results, adhering to the principles of good scientific practice.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Human Genetics F2			07-MS2HGF2-152-m01
Module coordinator		**Module offered by**	
Managing Director of the Institute of Human Genetics		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Current problems in the field of human genetics will be addressed by critically reading and presenting original research papers. The participants will be involved in the development of a research plan and will learn to apply advanced techniques to answer a scientific question in human genetics. This practical course will have a duration of 12 weeks (three months).

Intended learning outcomes

Students are able to independently investigate a topic in human genetics as well as to document, interpret and discuss their results, adhering to the principles of good scientific practice.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Physiological Chemistry

(30 ECTS credits)

Students who selected this subject area must take module 07-MS2 and must select either module 07-MS2ZE1 or module 07-MS2ZE2 as their second theoretical module.

Module title			Abbreviation
Molecular Biology			07-MS2-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Molecular biology of the eukaryotic and prokaryotic cell. The lecture is a joint activity of the Chairs of Cell- and Developmental Biology, Microbiology, Biophysics and Bioinformatics and deals with concepts of modern molecular biology from the point of view of these different disciplines. Participants are recommended to read the textbook "Essential Cell Biology". The section on cell biology (app. a quarter of the lecture) mainly discusses the eukaryotic cell and intends to elucidate the vast diversity in structure and function of molecules, organelles and cells in addition to fundamental principles of modern molecular cell biology. The bioinformatics section (app. a quarter of the lecture) contains a large amount of examples for applications which allow the investigation of the molecular biology of a cell with bioinformatic tools. We closely adhere to the contents of the book "Essential Cell Biology" and present many clear and useful examples for the application of our tools when working on the topics of the other three Chairs. Our vision: bioinformatics essentially is molecular biology based on computing technology (time consuming "wet" experiments can be planned more easily and thus bioinformatics saves precious time). The microbiological section (app. a quarter of the lecture) deals with fundamental molecular aspects of prokaryotic cells. Key aspects include the organisation of the bacterial genome, the transcription and translation machinery, mechanisms of regulation of gene expression, transport of small molecules and macromolecules, cell division and differentiation, bacterial motility and chemotaxis, signal transduction and bacterial communication mechanisms. Recommended reading: (a) Allgemeine Mikrobiologie (Fuchs) and (b) Biology of Microorganisms (Brock).

Intended learning outcomes

Master level knowledge about the molecular biology of the eukaryotic and prokaryotic cell.

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

V (3)
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 is creditable for 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) 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) Biosciences (2018)
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
Cell and Developmental Biology Master 1	07-MS2ZE1-152-m01

Module coordinator	Module offered by
holder of the Chair of Cell Biology and Developmental 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

The module consists of the lecture *Zellpathologie* (*Cytopathology*) and the seminar *Zellbiologie-Meilensteine und Perspektiven* (*Milestones and Perspectives of Cell Biology*). The lecture describes pathological states of the cell and unravels their biological causes and consequences, such as infection, apoptosis, senescence, metabolic disorders and cancer. In the seminar *Milestones and Perspectives of Cell Biology*, classic ground-breaking publications in the field of cell biology are discussed from an unusual point of view.

Intended learning outcomes

Students possess a knowledge of the theoretical principles underlying cell pathology and are able to put this into the broader context of cell biology research.

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

V (1) + S (2)
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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Cell and Developmental Biology Master 2	07-MS2ZE2-152-m01

Module coordinator	Module offered by
holder of the Chair of Cell Biology and Developmental 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

The module consists of the lecture *Signale und Differenzierung* (Signals and Differentiation) and the seminar *Entwicklungsbiologie - Meilensteine und Perspektiven* (*Milestones and Perspectives of Developmental Biology*). The lecture *Signals and Differentiation* does not attempt to impart pure textbook knowledge. Instead, historically important as well as particularly interesting and important trend-setting topics in developmental biology are presented. The topics range from classical developmental subjects such as tissue regeneration and morphogenetic cell migration to molecular stem cell biology, epigenetic plasticity, origins of multicellularity and development within changing environments. In the seminar *Milestones and Perspectives of Developmental Biology*, classic ground-breaking publications in the field of developmental biology are discussed from an unusual point of view.

Intended learning outcomes

Participants possess a knowledge of the theoretical and molecular biological principles underlying developmental biology and are able to put this into the broader context of cell and developmental biology research.

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 is creditable for 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) 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) Biosciences (2018)
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
Cell and Developmental Biology F1	07-MS2ZEF1-152-m01

Module coordinator	Module offered by
holder of the Chair of Cell Biology and Developmental 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

This 5 week full-time practical course provides an introduction to modern cell and developmental biology-related methods with a focus on bio-imaging techniques. A broad variety of model organisms is covered and the participants are encouraged to independently design and perform their own experiments. Participants use their acquired technological skills to analyse important basic biological processes. Large parts of this practical course are devoted to small projects, which should provide sustained insights into current research activities of the Chair. Interactions with Master's students, doctoral researchers and post-docs prepare participants for a working in a team-based environment.

Intended learning outcomes

The participants are able to approach complex scientific questions in the fields of cell and developmental biology and to independently implement acquired methodological tools to answer these questions. They are able to perform and document cell and developmental biology-related experiments, adhering to a generally accepted code of scientific practice.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Laboratory Course 2			07-MSL2-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
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 course advisory service in advance.	

Contents

Practical course, summer school or workshop on specific topics in biology (duration: 4-6 weeks).

Intended learning outcomes

Proficiency in specific methods and lab techniques from selected fields of biology. Ability to apply these methods and techniques later on in a research project.

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

P (15)
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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Laboratory Research Training F1			07-MSLRTF1-152-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	Please consult with course advisory service in advance.	

Contents

Practical course on a biological topic. Students spend five weeks working on a small, well-defined scientific lab project and learn how to present their data. They learn to discuss their data in a seminar. The students learn to apply defined experimental procedures and methods, to independently address scientific questions and to document their experimental work in an appropriate way.

Intended learning outcomes

Students have reinforced previously acquired lab skills, acquired new lab techniques and learned how to transfer theoretical knowledge into experiments. Students have gained expertise in the analysis of raw data, their interpretation and their presentation.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Physiological Chemistry F2			07-MS2PHF2-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Biochemistry and Molecular Biology		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Critically reading and presenting original research papers (in English language), participants will independently investigate current problems in physiological chemistry. They will be involved in the development of a research plan and will independently apply advanced techniques in molecular cell biology and/or developmental biochemistry.

Intended learning outcomes

Students are able to plan and design research in the fields of molecular cell biology and developmental biochemistry. They are able to work according to good scientific practice and to document, interpret and discuss their results.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Cellular Tumor Biology

(30 ECTS credits)

Module title			Abbreviation
Molecular Tumor Biology			07-TUM-MOL-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)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

The lecture *Molekulare Tumorbiologie* (*Molecular Tumour Biology*) discusses molecular characteristics of tumours and relevant biological processes (such as signal transduction, cell growth, cell proliferation, metabolism), tumour-specific modifications and current molecular biological methods in tumour research.

Intended learning outcomes

Understanding of current topics and challenges in tumour research, understanding of the methods which could be used address these challenges.

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

V (2)
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 is creditable for 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

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) Biology (2015)
Master's degree (1 major) FOKUS Life Sciences (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
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 degree (1 major) FOKUS Life Sciences (2025)

Module title			Abbreviation
Clinical Tumor Biology			07-TUM-CLIN-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)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

In the lecture series *Klinische Tumorbiologie* (*Clinical Tumour Biology*), current clinical aspects will be addressed. Several tumour types will be discussed (such as tumours of the skin, lung, intestine, breast, blood). Additional topics: diagnostics and pathology, different treatments and therapies and clinical trials.

Intended learning outcomes

Knowledge of the similarities and differences of various tumour types. Understanding of requirements, possibilities and limitations of clinical medicine.

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

V (2)
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 is creditable for 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

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) Biology (2015)
Master's degree (1 major) FOKUS Life Sciences (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
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 degree (1 major) FOKUS Life Sciences (2025)

Module title			Abbreviation
Molecular Biology			07-MS2-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Molecular biology of the eukaryotic and prokaryotic cell. The lecture is a joint activity of the Chairs of Cell- and Developmental Biology, Microbiology, Biophysics and Bioinformatics and deals with concepts of modern molecular biology from the point of view of these different disciplines. Participants are recommended to read the textbook "Essential Cell Biology". The section on cell biology (app. a quarter of the lecture) mainly discusses the eukaryotic cell and intends to elucidate the vast diversity in structure and function of molecules, organelles and cells in addition to fundamental principles of modern molecular cell biology. The bioinformatics section (app. a quarter of the lecture) contains a large amount of examples for applications which allow the investigation of the molecular biology of a cell with bioinformatic tools. We closely adhere to the contents of the book "Essential Cell Biology" and present many clear and useful examples for the application of our tools when working on the topics of the other three Chairs. Our vision: bioinformatics essentially is molecular biology based on computing technology (time consuming "wet" experiments can be planned more easily and thus bioinformatics saves precious time). The microbiological section (app. a quarter of the lecture) deals with fundamental molecular aspects of prokaryotic cells. Key aspects include the organisation of the bacterial genome, the transcription and translation machinery, mechanisms of regulation of gene expression, transport of small molecules and macromolecules, cell division and differentiation, bacterial motility and chemotaxis, signal transduction and bacterial communication mechanisms. Recommended reading: (a) Allgemeine Mikrobiologie (Fuchs) and (b) Biology of Microorganisms (Brock).

Intended learning outcomes

Master level knowledge about the molecular biology of the eukaryotic and prokaryotic cell.

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

V (3)
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 is creditable for 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) 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) Biosciences (2018)
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
Cell and Developmental Biology Master 1	07-MS2ZE1-152-m01

Module coordinator	Module offered by
holder of the Chair of Cell Biology and Developmental 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

The module consists of the lecture *Zellpathologie* (*Cytopathology*) and the seminar *Zellbiologie-Meilensteine und Perspektiven* (*Milestones and Perspectives of Cell Biology*). The lecture describes pathological states of the cell and unravels their biological causes and consequences, such as infection, apoptosis, senescence, metabolic disorders and cancer. In the seminar *Milestones and Perspectives of Cell Biology*, classic ground-breaking publications in the field of cell biology are discussed from an unusual point of view.

Intended learning outcomes

Students possess a knowledge of the theoretical principles underlying cell pathology and are able to put this into the broader context of cell biology research.

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

V (1) + S (2)
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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Cell and Developmental Biology Master 2	07-MS2ZE2-152-m01

Module coordinator	Module offered by
holder of the Chair of Cell Biology and Developmental 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

The module consists of the lecture *Signale und Differenzierung* (Signals and Differentiation) and the seminar *Entwicklungsbiologie - Meilensteine und Perspektiven* (*Milestones and Perspectives of Developmental Biology*). The lecture *Signals and Differentiation* does not attempt to impart pure textbook knowledge. Instead, historically important as well as particularly interesting and important trend-setting topics in developmental biology are presented. The topics range from classical developmental subjects such as tissue regeneration and morphogenetic cell migration to molecular stem cell biology, epigenetic plasticity, origins of multicellularity and development within changing environments. In the seminar *Milestones and Perspectives of Developmental Biology*, classic ground-breaking publications in the field of developmental biology are discussed from an unusual point of view.

Intended learning outcomes

Participants possess a knowledge of the theoretical and molecular biological principles underlying developmental biology and are able to put this into the broader context of cell and developmental biology research.

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 is creditable for 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) 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) Biosciences (2018)
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
Infection Biology			07-MS2INF-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)
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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Pathogenicity of Microorganisms			07-MS2PA-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)
Module taught in: English

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

a) written examination (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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Immunology 1	07-MS2IM1-152-m01

Module coordinator	Module offered by
Managing Director of the Institute of Virology and Immunobiology	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 concepts of modern cellular and molecular immunology. More information is available at http://www.virologie.uni-wuerzburg.de/lehrveranstaltungen/vorlesungen_und_praktika/immunologie/immunologie_biologen_master/.

Intended learning outcomes

Students will gain knowledge about, and will be able to present and discuss basic concepts and methods in molecular and cellular immunology.

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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English
Assessment offered: Winter semester only

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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Immunology 2			07-MS2IM2-152-m01
Module coordinator			**Module offered by**
Managing Director of the Institute of Virology and Immunobiology			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

Recent progress in molecular and cellular immunology. Deeper insights into selected immunology chapters, such as autoimmunity and immunomodulation, development of the immune system, immunogenetics, evolution of the immune system, infection immunology, and more.

Intended learning outcomes

Students are able to understand current topics 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English
Assessment offered: Summer semester only

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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Molecular Virology			03-MSMV-171-m01

Module coordinator	Module offered by
unknown	Faculty of Medicine

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

Duration	Module level	Other prerequisites
1 semester	unknown	--

Contents

No information on contents available.

Intended learning outcomes

No information on intended learning outcomes available.

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

V (1) + S (2)
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 is creditable for bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 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) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
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)

Module title			Abbreviation
Human Genetics			07-MS2HG-152-m01
Module coordinator		**Module offered by**	
Managing Director of the Institute of Human Genetics		Faculty of Biology	
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 will have gained the ability to understand current issues in human genetics and to discuss these in depth.

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 is creditable for 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
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)

Module title			Abbreviation
Laboratory Research Training F1			07-MSLRTF1-152-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	Please consult with course advisory service in advance.	

Contents

Practical course on a biological topic. Students spend five weeks working on a small, well-defined scientific lab project and learn how to present their data. They learn to discuss their data in a seminar. The students learn to apply defined experimental procedures and methods, to independently address scientific questions and to document their experimental work in an appropriate way.

Intended learning outcomes

Students have reinforced previously acquired lab skills, acquired new lab techniques and learned how to transfer theoretical knowledge into experiments. Students have gained expertise in the analysis of raw data, their interpretation and their presentation.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Laboratory Course 2			07-MSL2-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
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 course advisory service in advance.	

Contents

Practical course, summer school or workshop on specific topics in biology (duration: 4-6 weeks).

Intended learning outcomes

Proficiency in specific methods and lab techniques from selected fields of biology. Ability to apply these methods and techniques later on in a research project.

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

P (15)
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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Cellular Tumor Biology F1			07-MS2ZTF1-152-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

Under guidance, participants will work on a current topic in tumour biology. Topics will focus in particular on current problems in oncolytic virotherapy. Participants will become familiar with a variety of methods within the fields of molecular biology, infection biology and cell biology as well as literature search techniques. They will employ a broad range of methods in cell biology, infection biology and immunology. Results will be documented in the form of a presentation, a publication or a term paper.

Intended learning outcomes

Students are able to investigate scientific questions in molecular biology and cell biology and to document their work, adhering to the principles of good scientific practice.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Cellular Tumor Biology F2			07-MS2ZTF2-152-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)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Students will be involved in current research projects in tumour biology. Aspects of the scientific question will be independently addressed by the students. They will apply experimental techniques in cell biology, immunology and/or molecular biology. The techniques applied will be evaluated on the basis of the results obtained and modified where necessary. Experimental results and progress in the research project will be documented in the form of a presentation, a publication or a term paper.

Intended learning outcomes

Students are able to independently carry out scientific experiments on a topic in tumour biology/oncology. They are able to answer and discuss questions in the field of tumour biology/oncology. Students are able to adhere to the principles of good scientific practice and to document, interpret and discuss their results. They are able to apply specific techniques required to answer scientific questions.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)

Master's degree (1 major) Biosciences (2024)

Module Group 3

(ECTS credits)

Molecular Plant Physiology

(30 ECTS credits)

Module title			Abbreviation
Current Methods in Biology			07-MS31-152-m01

Module coordinator	Module offered by
holder of the Chair of Plant Physiology 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 series imparts the theoretical background of fundamental and up-to-date molecular biological methods in plant sciences. Special emphasis is placed on analytical tools, large-scale data analysis and their application.

Intended learning outcomes

At the end of the lecture series, students will (I) be able to qualitatively evaluate results acquired with analytical and molecular biological methods and to integrate them into the context of the current scientific knowledge in this field (II) have gained an overview of the advantages/disadvantages of analytical and molecular biological approaches (III) be able to apply the knowledge they have acquired to design their own experimental strategies for addressing a specific research question.

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

V (3)
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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Plant Ecology	07-MS31POEK-152-m01

Module coordinator	Module offered by
holder of the Chair of Ecophysiology and Vegetation Ecology	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

The lecture will deal with the ecological and environmental constraints under which plants grow and develop (biogeography, biodiversity) and with the interactions of plants with abiotic and biotic environmental factors (e. g. plant-insect, plant-fungus interactions). The evolutionary adaptations on the physiological and organismic level will be emphasised in particular (stress and defence reactions, carnivory, plant protection). Corresponding experimental approaches will be illustrated. Based on selected examples from current research, the seminar will address the topics covered in the lecture in more detail. It will be complemented by topic-related guided tours in the Botanical Garden of the University of Würzburg.

Intended learning outcomes

Participants are able to identify and interpret ecological and ecophysiological interrelations and to discuss them in the context of the current state of knowledge in these fields.

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 is creditable for 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) 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) Biosciences (2018)

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)

Module title			Abbreviation
Plant Immunobiology and Pharmaceutical Biology			07-MS31PIP-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Ecophysiology and Vegetation Ecology		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 addresses topics of pathogen recognition and signal transduction in plants, molecular and organismic defence and the pharmaceutical relevance of plant-derived bioactive compounds. Plant immunobiology: interactions between plants and pathogens comprise evolutionary dynamic and complex systems. Different strategies of the pathogens - bacteria, fungi and viruses - as well as defence mechanisms of the host plants will be discussed. The molecular mechanisms of pathogen recognition, signal transduction, regulation of gene expression and activation of local and systemic defence responses are in the focus of this lecture. Differences and similarities between plant and human immune systems will be pointed out. Understanding plant-pathogen-interactions and molecular mechanisms determining susceptibility and defence is fundamental for the development of strategies in plant protection. Evolution, function and pharmaceutical relevance of plant secondary metabolites: Secondary metabolites are part of effective plant defence strategies against microorganisms and herbivores and are often essential for survival. The evolution of secondary metabolism will be discussed and general as well as specific defence strategies will be explained. Pharmacological mechanisms of action and molecular targets of important classes of plant bioactive compounds will be presented. A high proportion of currently used drugs have been developed from plant secondary metabolites that have been used as lead structures to generate potent drugs with improved pharmaceutical properties. Examples of therapies with very potent plant pharmaceuticals (evidence-based medicine) as well as possibilities and limitations of phytotherapy (traditional medicine) will be discussed.

Intended learning outcomes

Students are able to understand the interaction between plants and the environment on a molecular level and to discuss the topic in the context of the scientific state of the art.

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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Biophysics and Biochemistry			07-MS3BB-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology 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

The module imparts theoretical and methodological knowledge of plant membrane transport, structural biology and biochemistry which is illustrated with specific examples from current research. Depending on the number of participants and their interests, practical demonstrations of methods that are currently used give students an opportunity to experience the practical aspects of biophysical and biochemical research.

Intended learning outcomes

Students are able to use methods dealing with soluble proteins or membrane proteins in the fields of biophysics, structural biology and biochemistry. They are able to interpret the data and to discuss the results within the context of current knowledge.

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 is creditable for 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) 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) Biosciences (2018)
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
Molecular Plant Physiology F1			07-MS31MPPF1-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology 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

The module provides an in-depth insight into molecular biological strategies and methods applied in plant physiology. The students will be integrated into research projects on current topics in molecular plant physiology.

Intended learning outcomes

The students have knowledge about basic molecular biological strategies and methods focusing on plant physiology. They are able to perform and organise their scientific laboratory work independently and document the results obtained.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Molecular Plant Physiology F2			07-MS31MPPF2-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology and Biophysics		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

The students perform their research work within the context of a current research project in molecular plant physiology in a largely independent manner under supervision of a principal investigator.

Intended learning outcomes

Students are able to work on a scientific question, to design an experimental setup as well as to interpret, document and present their results.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)
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) 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)

Biochemistry and Structural Biology

(30 ECTS credits)

Module title			Abbreviation
Current Methods in Biology			07-MS31-152-m01

Module coordinator	Module offered by
holder of the Chair of Plant Physiology 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 series imparts the theoretical background of fundamental and up-to-date molecular biological methods in plant sciences. Special emphasis is placed on analytical tools, large-scale data analysis and their application.

Intended learning outcomes

At the end of the lecture series, students will (I) be able to qualitatively evaluate results acquired with analytical and molecular biological methods and to integrate them into the context of the current scientific knowledge in this field (II) have gained an overview of the advantages/disadvantages of analytical and molecular biological approaches (III) be able to apply the knowledge they have acquired to design their own experimental strategies for addressing a specific research question.

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

V (3)
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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Biophysics and Biochemistry			07-MS3BB-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology 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

The module imparts theoretical and methodological knowledge of plant membrane transport, structural biology and biochemistry which is illustrated with specific examples from current research. Depending on the number of participants and their interests, practical demonstrations of methods that are currently used give students an opportunity to experience the practical aspects of biophysical and biochemical research.

Intended learning outcomes

Students are able to use methods dealing with soluble proteins or membrane proteins in the fields of biophysics, structural biology and biochemistry. They are able to interpret the data and to discuss the results within the context of current knowledge.

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 is creditable for 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) 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) Biosciences (2018)
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
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 is creditable for 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
Plant Immunobiology and Pharmaceutical Biology			07-MS31PIP-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Ecophysiology and Vegetation Ecology		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 addresses topics of pathogen recognition and signal transduction in plants, molecular and organismic defence and the pharmaceutical relevance of plant-derived bioactive compounds. Plant immunobiology: interactions between plants and pathogens comprise evolutionary dynamic and complex systems. Different strategies of the pathogens - bacteria, fungi and viruses - as well as defence mechanisms of the host plants will be discussed. The molecular mechanisms of pathogen recognition, signal transduction, regulation of gene expression and activation of local and systemic defence responses are in the focus of this lecture. Differences and similarities between plant and human immune systems will be pointed out. Understanding plant-pathogen-interactions and molecular mechanisms determining susceptibility and defence is fundamental for the development of strategies in plant protection. Evolution, function and pharmaceutical relevance of plant secondary metabolites: Secondary metabolites are part of effective plant defence strategies against microorganisms and herbivores and are often essential for survival. The evolution of secondary metabolism will be discussed and general as well as specific defence strategies will be explained. Pharmacological mechanisms of action and molecular targets of important classes of plant bioactive compounds will be presented. A high proportion of currently used drugs have been developed from plant secondary metabolites that have been used as lead structures to generate potent drugs with improved pharmaceutical properties. Examples of therapies with very potent plant pharmaceuticals (evidence-based medicine) as well as possibilities and limitations of phytotherapy (traditional medicine) will be discussed.

Intended learning outcomes

Students are able to understand the interaction between plants and the environment on a molecular level and to discuss the topic in the context of the scientific state of the art.

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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Plant Ecology	07-MS31POEK-152-m01

Module coordinator	Module offered by
holder of the Chair of Ecophysiology and Vegetation Ecology	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

The lecture will deal with the ecological and environmental constraints under which plants grow and develop (biogeography, biodiversity) and with the interactions of plants with abiotic and biotic environmental factors (e. g. plant-insect, plant-fungus interactions). The evolutionary adaptations on the physiological and organismic level will be emphasised in particular (stress and defence reactions, carnivory, plant protection). Corresponding experimental approaches will be illustrated. Based on selected examples from current research, the seminar will address the topics covered in the lecture in more detail. It will be complemented by topic-related guided tours in the Botanical Garden of the University of Würzburg.

Intended learning outcomes

Participants are able to identify and interpret ecological and ecophysiological interrelations and to discuss them in the context of the current state of knowledge in these fields.

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 is creditable for 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) 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) Biosciences (2018)

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)

Module title			Abbreviation
Biochemistry and Structural Biology F1			07-MS3BSBF1-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology 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

The module provides an in-depth insight into strategies and methods in protein biochemistry and structural biology. The students will be integrated into research projects on current topics in biochemistry and structural biology.

Intended learning outcomes

The students have knowledge about general strategies and methods of protein biochemistry and structural biology with a focus on membrane proteins. They are able to perform and organise their scientific laboratory work independently and document the results obtained.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Biochemistry and Structural Biology F2			07-MS3BSBF2-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology and Biophysics		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

The students perform their research work within the context of a current research project on biochemistry and structural biology in a largely independent manner under supervision of a principal investigator.

Intended learning outcomes

The students are able to independently perform and organise their scientific laboratory work in the fields of biochemistry and structural biology and to document the results obtained. They are able to design a research project and are prepared for working on a scientific question for their thesis.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)
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) 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)

Molecular Membran Biology

(30 ECTS credits)

Module title			Abbreviation
Current Methods in Biology			07-MS31-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology 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 series imparts the theoretical background of fundamental and up-to-date molecular biological methods in plant sciences. Special emphasis is placed on analytical tools, large-scale data analysis and their application.

Intended learning outcomes

At the end of the lecture series, students will (I) be able to qualitatively evaluate results acquired with analytical and molecular biological methods and to integrate them into the context of the current scientific knowledge in this field (II) have gained an overview of the advantages/disadvantages of analytical and molecular biological approaches (III) be able to apply the knowledge they have acquired to design their own experimental strategies for addressing a specific research question.

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

V (3)
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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Biophysics and Biochemistry			07-MS3BB-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology 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

The module imparts theoretical and methodological knowledge of plant membrane transport, structural biology and biochemistry which is illustrated with specific examples from current research. Depending on the number of participants and their interests, practical demonstrations of methods that are currently used give students an opportunity to experience the practical aspects of biophysical and biochemical research.

Intended learning outcomes

Students are able to use methods dealing with soluble proteins or membrane proteins in the fields of biophysics, structural biology and biochemistry. They are able to interpret the data and to discuss the results within the context of current knowledge.

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 is creditable for 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) 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) Biosciences (2018)
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
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 is creditable for 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
Plant Immunobiology and Pharmaceutical Biology			07-MS31PIP-152-m01

Module coordinator	Module offered by
holder of the Chair of Ecophysiology and Vegetation Ecology	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 addresses topics of pathogen recognition and signal transduction in plants, molecular and organismic defence and the pharmaceutical relevance of plant-derived bioactive compounds. Plant immunobiology: interactions between plants and pathogens comprise evolutionary dynamic and complex systems. Different strategies of the pathogens - bacteria, fungi and viruses - as well as defence mechanisms of the host plants will be discussed. The molecular mechanisms of pathogen recognition, signal transduction, regulation of gene expression and activation of local and systemic defence responses are in the focus of this lecture. Differences and similarities between plant and human immune systems will be pointed out. Understanding plant-pathogen-interactions and molecular mechanisms determining susceptibility and defence is fundamental for the development of strategies in plant protection. Evolution, function and pharmaceutical relevance of plant secondary metabolites: Secondary metabolites are part of effective plant defence strategies against microorganisms and herbivores and are often essential for survival. The evolution of secondary metabolism will be discussed and general as well as specific defence strategies will be explained. Pharmacological mechanisms of action and molecular targets of important classes of plant bioactive compounds will be presented. A high proportion of currently used drugs have been developed from plant secondary metabolites that have been used as lead structures to generate potent drugs with improved pharmaceutical properties. Examples of therapies with very potent plant pharmaceuticals (evidence-based medicine) as well as possibilities and limitations of phytotherapy (traditional medicine) will be discussed.

Intended learning outcomes

Students are able to understand the interaction between plants and the environment on a molecular level and to discuss the topic in the context of the scientific state of the art.

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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Plant Ecology	07-MS31POEK-152-m01

Module coordinator	Module offered by
holder of the Chair of Ecophysiology and Vegetation Ecology	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

The lecture will deal with the ecological and environmental constraints under which plants grow and develop (biogeography, biodiversity) and with the interactions of plants with abiotic and biotic environmental factors (e. g. plant-insect, plant-fungus interactions). The evolutionary adaptations on the physiological and organismic level will be emphasised in particular (stress and defence reactions, carnivory, plant protection). Corresponding experimental approaches will be illustrated. Based on selected examples from current research, the seminar will address the topics covered in the lecture in more detail. It will be complemented by topic-related guided tours in the Botanical Garden of the University of Würzburg.

Intended learning outcomes

Participants are able to identify and interpret ecological and ecophysiological interrelations and to discuss them in the context of the current state of knowledge in these fields.

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 is creditable for 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) 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) Biosciences (2018)

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)

Module title			Abbreviation
Biophysics of Plant Membrane Proteins F1			07-MS3BPF1-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology 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

The module provides an in-depth insight into biophysical strategies and methods which are used for the functional characterisation of plant membrane proteins. The students will be integrated into research projects on current topics in molecular plant membrane biology.

Intended learning outcomes

The students have knowledge of general biophysical strategies and methods with a focus on plant membrane proteins, they are able to independently work on related scientific issues and to document the results obtained.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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) 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)

Module title	Abbreviation
Biophysics of Plant Membrane Proteins F2	07-MS3BPF2-152-m01

Module coordinator	Module offered by
holder of the Chair of Plant Physiology and Biophysics	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

The students perform their research work within the context of a current research project on the biophysics of plant membrane proteins in a largely independent manner under supervision of a principal investigator.

Intended learning outcomes

The students are able to address scientific issues in biophysics, using appropriate biophysical methods. They are able to independently design the appropriate experiments as well as to analyse, document, present and discuss the results.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)
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) 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)

Plant Signalling

(30 ECTS credits)

Module title			Abbreviation
Current Methods in Biology			07-MS31-152-m01

Module coordinator	Module offered by
holder of the Chair of Plant Physiology 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 series imparts the theoretical background of fundamental and up-to-date molecular biological methods in plant sciences. Special emphasis is placed on analytical tools, large-scale data analysis and their application.

Intended learning outcomes

At the end of the lecture series, students will (I) be able to qualitatively evaluate results acquired with analytical and molecular biological methods and to integrate them into the context of the current scientific knowledge in this field (II) have gained an overview of the advantages/disadvantages of analytical and molecular biological approaches (III) be able to apply the knowledge they have acquired to design their own experimental strategies for addressing a specific research question.

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

V (3)
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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Biophysics and Biochemistry			07-MS3BB-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology 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

The module imparts theoretical and methodological knowledge of plant membrane transport, structural biology and biochemistry which is illustrated with specific examples from current research. Depending on the number of participants and their interests, practical demonstrations of methods that are currently used give students an opportunity to experience the practical aspects of biophysical and biochemical research.

Intended learning outcomes

Students are able to use methods dealing with soluble proteins or membrane proteins in the fields of biophysics, structural biology and biochemistry. They are able to interpret the data and to discuss the results within the context of current knowledge.

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 is creditable for 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) 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) Biosciences (2018)
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
Plant Immunobiology and Pharmaceutical Biology			07-MS31PIP-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Ecophysiology and Vegetation Ecology		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 addresses topics of pathogen recognition and signal transduction in plants, molecular and organismic defence and the pharmaceutical relevance of plant-derived bioactive compounds. Plant immunobiology: interactions between plants and pathogens comprise evolutionary dynamic and complex systems. Different strategies of the pathogens - bacteria, fungi and viruses - as well as defence mechanisms of the host plants will be discussed. The molecular mechanisms of pathogen recognition, signal transduction, regulation of gene expression and activation of local and systemic defence responses are in the focus of this lecture. Differences and similarities between plant and human immune systems will be pointed out. Understanding plant-pathogen-interactions and molecular mechanisms determining susceptibility and defence is fundamental for the development of strategies in plant protection. Evolution, function and pharmaceutical relevance of plant secondary metabolites: Secondary metabolites are part of effective plant defence strategies against microorganisms and herbivores and are often essential for survival. The evolution of secondary metabolism will be discussed and general as well as specific defence strategies will be explained. Pharmacological mechanisms of action and molecular targets of important classes of plant bioactive compounds will be presented. A high proportion of currently used drugs have been developed from plant secondary metabolites that have been used as lead structures to generate potent drugs with improved pharmaceutical properties. Examples of therapies with very potent plant pharmaceuticals (evidence-based medicine) as well as possibilities and limitations of phytotherapy (traditional medicine) will be discussed.

Intended learning outcomes

Students are able to understand the interaction between plants and the environment on a molecular level and to discuss the topic in the context of the scientific state of the art.

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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Plant Ecology	07-MS31POEK-152-m01

Module coordinator	Module offered by
holder of the Chair of Ecophysiology and Vegetation Ecology	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

The lecture will deal with the ecological and environmental constraints under which plants grow and develop (biogeography, biodiversity) and with the interactions of plants with abiotic and biotic environmental factors (e. g. plant-insect, plant-fungus interactions). The evolutionary adaptations on the physiological and organismic level will be emphasised in particular (stress and defence reactions, carnivory, plant protection). Corresponding experimental approaches will be illustrated. Based on selected examples from current research, the seminar will address the topics covered in the lecture in more detail. It will be complemented by topic-related guided tours in the Botanical Garden of the University of Würzburg.

Intended learning outcomes

Participants are able to identify and interpret ecological and ecophysiological interrelations and to discuss them in the context of the current state of knowledge in these fields.

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 is creditable for 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) 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) Biosciences (2018)

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)

Module title	Abbreviation
Plant Signalling F1	07-MS3SPF1-152-m01

Module coordinator	Module offered by
holder of the Chair of Plant Physiology 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

Molecular mechanisms of plant signal transduction and regulation of gene expression will be investigated in the context of plant-pathogen interaction, plant responses to abiotic stress, lipid signalling and plant hormone signalling. Specific molecular biology methods which are suitable to address these topics will be applied. In addition, students will gain experience in designing appropriate experimental approaches as well as in the documentation and presentation of results. Students will work on a current research project and learn to independently plan and perform the experiments. More information is available on request or can be found at http://www.p-bio.biozentrum.uni-wuerzburg.de/.

Intended learning outcomes

Students will be trained to apply specific methods in the field of molecular biology, to address scientific questions, to document experimental procedures and results and to interpret experimental data.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (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) Biosciences (2018)

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) 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)

Module title			Abbreviation
Plant Signalling F2			07-MS3SPF2-152-m01

Module coordinator	Module offered by
holder of the Chair of Plant Physiology and Biophysics	Faculty of Biology

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 will independently work on aspects of current research projects in the area of plant signal transduction and stress responses. Results will be discussed in the context of recent publications. The molecular biology and bioanalytical methods which are used will be evaluated and optimised. The aim and progress of the project will be presented in a seminar. More information is available on request or can be found at http://www.pbio.biozentrum.uni-wuerzburg.de/.

Intended learning outcomes

Students are able to independently perform scientific experiments and to use specific techniques in the field of molecular biology and bioanalytics to address scientific questions in the field of plant signal transduction. Students are able to independently work according to the rules of best practice.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)
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) 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)

Pharmaceutical Biology & Metabolomics

(30 ECTS credits)

Module title			Abbreviation
Current Methods in Biology			07-MS31-152-m01

Module coordinator	Module offered by
holder of the Chair of Plant Physiology 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 series imparts the theoretical background of fundamental and up-to-date molecular biological methods in plant sciences. Special emphasis is placed on analytical tools, large-scale data analysis and their application.

Intended learning outcomes

At the end of the lecture series, students will (I) be able to qualitatively evaluate results acquired with analytical and molecular biological methods and to integrate them into the context of the current scientific knowledge in this field (II) have gained an overview of the advantages/disadvantages of analytical and molecular biological approaches (III) be able to apply the knowledge they have acquired to design their own experimental strategies for addressing a specific research question.

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

V (3)
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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Plant Immunobiology and Pharmaceutical Biology			07-MS31PIP-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Ecophysiology and Vegetation Ecology		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 addresses topics of pathogen recognition and signal transduction in plants, molecular and organismic defence and the pharmaceutical relevance of plant-derived bioactive compounds. Plant immunobiology: interactions between plants and pathogens comprise evolutionary dynamic and complex systems. Different strategies of the pathogens - bacteria, fungi and viruses - as well as defence mechanisms of the host plants will be discussed. The molecular mechanisms of pathogen recognition, signal transduction, regulation of gene expression and activation of local and systemic defence responses are in the focus of this lecture. Differences and similarities between plant and human immune systems will be pointed out. Understanding plant-pathogen-interactions and molecular mechanisms determining susceptibility and defence is fundamental for the development of strategies in plant protection. Evolution, function and pharmaceutical relevance of plant secondary metabolites: Secondary metabolites are part of effective plant defence strategies against microorganisms and herbivores and are often essential for survival. The evolution of secondary metabolism will be discussed and general as well as specific defence strategies will be explained. Pharmacological mechanisms of action and molecular targets of important classes of plant bioactive compounds will be presented. A high proportion of currently used drugs have been developed from plant secondary metabolites that have been used as lead structures to generate potent drugs with improved pharmaceutical properties. Examples of therapies with very potent plant pharmaceuticals (evidence-based medicine) as well as possibilities and limitations of phytotherapy (traditional medicine) will be discussed.

Intended learning outcomes

Students are able to understand the interaction between plants and the environment on a molecular level and to discuss the topic in the context of the scientific state of the art.

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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Biophysics and Biochemistry			07-MS3BB-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology 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

The module imparts theoretical and methodological knowledge of plant membrane transport, structural biology and biochemistry which is illustrated with specific examples from current research. Depending on the number of participants and their interests, practical demonstrations of methods that are currently used give students an opportunity to experience the practical aspects of biophysical and biochemical research.

Intended learning outcomes

Students are able to use methods dealing with soluble proteins or membrane proteins in the fields of biophysics, structural biology and biochemistry. They are able to interpret the data and to discuss the results within the context of current knowledge.

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 is creditable for 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) 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) Biosciences (2018)
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
Plant Ecology	07-MS31POEK-152-m01

Module coordinator	Module offered by
holder of the Chair of Ecophysiology and Vegetation Ecology	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

The lecture will deal with the ecological and environmental constraints under which plants grow and develop (biogeography, biodiversity) and with the interactions of plants with abiotic and biotic environmental factors (e. g. plant-insect, plant-fungus interactions). The evolutionary adaptations on the physiological and organismic level will be emphasised in particular (stress and defence reactions, carnivory, plant protection). Corresponding experimental approaches will be illustrated. Based on selected examples from current research, the seminar will address the topics covered in the lecture in more detail. It will be complemented by topic-related guided tours in the Botanical Garden of the University of Würzburg.

Intended learning outcomes

Participants are able to identify and interpret ecological and ecophysiological interrelations and to discuss them in the context of the current state of knowledge in these fields.

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 is creditable for 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) 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) Biosciences (2018)

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)

Module title			Abbreviation
Molecular Biology			07-MS2-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Molecular biology of the eukaryotic and prokaryotic cell. The lecture is a joint activity of the Chairs of Cell- and Developmental Biology, Microbiology, Biophysics and Bioinformatics and deals with concepts of modern molecular biology from the point of view of these different disciplines. Participants are recommended to read the textbook "Essential Cell Biology". The section on cell biology (app. a quarter of the lecture) mainly discusses the eukaryotic cell and intends to elucidate the vast diversity in structure and function of molecules, organelles and cells in addition to fundamental principles of modern molecular cell biology. The bioinformatics section (app. a quarter of the lecture) contains a large amount of examples for applications which allow the investigation of the molecular biology of a cell with bioinformatic tools. We closely adhere to the contents of the book "Essential Cell Biology" and present many clear and useful examples for the application of our tools when working on the topics of the other three Chairs. Our vision: bioinformatics essentially is molecular biology based on computing technology (time consuming "wet" experiments can be planned more easily and thus bioinformatics saves precious time). The microbiological section (app. a quarter of the lecture) deals with fundamental molecular aspects of prokaryotic cells. Key aspects include the organisation of the bacterial genome, the transcription and translation machinery, mechanisms of regulation of gene expression, transport of small molecules and macromolecules, cell division and differentiation, bacterial motility and chemotaxis, signal transduction and bacterial communication mechanisms. Recommended reading: (a) Allgemeine Mikrobiologie (Fuchs) and (b) Biology of Microorganisms (Brock).

Intended learning outcomes

Master level knowledge about the molecular biology of the eukaryotic and prokaryotic cell.

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

V (3)
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 is creditable for 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) 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) Biosciences (2018)
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 is creditable for 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
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 is creditable for 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
Neurobiology, Behavioural Physiology and Animal Ecology	07-MS1-152-m01

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

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Timing matters: Temporal organisation in the animal kingdom. Timing plays an important role in all living systems. Animals make use of endogenous clocks to predict and adapt to daily or seasonal changes in environmental parameters. To be at the right place at the right time is of great fitness relevance if -for example- a mating partner or enough food has to be found. Many mutualistic, antagonistic or social interactions can only take place if animals are at the same place at the same time and in the appropriate developmental stage. The lecture gives an introduction to the mechanisms underlying the temporal organisation in the animal kingdom. Adopting an integrative approach, the lecture goes from timing mechanisms on the neuronal level to individual behaviour and then to interactions in social groups, populations or partners in complex and variable ecosystems.

Intended learning outcomes

Students get to know the advantages of an integrative approach when analysing complex biological systems. They learn to relate and integrate different fields within biology. In the seminar, students practise the discussion of research findings.

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 is creditable for 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) 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) Biosciences (2018)
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
Pharmaceutical Biology and Metabolomics F1			07-MS3PBMF1-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Pharmaceutical 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

All organisms are able to reprogram their metabolism in response to various endogenous or exogenous perturbations. Reprogramming of metabolism is often correlated to phenotypic changes e. g. in disease development, physiology or behaviour. At the Chair of Pharmaceutical Biology, we apply metabolomics for gene function- or stress response analysis. Students can choose a topic from the variety of ongoing projects. Depending on the scientific question addressed by the research team at the Chair, the methodological approach involves techniques in the field of metabolomics/bioanalytics and/or molecular biology. In this module, students will be trained to use quantitative metabolite analysis methods (chromatography, mass spectrometry) and apply advanced molecular biology techniques. Depending on the project, different model organisms are studied. Prior knowledge in metabolite analysis or mass spectrometry is not required. Current scientific questions in the life sciences form the basis to impart scientific concepts and to train students in the laboratory. The module involves the experimental design, realisation and critical evaluation of scientific experiments as well as the documentation and presentation of the progress. More information is available on request or can be found at http://www.pbio.biozentrum.uni-wuerzburg.de/.

Intended learning outcomes

Students will be trained in using specific molecular biology methods and/or metabolomics approaches to address scientific questions, in the documentation of experimental procedures and results, and in the interpretation of data.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Pharmaceutical Biology and Metabolomics F2			07-MS3PBMF2-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Pharmaceutical Biology		Faculty of Biology	
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 will be involved in current research projects in pharmaceutical biology or in collaborative research projects that focus on the regulation of metabolism and analysis of metabolic pathways (e. g. in the context of reactions towards biotic or abiotic stress, functional and phenotypic analysis of mutants, or drug metabolism). Aspects of the scientific question will be independently addressed by the students. Molecular biology methods and/or metabolomic approaches will be optimised for and adapted to the specific problem. Experimental results and progress in the understanding of biological problems will be documented in the form of a log and presented in a seminar. More information is available on request or can be found at http://www.pbio.biozentrum.uni-wuerzburg.de/.

Intended learning outcomes

The participants are able to independently carry out scientific experiments and to modify them according to the outcome. They are able to independently approach scientific topics in pharmaceutical biology and to perform, interpret and document experiments, adhering to accepted rules of scientific practice. They are able to apply specific techniques required to answer scientific questions.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)
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) 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)

Physiological Plant Ecology

(30 ECTS credits)

Module title			Abbreviation
Current Methods in Biology			07-MS31-152-m01

Module coordinator	Module offered by
holder of the Chair of Plant Physiology 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 series imparts the theoretical background of fundamental and up-to-date molecular biological methods in plant sciences. Special emphasis is placed on analytical tools, large-scale data analysis and their application.

Intended learning outcomes

At the end of the lecture series, students will (I) be able to qualitatively evaluate results acquired with analytical and molecular biological methods and to integrate them into the context of the current scientific knowledge in this field (II) have gained an overview of the advantages/disadvantages of analytical and molecular biological approaches (III) be able to apply the knowledge they have acquired to design their own experimental strategies for addressing a specific research question.

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

V (3)
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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Biophysics and Biochemistry			07-MS3BB-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology 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

The module imparts theoretical and methodological knowledge of plant membrane transport, structural biology and biochemistry which is illustrated with specific examples from current research. Depending on the number of participants and their interests, practical demonstrations of methods that are currently used give students an opportunity to experience the practical aspects of biophysical and biochemical research.

Intended learning outcomes

Students are able to use methods dealing with soluble proteins or membrane proteins in the fields of biophysics, structural biology and biochemistry. They are able to interpret the data and to discuss the results within the context of current knowledge.

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 is creditable for 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) 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) Biosciences (2018)
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
Plant Immunobiology and Pharmaceutical Biology			07-MS31PIP-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Ecophysiology and Vegetation Ecology		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 addresses topics of pathogen recognition and signal transduction in plants, molecular and organismic defence and the pharmaceutical relevance of plant-derived bioactive compounds. Plant immunobiology: interactions between plants and pathogens comprise evolutionary dynamic and complex systems. Different strategies of the pathogens - bacteria, fungi and viruses - as well as defence mechanisms of the host plants will be discussed. The molecular mechanisms of pathogen recognition, signal transduction, regulation of gene expression and activation of local and systemic defence responses are in the focus of this lecture. Differences and similarities between plant and human immune systems will be pointed out. Understanding plant-pathogen-interactions and molecular mechanisms determining susceptibility and defence is fundamental for the development of strategies in plant protection. Evolution, function and pharmaceutical relevance of plant secondary metabolites: Secondary metabolites are part of effective plant defence strategies against microorganisms and herbivores and are often essential for survival. The evolution of secondary metabolism will be discussed and general as well as specific defence strategies will be explained. Pharmacological mechanisms of action and molecular targets of important classes of plant bioactive compounds will be presented. A high proportion of currently used drugs have been developed from plant secondary metabolites that have been used as lead structures to generate potent drugs with improved pharmaceutical properties. Examples of therapies with very potent plant pharmaceuticals (evidence-based medicine) as well as possibilities and limitations of phytotherapy (traditional medicine) will be discussed.

Intended learning outcomes

Students are able to understand the interaction between plants and the environment on a molecular level and to discuss the topic in the context of the scientific state of the art.

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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Plant Ecology	07-MS31POEK-152-m01

Module coordinator	Module offered by
holder of the Chair of Ecophysiology and Vegetation Ecology	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

The lecture will deal with the ecological and environmental constraints under which plants grow and develop (biogeography, biodiversity) and with the interactions of plants with abiotic and biotic environmental factors (e. g. plant-insect, plant-fungus interactions). The evolutionary adaptations on the physiological and organismic level will be emphasised in particular (stress and defence reactions, carnivory, plant protection). Corresponding experimental approaches will be illustrated. Based on selected examples from current research, the seminar will address the topics covered in the lecture in more detail. It will be complemented by topic-related guided tours in the Botanical Garden of the University of Würzburg.

Intended learning outcomes

Participants are able to identify and interpret ecological and ecophysiological interrelations and to discuss them in the context of the current state of knowledge in these fields.

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 is creditable for 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) 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) Biosciences (2018)

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)

Module title	Abbreviation
Physiological Plant Ecology F1	07-MS3PPEF1-152-m01

Module coordinator	Module offered by
holder of the Chair of Plant Physiology 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

Under the guidance of an experienced scientist, students will work on a current research topic from the field of ecology/ecophysiology. Particular emphasis will be placed on the physiological bases of the interactions between plants and abiotic and biotic environmental factors (e. g. water relations, stress, biogeography). Working concepts and complex experiments will be designed, and the results will be documented and presented in the form of a presentation, a publication or a log. The participants will be involved in ongoing projects and will deepen their knowledge on applying special methods, in ecophysiology in particular but also in chemical analysis.

Intended learning outcomes

The participants are able to perform scientific experiments in the field of physiological plant ecology and to apply appropriate methods. They are also able to address and document questions in the field of ecology/ecophysiology, adhering to the rules of good scientific practice.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Physiological Plant Ecology F2			07-MS3PPEF2-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology and Biophysics		Faculty of Biology	
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 will work on projects taken from ongoing research in the supervisors' labs in the field of plant ecology and ecophysiology (e. g. plant-insect-, plant-fungus interactions; biogeography; water relations). They will do this work to a large extent on their own responsibility by performing advanced experiments, their documentation and evaluation. Based on the results obtained, the ecophysiological and analytical methods applied (e. g. measurement of transpiration, fluorescence microscopy, chlorophyll-fluorometry) will be critically assessed, and, where necessary, modified. The progress of the experiments and their contribution to more general projects will be documented and presented in the form of presentations, publications or logs.

Intended learning outcomes

Students have gained knowledge on experimental setups and methods used in the field of plant ecophysiology. They are able to design scientific research, to collect data and to interpret them statistically, adhering to the principles of good scientific practice.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)
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) 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)

Molecular and Chemical Plant Ecology

(30 ECTS credits)

Module title			Abbreviation
Current Methods in Biology			07-MS31-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology 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 series imparts the theoretical background of fundamental and up-to-date molecular biological methods in plant sciences. Special emphasis is placed on analytical tools, large-scale data analysis and their application.

Intended learning outcomes

At the end of the lecture series, students will (I) be able to qualitatively evaluate results acquired with analytical and molecular biological methods and to integrate them into the context of the current scientific knowledge in this field (II) have gained an overview of the advantages/disadvantages of analytical and molecular biological approaches (III) be able to apply the knowledge they have acquired to design their own experimental strategies for addressing a specific research question.

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

V (3)
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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Biophysics and Biochemistry			07-MS3BB-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology 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

The module imparts theoretical and methodological knowledge of plant membrane transport, structural biology and biochemistry which is illustrated with specific examples from current research. Depending on the number of participants and their interests, practical demonstrations of methods that are currently used give students an opportunity to experience the practical aspects of biophysical and biochemical research.

Intended learning outcomes

Students are able to use methods dealing with soluble proteins or membrane proteins in the fields of biophysics, structural biology and biochemistry. They are able to interpret the data and to discuss the results within the context of current knowledge.

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 is creditable for 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) 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) Biosciences (2018)
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
Plant Immunobiology and Pharmaceutical Biology			07-MS31PIP-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Ecophysiology and Vegetation Ecology		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 addresses topics of pathogen recognition and signal transduction in plants, molecular and organismic defence and the pharmaceutical relevance of plant-derived bioactive compounds. Plant immunobiology: interactions between plants and pathogens comprise evolutionary dynamic and complex systems. Different strategies of the pathogens - bacteria, fungi and viruses - as well as defence mechanisms of the host plants will be discussed. The molecular mechanisms of pathogen recognition, signal transduction, regulation of gene expression and activation of local and systemic defence responses are in the focus of this lecture. Differences and similarities between plant and human immune systems will be pointed out. Understanding plant-pathogen-interactions and molecular mechanisms determining susceptibility and defence is fundamental for the development of strategies in plant protection. Evolution, function and pharmaceutical relevance of plant secondary metabolites: Secondary metabolites are part of effective plant defence strategies against microorganisms and herbivores and are often essential for survival. The evolution of secondary metabolism will be discussed and general as well as specific defence strategies will be explained. Pharmacological mechanisms of action and molecular targets of important classes of plant bioactive compounds will be presented. A high proportion of currently used drugs have been developed from plant secondary metabolites that have been used as lead structures to generate potent drugs with improved pharmaceutical properties. Examples of therapies with very potent plant pharmaceuticals (evidence-based medicine) as well as possibilities and limitations of phytotherapy (traditional medicine) will be discussed.

Intended learning outcomes

Students are able to understand the interaction between plants and the environment on a molecular level and to discuss the topic in the context of the scientific state of the art.

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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Plant Ecology	07-MS31POEK-152-m01

Module coordinator	Module offered by
holder of the Chair of Ecophysiology and Vegetation Ecology	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

The lecture will deal with the ecological and environmental constraints under which plants grow and develop (biogeography, biodiversity) and with the interactions of plants with abiotic and biotic environmental factors (e. g. plant-insect, plant-fungus interactions). The evolutionary adaptations on the physiological and organismic level will be emphasised in particular (stress and defence reactions, carnivory, plant protection). Corresponding experimental approaches will be illustrated. Based on selected examples from current research, the seminar will address the topics covered in the lecture in more detail. It will be complemented by topic-related guided tours in the Botanical Garden of the University of Würzburg.

Intended learning outcomes

Participants are able to identify and interpret ecological and ecophysiological interrelations and to discuss them in the context of the current state of knowledge in these fields.

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 is creditable for 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) 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) Biosciences (2018)

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)

Module title	Abbreviation
Molecular and Chemical Plant Ecology F1	07-MS3MCPEF1-152-m01

Module coordinator	Module offered by
holder of the Chair of Plant Physiology 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

Under the guidance of an experienced scientist, students will work on a current research topic from the field of molecular and chemical plant ecology. Particular emphasis will be placed on the molecular and chemical bases of the interactions between plants and abiotic and biotic environmental factors (e. g. cuticular barrier properties, plant-insect, and plant-fungus interactions). Working concepts and complex experiments will be designed, and the results will be documented and presented in the form of presentations, publications or logs. The participants will be involved in ongoing projects and will deepen their knowledge on applying special methods, in molecular biology in particular but also in chemical analysis.

Intended learning outcomes

The participants are able to perform scientific experiments in the field of molecular and chemical plant ecology and to apply appropriate methods. They are also able to address and document questions in the field of molecular biology/chemical ecology, adhering to the rules of good scientific practice.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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) Biosciences (2023)

Module title			Abbreviation
Molecular and Chemical Plant Ecology F2			07-MS3MCPEF2-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology and Biophysics		Faculty of Biology	
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 will work on projects taken from ongoing research in the supervisors' labs from the field of molecular and chemical plant ecology (e. g. cuticular barrier properties, plant-insect, and plant-fungus interactions). They will do this work to a large extent on their own responsibility by performing advanced experiments, their documentation and evaluation. Based on the results obtained, the analytical, molecular biological and/or microbiological methods applied (e. g. PCR, cloning strategies, chromatography, mass spectrometry) will be critically assessed and, where necessary, modified. The progress of the experiments and their contribution to more general projects will be documented and presented in the form of presentations, publications or logs.

Intended learning outcomes

The participants are able to independently perform scientific experiments in the field of molecular and chemical plant ecology and to modify them according to the outcome. They are able to independently address, document and interpret questions in the field of molecular/chemical plant ecology, adhering to the rules of good scientific practice. Students are also able to apply specific techniques required to answer scientific questions.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)
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) Biosciences (2023)

System Biology

(30 ECTS credits)

Students who selected this subject area must take module 07-MS3S.

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 is creditable for 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
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 is creditable for 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
Neurobiology, Behavioural Physiology and Animal Ecology	07-MS1-152-m01

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

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Timing matters: Temporal organisation in the animal kingdom. Timing plays an important role in all living systems. Animals make use of endogenous clocks to predict and adapt to daily or seasonal changes in environmental parameters. To be at the right place at the right time is of great fitness relevance if -for example- a mating partner or enough food has to be found. Many mutualistic, antagonistic or social interactions can only take place if animals are at the same place at the same time and in the appropriate developmental stage. The lecture gives an introduction to the mechanisms underlying the temporal organisation in the animal kingdom. Adopting an integrative approach, the lecture goes from timing mechanisms on the neuronal level to individual behaviour and then to interactions in social groups, populations or partners in complex and variable ecosystems.

Intended learning outcomes

Students get to know the advantages of an integrative approach when analysing complex biological systems. They learn to relate and integrate different fields within biology. In the seminar, students practise the discussion of research findings.

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 is creditable for 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) 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) Biosciences (2018)
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
Molecular and Clinical Neurobiology	07-MS1N-152-m01

Module coordinator	Module offered by
Managing Director of the Institute of Clinical Neurobiology	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

Content of the lecture *Molekulare und klinische Neurobiologie* (*Molecular and Clinical Neurobiology*) - cells of the nervous system, properties of neurons and glial cells - ion channels and excitability of membranes, channelopathies - synapses, transmitter release, neuromuscular end plate, Myasthenia gravis - motor activity, anatomy of the human motor system, spinal reflexes, motor neuron diseases - cerebellum, ataxia and basal ganglia, Morbus Parkinson - muscles and muscle diseases - somatosensory system and pain - hippocampus, learning and memory, anterograde amnesia, visual agnosia - cortex, Morbus Alzheimer - sleep, EEG, epilepsy - sensory physiology, vision, diseases of the visual system; Reading: Kandel, Principles of Neural Science, 4th Edition: A detailed description of this course is also available at http://neurobiologie.uk-wuerzburg.de/lehrveranstaltungen.html. The lecture Molecular and Clinical Neurobiology (incl. seminar) and *Neuroentwicklungsbiologie* (*Neurodevelopment*; Fridays 8-9 a. m.) together form one theoretical module (10 ECTS). However, you may also complete these two modules separately and have them credited within the area of mandatory electives 2.

Intended learning outcomes

Theoretical foundations of molecular and clinical neurobiology, developmental mechanisms of neuronal diseases.

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 is creditable for 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)

Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title	Abbreviation
Animal Ecology and Tropical Biology	07-MS1TÖ-152-m01

Module coordinator	Module offered by
holder of the Chair of Animal Ecology and Tropical 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

This module consists of a lecture and a seminar. The lecture gives an overview of the theoretical foundations and current issues in animal ecology. Focus will be on biodiversity and ecosystem functions, multi-trophic interactions and food nets, evolutionary ecology, chemical ecology, tropical ecology, agricultural ecology, and global change. In the seminar, recent scientific publications within the topics mentioned above will be presented and discussed.

Intended learning outcomes

The students will acquire an advanced knowledge of ecological theories and current research issues in the field of animal ecology. They will be able to interpret scientific publications and apply the acquired knowledge to the solution of current environmental risks.

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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Animal Communication	07-MS1K-152-m01

Module coordinator	Module offered by
holder of the Chair of Behavioral Physiology and Sociobiology	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

The lectures deal with physiological and neurobiological principles of the different communication channels used by animals, but also highlight adaptive values and evolutionary aspects of animal signalling. In a follow-up seminar session, students will deepen their knowledge by presenting and discussing current papers related to the topic of the lecture.

Intended learning outcomes

Students understand the value of an integrative approach when looking at complex issues in biology. They have learned to connect findings from different research areas, such as physiology, neurobiology, behaviour and ecological conditions, in order to gain a more complete picture of a topic. In addition, students have learned to present and discuss current scientific publications within a broader theoretical framework.

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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (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) Biosciences (2018)

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)

Module title			Abbreviation
Molecular Biology			07-MS2-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Molecular biology of the eukaryotic and prokaryotic cell. The lecture is a joint activity of the Chairs of Cell- and Developmental Biology, Microbiology, Biophysics and Bioinformatics and deals with concepts of modern molecular biology from the point of view of these different disciplines. Participants are recommended to read the textbook "Essential Cell Biology". The section on cell biology (app. a quarter of the lecture) mainly discusses the eukaryotic cell and intends to elucidate the vast diversity in structure and function of molecules, organelles and cells in addition to fundamental principles of modern molecular cell biology. The bioinformatics section (app. a quarter of the lecture) contains a large amount of examples for applications which allow the investigation of the molecular biology of a cell with bioinformatic tools. We closely adhere to the contents of the book "Essential Cell Biology" and present many clear and useful examples for the application of our tools when working on the topics of the other three Chairs. Our vision: bioinformatics essentially is molecular biology based on computing technology (time consuming "wet" experiments can be planned more easily and thus bioinformatics saves precious time). The microbiological section (app. a quarter of the lecture) deals with fundamental molecular aspects of prokaryotic cells. Key aspects include the organisation of the bacterial genome, the transcription and translation machinery, mechanisms of regulation of gene expression, transport of small molecules and macromolecules, cell division and differentiation, bacterial motility and chemotaxis, signal transduction and bacterial communication mechanisms. Recommended reading: (a) Allgemeine Mikrobiologie (Fuchs) and (b) Biology of Microorganisms (Brock).

Intended learning outcomes

Master level knowledge about the molecular biology of the eukaryotic and prokaryotic cell.

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

V (3)
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 is creditable for 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) 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) Biosciences (2018)
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
Cell and Developmental Biology Master 1	07-MS2ZE1-152-m01

Module coordinator	Module offered by
holder of the Chair of Cell Biology and Developmental 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

The module consists of the lecture *Zellpathologie* (*Cytopathology*) and the seminar *Zellbiologie-Meilensteine und Perspektiven* (*Milestones and Perspectives of Cell Biology*). The lecture describes pathological states of the cell and unravels their biological causes and consequences, such as infection, apoptosis, senescence, metabolic disorders and cancer. In the seminar *Milestones and Perspectives of Cell Biology*, classic ground-breaking publications in the field of cell biology are discussed from an unusual point of view.

Intended learning outcomes

Students possess a knowledge of the theoretical principles underlying cell pathology and are able to put this into the broader context of cell biology research.

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

V (1) + S (2)
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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Cell and Developmental Biology Master 2	07-MS2ZE2-152-m01

Module coordinator	Module offered by
holder of the Chair of Cell Biology and Developmental 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

The module consists of the lecture *Signale und Differenzierung* (Signals and Differentiation) and the seminar *Entwicklungsbiologie - Meilensteine und Perspektiven* (*Milestones and Perspectives of Developmental Biology*). The lecture *Signals and Differentiation* does not attempt to impart pure textbook knowledge. Instead, historically important as well as particularly interesting and important trend-setting topics in developmental biology are presented. The topics range from classical developmental subjects such as tissue regeneration and morphogenetic cell migration to molecular stem cell biology, epigenetic plasticity, origins of multicellularity and development within changing environments. In the seminar *Milestones and Perspectives of Developmental Biology*, classic ground-breaking publications in the field of developmental biology are discussed from an unusual point of view.

Intended learning outcomes

Participants possess a knowledge of the theoretical and molecular biological principles underlying developmental biology and are able to put this into the broader context of cell and developmental biology research.

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 is creditable for 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) 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) Biosciences (2018)
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
Infection Biology			07-MS2INF-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)
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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Pathogenicity of Microorganisms			07-MS2PA-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)
Module taught in: English

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

a) written examination (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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Immunology 1	07-MS2IM1-152-m01

Module coordinator	Module offered by
Managing Director of the Institute of Virology and Immunobiology	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 concepts of modern cellular and molecular immunology. More information is available at http://www.virologie.uni-wuerzburg.de/lehrveranstaltungen/vorlesungen_und_praktika/immunologie/immunologie_biologen_master/.

Intended learning outcomes

Students will gain knowledge about, and will be able to present and discuss basic concepts and methods in molecular and cellular immunology.

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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English
Assessment offered: Winter semester only

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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Immunology 2			07-MS2IM2-152-m01
Module coordinator			**Module offered by**
Managing Director of the Institute of Virology and Immunobiology			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

Recent progress in molecular and cellular immunology. Deeper insights into selected immunology chapters, such as autoimmunity and immunomodulation, development of the immune system, immunogenetics, evolution of the immune system, infection immunology, and more.

Intended learning outcomes

Students are able to understand current topics 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English
Assessment offered: Summer semester only

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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Molecular Virology			03-MSMV-171-m01
Module coordinator		**Module offered by**	
unknown		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	unknown	--	

Contents

No information on contents available.

Intended learning outcomes

No information on intended learning outcomes available.

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

V (1) + S (2)
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 is creditable for bonus)

written examination (approx. 60 to 120 minutes).
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 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) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
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)

Module title			Abbreviation
Human Genetics			07-MS2HG-152-m01
Module coordinator		**Module offered by**	
Managing Director of the Institute of Human Genetics		Faculty of Biology	
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 will have gained the ability to understand current issues in human genetics and to discuss these in depth.

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 is creditable for 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
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)

Module title			Abbreviation
Current Methods in Biology			07-MS31-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology 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 series imparts the theoretical background of fundamental and up-to-date molecular biological methods in plant sciences. Special emphasis is placed on analytical tools, large-scale data analysis and their application.

Intended learning outcomes

At the end of the lecture series, students will (I) be able to qualitatively evaluate results acquired with analytical and molecular biological methods and to integrate them into the context of the current scientific knowledge in this field (II) have gained an overview of the advantages/disadvantages of analytical and molecular biological approaches (III) be able to apply the knowledge they have acquired to design their own experimental strategies for addressing a specific research question.

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

V (3)
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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Biophysics and Biochemistry			07-MS3BB-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology 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

The module imparts theoretical and methodological knowledge of plant membrane transport, structural biology and biochemistry which is illustrated with specific examples from current research. Depending on the number of participants and their interests, practical demonstrations of methods that are currently used give students an opportunity to experience the practical aspects of biophysical and biochemical research.

Intended learning outcomes

Students are able to use methods dealing with soluble proteins or membrane proteins in the fields of biophysics, structural biology and biochemistry. They are able to interpret the data and to discuss the results within the context of current knowledge.

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 is creditable for 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) 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) Biosciences (2018)
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
Plant Immunobiology and Pharmaceutical Biology			07-MS31PIP-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Ecophysiology and Vegetation Ecology		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 addresses topics of pathogen recognition and signal transduction in plants, molecular and organismic defence and the pharmaceutical relevance of plant-derived bioactive compounds. Plant immunobiology: interactions between plants and pathogens comprise evolutionary dynamic and complex systems. Different strategies of the pathogens - bacteria, fungi and viruses - as well as defence mechanisms of the host plants will be discussed. The molecular mechanisms of pathogen recognition, signal transduction, regulation of gene expression and activation of local and systemic defence responses are in the focus of this lecture. Differences and similarities between plant and human immune systems will be pointed out. Understanding plant-pathogen-interactions and molecular mechanisms determining susceptibility and defence is fundamental for the development of strategies in plant protection. Evolution, function and pharmaceutical relevance of plant secondary metabolites: Secondary metabolites are part of effective plant defence strategies against microorganisms and herbivores and are often essential for survival. The evolution of secondary metabolism will be discussed and general as well as specific defence strategies will be explained. Pharmacological mechanisms of action and molecular targets of important classes of plant bioactive compounds will be presented. A high proportion of currently used drugs have been developed from plant secondary metabolites that have been used as lead structures to generate potent drugs with improved pharmaceutical properties. Examples of therapies with very potent plant pharmaceuticals (evidence-based medicine) as well as possibilities and limitations of phytotherapy (traditional medicine) will be discussed.

Intended learning outcomes

Students are able to understand the interaction between plants and the environment on a molecular level and to discuss the topic in the context of the scientific state of the art.

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 is creditable for 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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Plant Ecology			07-MS31POEK-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Ecophysiology and Vegetation Ecology		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

The lecture will deal with the ecological and environmental constraints under which plants grow and develop (biogeography, biodiversity) and with the interactions of plants with abiotic and biotic environmental factors (e. g. plant-insect, plant-fungus interactions). The evolutionary adaptations on the physiological and organismic level will be emphasised in particular (stress and defence reactions, carnivory, plant protection). Corresponding experimental approaches will be illustrated. Based on selected examples from current research, the seminar will address the topics covered in the lecture in more detail. It will be complemented by topic-related guided tours in the Botanical Garden of the University of Würzburg.

Intended learning outcomes

Participants are able to identify and interpret ecological and ecophysiological interrelations and to discuss them in the context of the current state of knowledge in these fields.

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 is creditable for 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) 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) Biosciences (2018)

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)

Module title			Abbreviation
Systems Biology F1			07-MS3SYF1-152-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

The practical course will provide students with advanced insights into a field of systems biology and will, in particular, make students proficient in a dynamical method in systems biology (areas that may be selected include protein structure analysis and protein folding, genome analysis and evolution; dynamic network analysis, the dynamics of protein-protein interactions, modelling cellular regulation; modelling metabolism, statistical modelling).

Intended learning outcomes

Students have gained knowledge on experimental setups and methods used in the field of systems biology. They are able to design scientific research, to collect data and to interpret them statistically, adhering to the principles of good scientific practice.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (2015)
Master's degree (1 major) FOKUS Life Sciences (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) Biosciences (2018)
Master's degree (1 major) Computational Mathematics (2019)
Master's degree (1 major) Mathematics (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
Systems Biology F2			07-MS3SYF2-152-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)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

The practical course will provide students with advanced insights into a field of systems biology and will, in particular, make students proficient in a dynamical method in systems biology (areas that may be selected include protein structure analysis and protein folding, genome analysis and evolution; dynamic network analysis, the dynamics of protein-protein interactions, modelling cellular regulation; modelling metabolism, statistical modelling). The techniques applied are evaluated on the basis of the results obtained and are modified where necessary. Results are documented in the form of a presentation, a publication or a term paper.

Intended learning outcomes

Proficiency in one or more methods in systems biology that allows students to independently perform and organise a scientific project in the field of bioinformatics and to document the results obtained. Students are able to design a research project and are prepared for working on a scientific question for their thesis.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) 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) Biosciences (2018)
Master's degree (1 major) Computational Mathematics (2019)
Master's degree (1 major) Mathematics (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 Group 4

(ECTS credits)

Neuroethology - Neurogenetics

(30 ECTS credits)

Students must combine the topics "Neuroethology -- Neurogenetics" and "Neuroethology -- Behavioural Physiology and Sociobiology".

Module title			Abbreviation
Neurogenetics of Behaviour			07-MS1NB-152-m01

Module coordinator	Module offered by
holder of the Chair of Neurobiology and Genetics	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

To understand how the brain controls behaviour is at the heart of neuroscience. Both brain and behaviour can be overwhelmingly complex and plastic, yet neurogenetic methods are powerful tools to dissect the principles of how the brain controls behaviour. The lecture and seminar will give a state-of-the art view on current and important topics of behavioural neurobiology (incl. e. g. sleep, control of appetite and feeding, social behaviour, mating, mirror neurons, molecular mechanisms of auditory-guided behaviour, neurogenetic techniques) focusing on genetic model systems such as the fruit fly Drosophila, the mouse, and the nematode C. elegans.

Intended learning outcomes

In the lecture, students acquire theoretical and methodological insights into current topics in the field of neurogenetics in general and the neurogenetics of behaviour. In the seminar, students practise presenting and discussing research findings in English.

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 is creditable for 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) 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) Biosciences (2018)

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
Endogenous Clocks			07-MS1CB-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Neurobiology and Genetics		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Introduction into endogenous clocks of unicellular organisms, fungi, plants and animals, with a focus on the neuronal organisation of the clock in the brain of mammals and insects. The biological functions of endogenous clocks and the underlying mechanisms will be discussed on the molecular, cellular and organismic levels. It will be explained how clocks adjust to a 24h day with variable photoperiods. Applied aspects regarding e. g. shift work or jetlag will also be discussed.

Intended learning outcomes

The students learn fundamental principles underlying chronobiology/endogenous clocks and obtain an insight into current research in the field. In the seminar, they practise their presentation skills and the discussion of research findings in English.

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 is creditable for 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) 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) Biosciences (2018)
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
Neurobiology F1	07-MS1NF1-152-m01

Module coordinator	Module offered by
holder of the Chair of Neurobiology and Genetics	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

A current topic in the field of neurobiology will be investigated. The practical course will be offered in different specialisations: molecular, clinical, cellular, developmental or behavioural neurobiology or in neurogenetics. In addition to a literature search, a variety of neurobiological methods (for example: electrophysiology, immunohistochemistry, molecular biological techniques, clinical and neurogenetic techniques) and different model systems are offered. The experimental results will be documented and presented in the form of a scientific talk, a publication or a seminar paper.

Intended learning outcomes

The participants are able to conduct scientific research within the field of neurobiology. They have acquired the knowledge and skills (e. g. basic and advanced knowledge, special knowledge, advanced methodological background, general and specific methods) to carry out and document neurobiological experiments according to best practice.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Neurobiology F2			07-MS1NF2-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Neurobiology and Genetics		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

The students will independently work on a smaller project within a current line of research at the Chair. Neurobiological, genetic or molecular techniques will be tested and adapted according to the research aim. The progress of the experiments and the current line of research will be documented and presented in the form of a scientific talk, a publication or a seminar paper.

Intended learning outcomes

The participants are able to independently conduct scientific research within the field of neurobiology and to adapt a research plan according to the experimental progress. They have acquired the knowledge and skills (e. g. basic and advanced knowledge, special knowledge, advanced methodological background, general and specific methods) to independently carry out, document and interpret neurobiological experiments according to best practice.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)

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) 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)

Neuroethology - Behavioural Physiology and Sociobiology

(30 ECTS credits)

Students must combine the topics "Neuroethology -- Neurogenetics" and "Neuroethology -- Behavioural Physiology and Sociobiology".

Module title	Abbreviation
Neurobiology, Behavioural Physiology and Animal Ecology	07-MS1-152-m01

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

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Timing matters: Temporal organisation in the animal kingdom. Timing plays an important role in all living systems. Animals make use of endogenous clocks to predict and adapt to daily or seasonal changes in environmental parameters. To be at the right place at the right time is of great fitness relevance if -for example- a mating partner or enough food has to be found. Many mutualistic, antagonistic or social interactions can only take place if animals are at the same place at the same time and in the appropriate developmental stage. The lecture gives an introduction to the mechanisms underlying the temporal organisation in the animal kingdom. Adopting an integrative approach, the lecture goes from timing mechanisms on the neuronal level to individual behaviour and then to interactions in social groups, populations or partners in complex and variable ecosystems.

Intended learning outcomes

Students get to know the advantages of an integrative approach when analysing complex biological systems. They learn to relate and integrate different fields within biology. In the seminar, students practise the discussion of research findings.

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 is creditable for 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) 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) Biosciences (2018)
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
Experimental Sociobiology	07-MS1ES-152-m01

Module coordinator	Module offered by
holder of the Chair of Behavioral Physiology and Sociobiology	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

The lecture covers the diversity and the development of social behaviour as well as the behavioural physiology and mechanisms of neurobiology that are the basis of the organisation of social groups. A special focus is on current research in the Faculty. With the help of selected publications, the seminar will discuss and explore in more detail the topics covered in the lecture.

Intended learning outcomes

Students understand the value of an integrative approach when looking at complex correlations in behavioural biology. Students are able to recognise and interpret relationships between various aspects of sociobiology. They are able to formulate scientific questions in the context of sociobiology and are able to discuss cutting edge literature in depth.

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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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)

Module title			Abbreviation
Behavioural Physiology and Sociobiology F1			07-MS1VF1-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Behavioral Physiology and Sociobiology		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

Students will be integrated into one of the research groups at the Chair and will independently work on one of the current topics in the field of behavioural physiology and sociobiology. They will gain an insight into the latest physiological, neurobiological and behavioural methods. The results obtained will be graphically and statistically analysed, summarised in a scientific report and presented in a talk. Please contact the research groups at the Chair for available topics and opportunities.

Intended learning outcomes

The students are able to independently perform scientific experiments in the field of behavioural physiology and sociobiology. In addition, they are able to process and document the results obtained and to present them to a scientific audience.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Behavioural Physiology and Sociobiology F2			07-MS1VF2-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Behavioral Physiology and Sociobiology		Faculty of Biology	
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 will be integrated into one of the research groups at the Chair and will independently work on one of the current topics in the field of behavioural physiology and sociobiology. They will learn to plan experimental series and to apply the latest physiological, neurobiological and behavioural methods. The results obtained will be graphically and statistically analysed, summarised in a scientific report and presented in a talk. Please contact the research groups at the Chair for available topics and opportunities.

Intended learning outcomes

The students are able to independently perform scientific experiments in the field of behavioural physiology and sociobiology. In addition, they have learned to interpret the results obtained, taking into account current literature, and to place them in the context of other research in the field.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)

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) 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)

Cell and Developmental Biology

(30 ECTS credits)

Students must combine the topics "Molecular Infection Biology" and "Cell and Developmental Biology".

Module title			Abbreviation
Molecular Biology			07-MS2-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Molecular biology of the eukaryotic and prokaryotic cell. The lecture is a joint activity of the Chairs of Cell- and Developmental Biology, Microbiology, Biophysics and Bioinformatics and deals with concepts of modern molecular biology from the point of view of these different disciplines. Participants are recommended to read the textbook "Essential Cell Biology". The section on cell biology (app. a quarter of the lecture) mainly discusses the eukaryotic cell and intends to elucidate the vast diversity in structure and function of molecules, organelles and cells in addition to fundamental principles of modern molecular cell biology. The bioinformatics section (app. a quarter of the lecture) contains a large amount of examples for applications which allow the investigation of the molecular biology of a cell with bioinformatic tools. We closely adhere to the contents of the book "Essential Cell Biology" and present many clear and useful examples for the application of our tools when working on the topics of the other three Chairs. Our vision: bioinformatics essentially is molecular biology based on computing technology (time consuming "wet" experiments can be planned more easily and thus bioinformatics saves precious time). The microbiological section (app. a quarter of the lecture) deals with fundamental molecular aspects of prokaryotic cells. Key aspects include the organisation of the bacterial genome, the transcription and translation machinery, mechanisms of regulation of gene expression, transport of small molecules and macromolecules, cell division and differentiation, bacterial motility and chemotaxis, signal transduction and bacterial communication mechanisms. Recommended reading: (a) Allgemeine Mikrobiologie (Fuchs) and (b) Biology of Microorganisms (Brock).

Intended learning outcomes

Master level knowledge about the molecular biology of the eukaryotic and prokaryotic cell.

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

V (3)
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 is creditable for 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) 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) Biosciences (2018)
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
Cell and Developmental Biology Master 2	07-MS2ZE2-152-m01

Module coordinator	Module offered by
holder of the Chair of Cell Biology and Developmental 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

The module consists of the lecture *Signale und Differenzierung* (Signals and Differentiation) and the seminar *Entwicklungsbiologie - Meilensteine und Perspektiven* (*Milestones and Perspectives of Developmental Biology*). The lecture *Signals and Differentiation* does not attempt to impart pure textbook knowledge. Instead, historically important as well as particularly interesting and important trend-setting topics in developmental biology are presented. The topics range from classical developmental subjects such as tissue regeneration and morphogenetic cell migration to molecular stem cell biology, epigenetic plasticity, origins of multicellularity and development within changing environments. In the seminar *Milestones and Perspectives of Developmental Biology*, classic ground-breaking publications in the field of developmental biology are discussed from an unusual point of view.

Intended learning outcomes

Participants possess a knowledge of the theoretical and molecular biological principles underlying developmental biology and are able to put this into the broader context of cell and developmental biology research.

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 is creditable for 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) 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) Biosciences (2018)
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
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 is creditable for 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
Cell and Developmental Biology F1			07-MS2ZEF1-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Cell Biology and Developmental 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

This 5 week full-time practical course provides an introduction to modern cell and developmental biology-related methods with a focus on bio-imaging techniques. A broad variety of model organisms is covered and the participants are encouraged to independently design and perform their own experiments. Participants use their acquired technological skills to analyse important basic biological processes. Large parts of this practical course are devoted to small projects, which should provide sustained insights into current research activities of the Chair. Interactions with Master's students, doctoral researchers and post-docs prepare participants for a working in a team-based environment.

Intended learning outcomes

The participants are able to approach complex scientific questions in the fields of cell and developmental biology and to independently implement acquired methodological tools to answer these questions. They are able to perform and document cell and developmental biology-related experiments, adhering to a generally accepted code of scientific practice.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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) 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)

Module title	Abbreviation
Cell and Developmental Biology F2	07-MS2ZEF2-152-m01

Module coordinator	Module offered by
holder of the Chair of Cell Biology and Developmental Biology	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Well-defined aspects of scientific projects are addressed with independently designed experiments in the context of current research projects in the field of cell and developmental biology. The techniques applied are evaluated on the basis of the results obtained and modified where necessary. The results of all experiments as well as the impact on the research project are presented and discussed in a progress report seminar within the research group.

Intended learning outcomes

The participants are able to independently carry out scientific experiments in the fields of cell and developmental biology and to modify them according to the outcome. They are able to independently approach current scientific topics and to perform, interpret and document experiments, adhering to accepted rules of scientific practice.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)

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) 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)

Molecular Infection Biology

(30 ECTS credits)

Students must combine the topics "Molecular Infection Biology" and "Cell and Developmental Biology".

Module title			Abbreviation
Molecular Biology			07-MS2-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Molecular biology of the eukaryotic and prokaryotic cell. The lecture is a joint activity of the Chairs of Cell- and Developmental Biology, Microbiology, Biophysics and Bioinformatics and deals with concepts of modern molecular biology from the point of view of these different disciplines. Participants are recommended to read the textbook "Essential Cell Biology". The section on cell biology (app. a quarter of the lecture) mainly discusses the eukaryotic cell and intends to elucidate the vast diversity in structure and function of molecules, organelles and cells in addition to fundamental principles of modern molecular cell biology. The bioinformatics section (app. a quarter of the lecture) contains a large amount of examples for applications which allow the investigation of the molecular biology of a cell with bioinformatic tools. We closely adhere to the contents of the book "Essential Cell Biology" and present many clear and useful examples for the application of our tools when working on the topics of the other three Chairs. Our vision: bioinformatics essentially is molecular biology based on computing technology (time consuming "wet" experiments can be planned more easily and thus bioinformatics saves precious time). The microbiological section (app. a quarter of the lecture) deals with fundamental molecular aspects of prokaryotic cells. Key aspects include the organisation of the bacterial genome, the transcription and translation machinery, mechanisms of regulation of gene expression, transport of small molecules and macromolecules, cell division and differentiation, bacterial motility and chemotaxis, signal transduction and bacterial communication mechanisms. Recommended reading: (a) Allgemeine Mikrobiologie (Fuchs) and (b) Biology of Microorganisms (Brock).

Intended learning outcomes

Master level knowledge about the molecular biology of the eukaryotic and prokaryotic cell.

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

V (3)
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 is creditable for 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) 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) Biosciences (2018)
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
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 is creditable for 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
Pathogenicity of Microorganisms			07-MS2PA-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)
Module taught in: English

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

a) written examination (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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Microbiology F1			07-MS2MF1-152-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

Participants will work independently on a current research project dealing with microbial pathogens and their interactions with the host. Participants will employ a variety of state-of-the-art methods within the fields of molecular biology, microbiology, cellular biology, and immunology as well as data analysis and literature research techniques. Results will be documented and discussed in a seminar paper or an oral presentation.

Intended learning outcomes

Participants will acquire the skills to experimentally address scientific questions in molecular biology and infection biology, properly document experimental results and adhere to the standards of good scientific practice.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

The internship must be completed full-time within a period of 5 to 6 weeks.

Workload

300 h

Teaching cycle

Teaching cycle: Ongoing, after consultation with the supervisor and registration for both winter and summer semesters.

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

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Module appears in

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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Microbiology F2			07-MS2MF2-152-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)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Participants will work independently on a current research project dealing with microbiology and infection biology. They will apply advanced experimental techniques in microbiology, cell biology and molecular biology according to the project requirements. Progress of the research project will be reported in a seminar paper, a research paper or an oral presentation.

Intended learning outcomes

The participants will acquire the skills to independently perform basic research on microbiology and infection biology according to the standards of good scientific practice and to properly document, interpret and present experimental results.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

The internship must be completed full-time within a period of 10 to 12 weeks.

Workload

450 h

Teaching cycle

Teaching cycle: Ongoing, after consultation with the supervisor and registration for both winter and summer semesters.

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

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Module appears in

Master's degree (1 major) Biology (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) Biosciences (2018)
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) 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)

Systems Biology and Metabolomics - Systems Biology

(30 ECTS credits)

Students must combine the topics "Systems Biology and Metabolomics -- Systems Biology" and "Systems Biology and Metabolomics -- Metabolomics".

Module title			Abbreviation
Topics in Systems Biology			07-MS3TSY-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: English

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

a) written examination (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) Biology (2015)
Master's degree (1 major) FOKUS Life Sciences (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)
Master's degree (1 major) FOKUS Life Sciences (2025)

Module title	Abbreviation
Neurobiology, Behavioural Physiology and Animal Ecology	07-MS1-152-m01

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

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Timing matters: Temporal organisation in the animal kingdom. Timing plays an important role in all living systems. Animals make use of endogenous clocks to predict and adapt to daily or seasonal changes in environmental parameters. To be at the right place at the right time is of great fitness relevance if -for example- a mating partner or enough food has to be found. Many mutualistic, antagonistic or social interactions can only take place if animals are at the same place at the same time and in the appropriate developmental stage. The lecture gives an introduction to the mechanisms underlying the temporal organisation in the animal kingdom. Adopting an integrative approach, the lecture goes from timing mechanisms on the neuronal level to individual behaviour and then to interactions in social groups, populations or partners in complex and variable ecosystems.

Intended learning outcomes

Students get to know the advantages of an integrative approach when analysing complex biological systems. They learn to relate and integrate different fields within biology. In the seminar, students practise the discussion of research findings.

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 is creditable for 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) 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) Biosciences (2018)
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
Systems Biology F1			07-MS3SYF1-152-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

The practical course will provide students with advanced insights into a field of systems biology and will, in particular, make students proficient in a dynamical method in systems biology (areas that may be selected include protein structure analysis and protein folding, genome analysis and evolution; dynamic network analysis, the dynamics of protein-protein interactions, modelling cellular regulation; modelling metabolism, statistical modelling).

Intended learning outcomes

Students have gained knowledge on experimental setups and methods used in the field of systems biology. They are able to design scientific research, to collect data and to interpret them statistically, adhering to the principles of good scientific practice.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (2015)
Master's degree (1 major) FOKUS Life Sciences (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) Biosciences (2018)
Master's degree (1 major) Computational Mathematics (2019)
Master's degree (1 major) Mathematics (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
Systems Biology F2			07-MS3SYF2-152-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)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

The practical course will provide students with advanced insights into a field of systems biology and will, in particular, make students proficient in a dynamical method in systems biology (areas that may be selected include protein structure analysis and protein folding, genome analysis and evolution; dynamic network analysis, the dynamics of protein-protein interactions, modelling cellular regulation; modelling metabolism, statistical modelling). The techniques applied are evaluated on the basis of the results obtained and are modified where necessary. Results are documented in the form of a presentation, a publication or a term paper.

Intended learning outcomes

Proficiency in one or more methods in systems biology that allows students to independently perform and organise a scientific project in the field of bioinformatics and to document the results obtained. Students are able to design a research project and are prepared for working on a scientific question for their thesis.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) 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) Biosciences (2018)
Master's degree (1 major) Computational Mathematics (2019)
Master's degree (1 major) Mathematics (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)

Systems Biology and Metabolomics - Metabolomics

(30 ECTS credits)

Students must combine the topics "Systems Biology and Metabolomics -- Systems Biology" and "Systems Biology and Metabolomics -- Metabolomics".

Module title			Abbreviation
Molecular Biology			07-MS2-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Molecular biology of the eukaryotic and prokaryotic cell. The lecture is a joint activity of the Chairs of Cell- and Developmental Biology, Microbiology, Biophysics and Bioinformatics and deals with concepts of modern molecular biology from the point of view of these different disciplines. Participants are recommended to read the textbook "Essential Cell Biology". The section on cell biology (app. a quarter of the lecture) mainly discusses the eukaryotic cell and intends to elucidate the vast diversity in structure and function of molecules, organelles and cells in addition to fundamental principles of modern molecular cell biology. The bioinformatics section (app. a quarter of the lecture) contains a large amount of examples for applications which allow the investigation of the molecular biology of a cell with bioinformatic tools. We closely adhere to the contents of the book "Essential Cell Biology" and present many clear and useful examples for the application of our tools when working on the topics of the other three Chairs. Our vision: bioinformatics essentially is molecular biology based on computing technology (time consuming "wet" experiments can be planned more easily and thus bioinformatics saves precious time). The microbiological section (app. a quarter of the lecture) deals with fundamental molecular aspects of prokaryotic cells. Key aspects include the organisation of the bacterial genome, the transcription and translation machinery, mechanisms of regulation of gene expression, transport of small molecules and macromolecules, cell division and differentiation, bacterial motility and chemotaxis, signal transduction and bacterial communication mechanisms. Recommended reading: (a) Allgemeine Mikrobiologie (Fuchs) and (b) Biology of Microorganisms (Brock).

Intended learning outcomes

Master level knowledge about the molecular biology of the eukaryotic and prokaryotic cell.

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

V (3)
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 is creditable for 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) 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) Biosciences (2018)
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
Topics in Bioinformatics			07-MS2TBI-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. next generation sequences, proteomics data), analysis of different functional RNAs (e. g. miRNAs, lncRNAs).

Intended learning outcomes

Students are able to understand recent results in bioinformatics and discuss their implications. They have developed an advanced knowledge about typical techniques, scientific objectives and scientific questions.

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 is creditable for 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) Biology (2015)
Master's degree (1 major) FOKUS Life Sciences (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)
Master's degree (1 major) FOKUS Life Sciences (2025)

Module title	Abbreviation
Cell and Developmental Biology Master 2	07-MS2ZE2-152-m01

Module coordinator	Module offered by
holder of the Chair of Cell Biology and Developmental 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

The module consists of the lecture *Signale und Differenzierung* (Signals and Differentiation) and the seminar *Entwicklungsbiologie - Meilensteine und Perspektiven* (*Milestones and Perspectives of Developmental Biology*). The lecture *Signals and Differentiation* does not attempt to impart pure textbook knowledge. Instead, historically important as well as particularly interesting and important trend-setting topics in developmental biology are presented. The topics range from classical developmental subjects such as tissue regeneration and morphogenetic cell migration to molecular stem cell biology, epigenetic plasticity, origins of multicellularity and development within changing environments. In the seminar *Milestones and Perspectives of Developmental Biology*, classic ground-breaking publications in the field of developmental biology are discussed from an unusual point of view.

Intended learning outcomes

Participants possess a knowledge of the theoretical and molecular biological principles underlying developmental biology and are able to put this into the broader context of cell and developmental biology research.

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 is creditable for 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) 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) Biosciences (2018)
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
Pharmaceutical Biology and Metabolomics F1			07-MS3PBMF1-152-m01

Module coordinator	Module offered by
holder of the Chair of Pharmaceutical 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

All organisms are able to reprogram their metabolism in response to various endogenous or exogenous perturbations. Reprogramming of metabolism is often correlated to phenotypic changes e. g. in disease development, physiology or behaviour. At the Chair of Pharmaceutical Biology, we apply metabolomics for gene function- or stress response analysis. Students can choose a topic from the variety of ongoing projects. Depending on the scientific question addressed by the research team at the Chair, the methodological approach involves techniques in the field of metabolomics/bioanalytics and/or molecular biology. In this module, students will be trained to use quantitative metabolite analysis methods (chromatography, mass spectrometry) and apply advanced molecular biology techniques. Depending on the project, different model organisms are studied. Prior knowledge in metabolite analysis or mass spectrometry is not required. Current scientific questions in the life sciences form the basis to impart scientific concepts and to train students in the laboratory. The module involves the experimental design, realisation and critical evaluation of scientific experiments as well as the documentation and presentation of the progress. More information is available on request or can be found at http://www.pbio.biozentrum.uni-wuerzburg.de/.

Intended learning outcomes

Students will be trained in using specific molecular biology methods and/or metabolomics approaches to address scientific questions, in the documentation of experimental procedures and results, and in the interpretation of data.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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) 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)

Module title	Abbreviation
Pharmaceutical Biology and Metabolomics F2	07-MS3PBMF2-152-m01

Module coordinator	Module offered by
holder of the Chair of Pharmaceutical Biology	Faculty of Biology

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 will be involved in current research projects in pharmaceutical biology or in collaborative research projects that focus on the regulation of metabolism and analysis of metabolic pathways (e. g. in the context of reactions towards biotic or abiotic stress, functional and phenotypic analysis of mutants, or drug metabolism). Aspects of the scientific question will be independently addressed by the students. Molecular biology methods and/or metabolomic approaches will be optimised for and adapted to the specific problem. Experimental results and progress in the understanding of biological problems will be documented in the form of a log and presented in a seminar. More information is available on request or can be found at http://www.pbio.biozentrum.uni-wuerzburg.de/.

Intended learning outcomes

The participants are able to independently carry out scientific experiments and to modify them according to the outcome. They are able to independently approach scientific topics in pharmaceutical biology and to perform, interpret and document experiments, adhering to accepted rules of scientific practice. They are able to apply specific techniques required to answer scientific questions.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)
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) 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)

Molecular and Computational Biology - Computational Biology

(30 ECTS credits)

Students may combine the topic "Molecular and Computational Biology -- Computational Biology" with "Molecular and Computational Biology -- Molecular Biology". Alternatively, they may combine this topic with "Protein Chemistry" or "Molecular and Cellular Biophysics".

Module title			Abbreviation
Topics in Systems Biology			07-MS3TSY-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: English

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

a) written examination (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) Biology (2015)
Master's degree (1 major) FOKUS Life Sciences (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)
Master's degree (1 major) FOKUS Life Sciences (2025)

Module title			Abbreviation
Topics in Bioinformatics			07-MS2TBI-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. next generation sequences, proteomics data), analysis of different functional RNAs (e. g. miRNAs, lncRNAs).

Intended learning outcomes

Students are able to understand recent results in bioinformatics and discuss their implications. They have developed an advanced knowledge about typical techniques, scientific objectives and scientific questions.

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 is creditable for 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) Biology (2015)
Master's degree (1 major) FOKUS Life Sciences (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)
Master's degree (1 major) FOKUS Life Sciences (2025)

Module title			Abbreviation
Computational Biology F1			07-MS3COBF1-152-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

Detailed insight into methods in bioinformatics; depending on the topic selected, fields covered include: genomics (sequence-, domain analysis and annotation), omics data analysis (NGS, transcriptomics, metabolomics, proteomics), topological and structural analysis of biological interactions including statistical methods, phylogenetic analysis, protein structure analysis. Results are documented in the form of a presentation, a publication or a term paper.

Intended learning outcomes

Students have gained knowledge on experimental setups and methods used in the field of bioinformatics. They are able to design experiments, collect data and interpret them statistically, adhering to the principles of good scientific practice.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)

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) 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)

Module title			Abbreviation
Computational Biology F2			07-MS3COBF2-152-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)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Advanced insight into methods in bioinformatics; depending on the topic selected, fields covered include: genomics (sequence-, domain analysis and annotation), omics data analysis (NGS, transcriptomics, metabolomics, proteomics), topological and structural analysis of biological interactions including statistical methods, phylogenetic analysis, protein structure analysis. The techniques applied are evaluated on the basis of the results obtained and are modified where necessary. Results are documented in the form of a presentation, a publication or a term paper.

Intended learning outcomes

Proficiency in one or more methods in bioinformatics that allows students to successfully conduct scientific research (for their Master's thesis). Ability to independently address topics in bioinformatics as well as document and interpret findings, adhering to the principles of good scientific practice.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)

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) 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)

Molecular and Computational Biology - Molecular Biology

(30 ECTS credits)

Students must combine the topics "Molecular and Computational Biology -- Computational Biology" and "Molecular and Computational Biology -- Molecular Biology".

Module title			Abbreviation
Molecular Biology			07-MS2-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Molecular biology of the eukaryotic and prokaryotic cell. The lecture is a joint activity of the Chairs of Cell- and Developmental Biology, Microbiology, Biophysics and Bioinformatics and deals with concepts of modern molecular biology from the point of view of these different disciplines. Participants are recommended to read the textbook "Essential Cell Biology". The section on cell biology (app. a quarter of the lecture) mainly discusses the eukaryotic cell and intends to elucidate the vast diversity in structure and function of molecules, organelles and cells in addition to fundamental principles of modern molecular cell biology. The bioinformatics section (app. a quarter of the lecture) contains a large amount of examples for applications which allow the investigation of the molecular biology of a cell with bioinformatic tools. We closely adhere to the contents of the book "Essential Cell Biology" and present many clear and useful examples for the application of our tools when working on the topics of the other three Chairs. Our vision: bioinformatics essentially is molecular biology based on computing technology (time consuming "wet" experiments can be planned more easily and thus bioinformatics saves precious time). The microbiological section (app. a quarter of the lecture) deals with fundamental molecular aspects of prokaryotic cells. Key aspects include the organisation of the bacterial genome, the transcription and translation machinery, mechanisms of regulation of gene expression, transport of small molecules and macromolecules, cell division and differentiation, bacterial motility and chemotaxis, signal transduction and bacterial communication mechanisms. Recommended reading: (a) Allgemeine Mikrobiologie (Fuchs) and (b) Biology of Microorganisms (Brock).

Intended learning outcomes

Master level knowledge about the molecular biology of the eukaryotic and prokaryotic cell.

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

V (3)
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 is creditable for 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) 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) Biosciences (2018)
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
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 is creditable for 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
Topics and Concepts in Life Sciences			07-MLS2-152-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

A broad variety of topics and concepts from the areas of neuroscience, infection and immunity, integrative biology, and biomedicine including for example: protein characterisation, DNA repair, Drosophila, computational biology, and neurocircuits.

Intended learning outcomes

Students have an overview of the current research topics in the Graduate School of Life Sciences and are able to explain their significance and scientific background.

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 is creditable for 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 (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: 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) 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) Biosciences (2018)
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
Pathogenicity of Microorganisms			07-MS2PA-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)
Module taught in: English

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

a) written examination (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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Molecular Biology F1			07-MSF1-152-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

Practical course on a topic in molecular biology. Students spend five weeks working on a small, well-defined scientific lab project and learn how to present their data. They learn to discuss their data in a seminar. The students learn to apply defined experimental procedures and methods, to independently address scientific questions and to document their experimental work in an appropriate manner.

Intended learning outcomes

Students have reinforced previously acquired lab skills, acquired new molecular lab techniques and learned how to transfer theoretical knowledge into experiments. Students have gained expertise in the analysis of raw data, their interpretation and their presentation.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (2015)
Master's degree (1 major) FOKUS Life Sciences (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Molecular Biology F2			07-MSF2-152-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)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Current problems in the field of molecular biology are addressed by critically reading and presenting original research papers. The participants will be involved in the development of a research plan and will learn to apply advanced techniques to answer a scientific question in molecular biology. This practical course will have a duration of 12 weeks (three months) and will prepare participants for their theses.

Intended learning outcomes

Students are able to independently work in a laboratory. They are able to answer and discuss questions in the field of molecular biology. Students are able to adhere to the principles of good scientific practice as well as to document, interpret and discuss their results. They are able to apply specific molecular techniques that are required to answer scientific questions.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Plant Ecology

(30 ECTS credits)

Students must combine the topics "Plant Ecology" and "Animal Ecology".

Module title	Abbreviation
Plant Ecology	07-MS31POEK-152-m01

Module coordinator	Module offered by
holder of the Chair of Ecophysiology and Vegetation Ecology	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

The lecture will deal with the ecological and environmental constraints under which plants grow and develop (biogeography, biodiversity) and with the interactions of plants with abiotic and biotic environmental factors (e. g. plant-insect, plant-fungus interactions). The evolutionary adaptations on the physiological and organismic level will be emphasised in particular (stress and defence reactions, carnivory, plant protection). Corresponding experimental approaches will be illustrated. Based on selected examples from current research, the seminar will address the topics covered in the lecture in more detail. It will be complemented by topic-related guided tours in the Botanical Garden of the University of Würzburg.

Intended learning outcomes

Participants are able to identify and interpret ecological and ecophysiological interrelations and to discuss them in the context of the current state of knowledge in these fields.

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 is creditable for 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) 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) Biosciences (2018)

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)

Module title			Abbreviation
Molecular Biology			07-MS2-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Molecular biology of the eukaryotic and prokaryotic cell. The lecture is a joint activity of the Chairs of Cell- and Developmental Biology, Microbiology, Biophysics and Bioinformatics and deals with concepts of modern molecular biology from the point of view of these different disciplines. Participants are recommended to read the textbook "Essential Cell Biology". The section on cell biology (app. a quarter of the lecture) mainly discusses the eukaryotic cell and intends to elucidate the vast diversity in structure and function of molecules, organelles and cells in addition to fundamental principles of modern molecular cell biology. The bioinformatics section (app. a quarter of the lecture) contains a large amount of examples for applications which allow the investigation of the molecular biology of a cell with bioinformatic tools. We closely adhere to the contents of the book "Essential Cell Biology" and present many clear and useful examples for the application of our tools when working on the topics of the other three Chairs. Our vision: bioinformatics essentially is molecular biology based on computing technology (time consuming "wet" experiments can be planned more easily and thus bioinformatics saves precious time). The microbiological section (app. a quarter of the lecture) deals with fundamental molecular aspects of prokaryotic cells. Key aspects include the organisation of the bacterial genome, the transcription and translation machinery, mechanisms of regulation of gene expression, transport of small molecules and macromolecules, cell division and differentiation, bacterial motility and chemotaxis, signal transduction and bacterial communication mechanisms. Recommended reading: (a) Allgemeine Mikrobiologie (Fuchs) and (b) Biology of Microorganisms (Brock).

Intended learning outcomes

Master level knowledge about the molecular biology of the eukaryotic and prokaryotic cell.

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

V (3)
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 is creditable for 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) 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) Biosciences (2018)
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
Physiological Plant Ecology F1	07-MS3PPEF1-152-m01

Module coordinator	Module offered by
holder of the Chair of Plant Physiology 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

Under the guidance of an experienced scientist, students will work on a current research topic from the field of ecology/ecophysiology. Particular emphasis will be placed on the physiological bases of the interactions between plants and abiotic and biotic environmental factors (e. g. water relations, stress, biogeography). Working concepts and complex experiments will be designed, and the results will be documented and presented in the form of a presentation, a publication or a log. The participants will be involved in ongoing projects and will deepen their knowledge on applying special methods, in ecophysiology in particular but also in chemical analysis.

Intended learning outcomes

The participants are able to perform scientific experiments in the field of physiological plant ecology and to apply appropriate methods. They are also able to address and document questions in the field of ecology/ecophysiology, adhering to the rules of good scientific practice.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Physiological Plant Ecology F2			07-MS3PPEF2-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology and Biophysics		Faculty of Biology	
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 will work on projects taken from ongoing research in the supervisors' labs in the field of plant ecology and ecophysiology (e. g. plant-insect-, plant-fungus interactions; biogeography; water relations). They will do this work to a large extent on their own responsibility by performing advanced experiments, their documentation and evaluation. Based on the results obtained, the ecophysiological and analytical methods applied (e. g. measurement of transpiration, fluorescence microscopy, chlorophyll-fluorometry) will be critically assessed, and, where necessary, modified. The progress of the experiments and their contribution to more general projects will be documented and presented in the form of presentations, publications or logs.

Intended learning outcomes

Students have gained knowledge on experimental setups and methods used in the field of plant ecophysiology. They are able to design scientific research, to collect data and to interpret them statistically, adhering to the principles of good scientific practice.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Molecular and Chemical Plant Ecology F1			07-MS3MCPEF1-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology 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

Under the guidance of an experienced scientist, students will work on a current research topic from the field of molecular and chemical plant ecology. Particular emphasis will be placed on the molecular and chemical bases of the interactions between plants and abiotic and biotic environmental factors (e. g. cuticular barrier properties, plant-insect, and plant-fungus interactions). Working concepts and complex experiments will be designed, and the results will be documented and presented in the form of presentations, publications or logs. The participants will be involved in ongoing projects and will deepen their knowledge on applying special methods, in molecular biology in particular but also in chemical analysis.

Intended learning outcomes

The participants are able to perform scientific experiments in the field of molecular and chemical plant ecology and to apply appropriate methods. They are also able to address and document questions in the field of molecular biology/chemical ecology, adhering to the rules of good scientific practice.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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) Biosciences (2023)

Module title			Abbreviation
Molecular and Chemical Plant Ecology F2			07-MS3MCPEF2-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology and Biophysics		Faculty of Biology	
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 will work on projects taken from ongoing research in the supervisors' labs from the field of molecular and chemical plant ecology (e. g. cuticular barrier properties, plant-insect, and plant-fungus interactions). They will do this work to a large extent on their own responsibility by performing advanced experiments, their documentation and evaluation. Based on the results obtained, the analytical, molecular biological and/or microbiological methods applied (e. g. PCR, cloning strategies, chromatography, mass spectrometry) will be critically assessed and, where necessary, modified. The progress of the experiments and their contribution to more general projects will be documented and presented in the form of presentations, publications or logs.

Intended learning outcomes

The participants are able to independently perform scientific experiments in the field of molecular and chemical plant ecology and to modify them according to the outcome. They are able to independently address, document and interpret questions in the field of molecular/chemical plant ecology, adhering to the rules of good scientific practice. Students are also able to apply specific techniques required to answer scientific questions.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)
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) Biosciences (2023)

Animal Ecology

(30 ECTS credits)

Students must combine the topics "Plant Ecology" and "Animal Ecology".

Module title	Abbreviation
Neurobiology, Behavioural Physiology and Animal Ecology	07-MS1-152-m01

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

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Timing matters: Temporal organisation in the animal kingdom. Timing plays an important role in all living systems. Animals make use of endogenous clocks to predict and adapt to daily or seasonal changes in environmental parameters. To be at the right place at the right time is of great fitness relevance if -for example- a mating partner or enough food has to be found. Many mutualistic, antagonistic or social interactions can only take place if animals are at the same place at the same time and in the appropriate developmental stage. The lecture gives an introduction to the mechanisms underlying the temporal organisation in the animal kingdom. Adopting an integrative approach, the lecture goes from timing mechanisms on the neuronal level to individual behaviour and then to interactions in social groups, populations or partners in complex and variable ecosystems.

Intended learning outcomes

Students get to know the advantages of an integrative approach when analysing complex biological systems. They learn to relate and integrate different fields within biology. In the seminar, students practise the discussion of research findings.

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 is creditable for 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) 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) Biosciences (2018)
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
Animal Ecology and Tropical Biology 2	07-MS1TÖ2-152-m01

Module coordinator	Module offered by
holder of the Chair of Animal Ecology and Tropical 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

This module provides the fundamentals of the biology of tropical habitats and tropical communities. A special focus is on the global significance of tropical systems (ecosystem goods and ecosystem services), but the biological features of these highly diverse biomes are also highlighted.

Intended learning outcomes

The students will acquire deep knowledge of ecological theories and up-to-date research issues in the field of animal ecology of the tropics. They will be qualified to interpret scientific work and apply the knowledge they have acquired to the solution of current environmental risks.

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 is creditable for 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) 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) Biosciences (2018)
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
Animal Ecology F1	07-MS1TÖF1-152-m01

Module coordinator	Module offered by
holder of the Chair of Animal Ecology and Tropical 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

This module consists of several exercises and a seminar series over the course of the entire semester. The exercises can be chosen from the following electives: 1. Wild and honeybee ecology (over the course of the semester): fundamentals and techniques of beekeeping, resource utilisation, behaviour experiments, pollinator diversity and plant-pollinator-interactions. 2. Ecology and taxonomy of insects (block, 2 weeks): observation and recording in the habitat, identification and characteristics of different arthropod groups, field experiments. 3. Ecological modelling (block, 2 weeks): current methods of ecological processes modelling, simulation models, the students' own modelling project on current issues in ecology. 4. Agroecology (block, 1 week): insect communities in agroecosystems, biological pest control in landscape context, evaluation of agri-environment schemes. 5. Forest ecology (block, 1 week): arthropod communities in forest ecosystems, methods of detection, influence of management on diversity patterns and functional groups. 6. Tropical ecology (block): small projects ecological or nature conservation-related issues to be implemented in a tropical ecosystem in East Africa. In the seminar, recent scientific publications on the topics covered in the modules listed above will be presented and discussed.

Intended learning outcomes

Students will have expanded their knowledge on ecological theories and current research issues in animal ecology. They will be able to design, perform, statistically analyse and interpret scientific research. They will be familiar with animal ecological methods and possible sources of error in data interpretation. They will have deepened their knowledge of the biology and ecology of important functional taxa of arthropods. Students will have acquired the knowledge and skills necessary to perform scientific activities in the context of an F2 practical course or a Master's thesis.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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) 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)

Module title	Abbreviation
Animal Ecology and Tropical Biology F2	07-MS1TÖF2-152-m01

Module coordinator	Module offered by
holder of the Chair of Animal Ecology and Tropical Biology	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

In the F2 practical course, students will explore a scientific question as independently as possible. They will develop hypotheses, prepare a work schedule, collect data, perform experiments in the field, greenhouse or laboratory and will statistically analyse data. Students will document the results of their work in a log similar to a short scientific paper, including an introduction, material and methods, findings and a discussion of these. Students will also be required to present their findings during a wrap-up seminar. The various research groups at the Chair of Animal Ecology and Tropical Biology offer a wide variety of opportunities for students to complete an F2 practical course in Germany, another country in Europe or in the tropics. F2 practical courses may be completed in the context of an ongoing research project of the Institute or in cooperation with other institutions. For more detailed information on the F2 practical course as well as current topics or appointments for consultations, please refer to WueCampus, check out the notice board of the Chair or contact the research groups directly.

Intended learning outcomes

Students have gained knowledge on experimental setups and methods used in the fields of animal ecology and tropical ecology. They are qualified to design scientific research and are able to collect data and interpret them statistically. They have developed knowledge and skills that allow them to set up a scientific project for their Master's thesis.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)
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) 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)

Molecular and Cellular Biophysics

(30 ECTS credits)

Students must combine the topics "Molecular and Cellular Biophysics" and "Molecular and Computational Biology -- Computational Biology".

Module title			Abbreviation
Biophysics and Biochemistry			07-MS3BB-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology 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

The module imparts theoretical and methodological knowledge of plant membrane transport, structural biology and biochemistry which is illustrated with specific examples from current research. Depending on the number of participants and their interests, practical demonstrations of methods that are currently used give students an opportunity to experience the practical aspects of biophysical and biochemical research.

Intended learning outcomes

Students are able to use methods dealing with soluble proteins or membrane proteins in the fields of biophysics, structural biology and biochemistry. They are able to interpret the data and to discuss the results within the context of current knowledge.

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 is creditable for 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) 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) Biosciences (2018)
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
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 is creditable for 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
Biophysics of Plant Membrane Proteins F1			07-MS3BPF1-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology 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

The module provides an in-depth insight into biophysical strategies and methods which are used for the functional characterisation of plant membrane proteins. The students will be integrated into research projects on current topics in molecular plant membrane biology.

Intended learning outcomes

The students have knowledge of general biophysical strategies and methods with a focus on plant membrane proteins, they are able to independently work on related scientific issues and to document the results obtained.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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) 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)

Module title	Abbreviation
Biophysics of Plant Membrane Proteins F2	07-MS3BPF2-152-m01

Module coordinator	Module offered by
holder of the Chair of Plant Physiology and Biophysics	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

The students perform their research work within the context of a current research project on the biophysics of plant membrane proteins in a largely independent manner under supervision of a principal investigator.

Intended learning outcomes

The students are able to address scientific issues in biophysics, using appropriate biophysical methods. They are able to independently design the appropriate experiments as well as to analyse, document, present and discuss the results.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)
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) 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)

Module title	Abbreviation
Biophysics and Molecular Biotechnology F1	07-MS2BTF1-152-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 practical course provides students with an insight into different biotechnological and biophysical topics and methods. Under expert guidance, students will perform selected experiments on the following topics: cellular and molecular biotechnology, nano and microsystems biotechnology, biomaterials and biosensors, high-resolution fluorescence microscopy, fluorescence spectroscopy, analysis and electromanipulation of cells.

Intended learning outcomes

Students will have acquired a knowledge of fundamental biotechnological and 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. Students will have acquired practical experience performing experiments, using a variety of scientific tools. In the seminar, students will have acquired detailed theoretical knowledge on these experiments and will have delivered a short presentation (15 minutes) on one of the experiments they performed.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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) 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)

Module title	Abbreviation
Biophysics and Molecular Biotechnology F2	07-MS2BTF2-152-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)
15	(not) successfully completed	--

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

This practical course provides students with an insight into different biotechnological and biophysical topics and is close to laboratory research. Under expert guidance, students will perform selected experiments on one of the following topics: cellular and molecular biotechnology, nano and microsystems biotechnology, biomaterials and biosensors, high-resolution fluorescence microscopy, fluorescence spectroscopy, analysis and electromanipulation of cells. Performing experiments under expert guidance, students will become acquainted with techniques and instruments. Over the duration of the course, students will then be required to work increasingly independently on current research topics. Work on current research topics will spark the students' interest in topics and will help them select a topic for their Master's thesis.

Intended learning outcomes

Students will become acquainted with modern biophysical methods and their applications in biotechnology. They will be able to independently work on scientific problems, to independently study relevant literature and to develop a quantitative understanding of biophysical mechanisms. In the seminar, students will acquire further theoretical knowledge on experiments and will give short presentations on experiments performed.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)
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) 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)

Protein Chemistry

(30 ECTS credits)

Students must combine the topics "Protein Chemistry" and "Molecular and Computational Biology -- Computational Biology".

Module title			Abbreviation
Biophysics and Biochemistry			07-MS3BB-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology 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

The module imparts theoretical and methodological knowledge of plant membrane transport, structural biology and biochemistry which is illustrated with specific examples from current research. Depending on the number of participants and their interests, practical demonstrations of methods that are currently used give students an opportunity to experience the practical aspects of biophysical and biochemical research.

Intended learning outcomes

Students are able to use methods dealing with soluble proteins or membrane proteins in the fields of biophysics, structural biology and biochemistry. They are able to interpret the data and to discuss the results within the context of current knowledge.

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 is creditable for 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) 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) Biosciences (2018)
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
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 is creditable for 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

--

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
Biochemistry and Structural Biology F1	07-MS3BSBF1-152-m01

Module coordinator	Module offered by
holder of the Chair of Plant Physiology 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

The module provides an in-depth insight into strategies and methods in protein biochemistry and structural biology. The students will be integrated into research projects on current topics in biochemistry and structural biology.

Intended learning outcomes

The students have knowledge about general strategies and methods of protein biochemistry and structural biology with a focus on membrane proteins. They are able to perform and organise their scientific laboratory work independently and document the results obtained.

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

P (14) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) 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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Biochemistry and Structural Biology F2			07-MS3BSBF2-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology and Biophysics		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

The students perform their research work within the context of a current research project on biochemistry and structural biology in a largely independent manner under supervision of a principal investigator.

Intended learning outcomes

The students are able to independently perform and organise their scientific laboratory work in the fields of biochemistry and structural biology and to document the results obtained. They are able to design a research project and are prepared for working on a scientific question for their thesis.

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

P (29) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)
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) 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)

Subtopic Additional Achievements

(15 ECTS credits)

Module title			Abbreviation
Laboratory Course 1			07-MSL1-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
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 course advisory service in advance.	

Contents

Practical course, summer school or workshop on specific topics in biology (duration: 2-3 weeks).

Intended learning outcomes

Proficiency in specific methods and lab techniques from selected fields of biology. Ability to apply these methods and techniques later on in a research project.

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

P (5)
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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Laboratory Course 2			07-MSL2-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
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 course advisory service in advance.	

Contents

Practical course, summer school or workshop on specific topics in biology (duration: 4-6 weeks).

Intended learning outcomes

Proficiency in specific methods and lab techniques from selected fields of biology. Ability to apply these methods and techniques later on in a research project.

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

P (15)
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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Laboratory Course 3			07-MSL3-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with course advisory service in advance.	

Contents

Practical course, summer school or workshop on specific topics in biology (duration: 6-9 weeks).

Intended learning outcomes

Proficiency in specific methods and lab techniques from selected fields of biology. Ability to apply these methods and techniques later on in a research project.

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

P (30)
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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
External Internship 1			07-MSA1-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
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 course advisory service in advance.	

Contents

Practical course during stay abroad on a selected topic in biology (duration: 2-3 weeks).

Intended learning outcomes

Proficiency in selected methods and lab techniques from selected fields of biology. Ability to apply these methods and techniques later on in a research project.

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

P (10)
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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 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) Biology (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) Biosciences (2018)
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) 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)

Module title			Abbreviation
External Internship 2			07-MSA2-171-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
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 course advisory service in advance.	

Contents

External placement on a biological topic. Students spend 4-6 weeks working on a well-defined scientific project and learn how to present their data.

Intended learning outcomes

Proficiency in selected methods and lab techniques from selected fields of biology. Ability to apply these methods and techniques later on in a research project.

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

P (15)
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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
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)

Module title			Abbreviation
External Internship 3			07-MSA3-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with course advisory service in advance.	

Contents

External placement on a biological topic. Students spend 6-9 weeks working on a well-defined scientific lab project and learn how to present their data.

Intended learning outcomes

Proficiency in selected methods and lab techniques from selected fields of biology. Ability to apply these methods and techniques later on in a research project.

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

P (30)
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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Biochemistry, Physiology and Genetics of Mammalian Cell Culture			07-MSCC-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)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Introduction to cell culture, cell culture lab equipment, cellular biochemistry and cell structures, cell proliferation, generation of in vitro cell models and their applications, cell culture formats, fundamental cell analytical technologies.

Intended learning outcomes

Students are able to understand the biochemistry, physiology and genetics of mammalian cell culture, and are able to use these techniques.

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

S (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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 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) Biology (2015)
Master's degree (1 major) FOKUS Life Sciences (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Molecular Techniques			03-MSMT-152-m01
Module coordinator		**Module offered by**	
degree programme coordinator Biologie (Biology)		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	graduate	--	

Contents

Introduction to new and cutting edge molecular techniques as well as methods for scientific investigation.

Intended learning outcomes

Students are able to apply molecular techniques and methods as well as to integrate these into experimental strategies and experimental set-ups to answer scientific questions.

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

S (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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (2015)
Master's degree (1 major) FOKUS Life Sciences (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Linux and Perl			07-ML-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Bioinformatics		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Introduction to the Linux operating system, writing computer programs using the programming language Perl to answer bioinformatic questions.

Intended learning outcomes

Students are able to use Linux as user and to write simple Perl scripts to answer bioinformatic questions.

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

S (3)
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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 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) Biology (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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Tissue engineering as alternative for animal testing			03-MSTEAT-171-m01
Module coordinator		**Module offered by**	
unknown		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	unknown	--	

Contents

No information on contents available.

Intended learning outcomes

No information on intended learning outcomes available.

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

S (1) + V (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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 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) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Clinical Virology for Biosciences			03-MSKVir-171-m01
Module coordinator		**Module offered by**	
unknown		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	unknown	--	

Contents

No information on contents available.

Intended learning outcomes

No information on intended learning outcomes available.

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

V (2)
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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 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) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Seminar Tropical Biology			07-MSTROPS-171-m01
Module coordinator		**Module offered by**	
holder of the Chair of Animal Ecology and Tropical Biology		Faculty of Biology	
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 seminar addresses fundamentals of the biology of tropical habitats and tropical communities. A special focus is on the global significance of tropical systems (biodiversity, ecosystem goods and ecosystem services). The course also highlights the biological features of these highly diverse biomes and compares them to the temperate zones.

Intended learning outcomes

Students will be able to recognise the special position of tropical habitats within the biosphere and to explain the significance tropical habitats have for our ecosystem. They will be able to evaluate the consequences of human interventions into tropical systems as well as associated conservation-related issues. Students will also be able to investigate, present, and discuss up-to-date publications in different thematic areas of tropical biology.

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

S (2)
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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 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) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Methods in Life Sciences B			07-MLS1B-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)
7	(not) successfully completed	--

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 is creditable for 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: English

Allocation of places

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Additional information

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Workload

210 h

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (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) Biosciences (2018)
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)

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 is creditable for 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
Topics and Concepts in Life Sciences B			07-MLS2B-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)**	
7	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

A broad variety of topics and concepts from the areas of neuroscience, infection and immunity, integrative biology, and biomedicine including for example: protein characterisation, DNA repair, Drosophila, computational biology, and neurocircuits.

Intended learning outcomes

Students have an overview of the current research topics in the Graduate School of Life Sciences and are able to explain their significance and scientific background.

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 is creditable for 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: English

Allocation of places

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Additional information

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Workload

210 h

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Topics and Concepts in Life Sciences			07-MLS2-152-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

A broad variety of topics and concepts from the areas of neuroscience, infection and immunity, integrative biology, and biomedicine including for example: protein characterisation, DNA repair, Drosophila, computational biology, and neurocircuits.

Intended learning outcomes

Students have an overview of the current research topics in the Graduate School of Life Sciences and are able to explain their significance and scientific background.

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 is creditable for 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 (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: English

Allocation of places

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Additional information

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Workload

300 h

Teaching cycle

--

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

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Module appears in

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) Biosciences (2018)
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
Molecular Tumor Biology			07-TUM-MOL-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)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

The lecture *Molekulare Tumorbiologie* (*Molecular Tumour Biology*) discusses molecular characteristics of tumours and relevant biological processes (such as signal transduction, cell growth, cell proliferation, metabolism), tumour-specific modifications and current molecular biological methods in tumour research.

Intended learning outcomes

Understanding of current topics and challenges in tumour research, understanding of the methods which could be used address these challenges.

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

V (2)
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 is creditable for 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

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) Biology (2015)
Master's degree (1 major) FOKUS Life Sciences (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
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 degree (1 major) FOKUS Life Sciences (2025)

Module title			Abbreviation
Clinical Tumor Biology			07-TUM-CLIN-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)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

In the lecture series *Klinische Tumorbiologie* (*Clinical Tumour Biology*), current clinical aspects will be addressed. Several tumour types will be discussed (such as tumours of the skin, lung, intestine, breast, blood). Additional topics: diagnostics and pathology, different treatments and therapies and clinical trials.

Intended learning outcomes

Knowledge of the similarities and differences of various tumour types. Understanding of requirements, possibilities and limitations of clinical medicine.

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

V (2)
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 is creditable for 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

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) Biology (2015)
Master's degree (1 major) FOKUS Life Sciences (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
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 degree (1 major) FOKUS Life Sciences (2025)

Module title	Abbreviation
Current Methods in Biology B	07-MS31B-152-m01

Module coordinator	Module offered by
holder of the Chair of Plant Physiology and Biophysics	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

This lecture series imparts the theoretical background of fundamental and up-to-date molecular biological methods in plant sciences. Special emphasis is placed on analytical tools, large-scale data analysis and their application.

Intended learning outcomes

At the end of the lecture series, students will (I) be able to qualitatively evaluate results acquired with analytical and molecular biological methods and to integrate them into the context of the current scientific knowledge in this field (II) have gained an overview of the advantages/disadvantages of analytical and molecular biological approaches (III) be able to apply the knowledge they have acquired to design their own experimental strategies for addressing a specific research question.

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 is creditable for 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

210 h

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Plant Ecology B			07-MS31POEKB-152-m01

Module coordinator	Module offered by
holder of the Chair of Ecophysiology and Vegetation Ecology	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

The lecture will deal with the ecological and environmental constraints under which plants grow and develop (biogeography, biodiversity) and with the interactions of plants with abiotic and biotic environmental factors (e. g. plant-insect, plant-fungus interactions). The evolutionary adaptations on the physiological and organismic level will be emphasised in particular (stress and defence reactions, carnivory, plant protection). Corresponding experimental approaches will be illustrated.

Intended learning outcomes

Participants are able to identify and interpret ecological and ecophysiological interrelations and to discuss them in the context of the current state of knowledge in these fields.

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

V (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 is creditable for 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

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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Plant Immunobiology and Pharmaceutical Biology B	07-MS31PIPB-152-m01

Module coordinator	Module offered by
holder of the Chair of Pharmaceutical Biology	Faculty of Biology

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 lecture addresses topics of pathogen recognition and signal transduction in plants, molecular and organismic defence and the pharmaceutical relevance of plant-derived bioactive compounds. Plant immunobiology: interactions between plants and pathogens comprise evolutionary dynamic and complex systems. Different strategies of the pathogens - bacteria, fungi and viruses - as well as defence mechanisms of the host plants will be discussed. The molecular mechanisms of pathogen recognition, signal transduction, regulation of gene expression and activation of local and systemic defence responses are in the focus of this lecture. Differences and similarities between plant and human immune systems will be pointed out. Understanding plant-pathogen-interactions and molecular mechanisms determining susceptibility and defence is fundamental for the development of strategies in plant protection. Evolution, function and pharmaceutical relevance of plant secondary metabolites: Secondary metabolites are part of effective plant defence strategies against microorganisms and herbivores and are often essential for survival. The evolution of secondary metabolism will be discussed and general as well as specific defence strategies will be explained. Pharmacological mechanisms of action and molecular targets of important classes of plant bioactive compounds will be presented. A high proportion of currently used drugs have been developed from plant secondary metabolites that have been used as lead structures to generate potent drugs with improved pharmaceutical properties. Examples of therapies with very potent plant pharmaceuticals (evidence-based medicine) as well as possibilities and limitations of phytotherapy (traditional medicine) will be discussed.

Intended learning outcomes

Students are able to understand the interaction between plants and the environment on a molecular level and to discuss the topic in the context of the scientific state of the art.

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

V (2)
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 is creditable for 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

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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Biophysics and Biochemistry B			07-MS3BBB-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Plant Physiology and Biophysics		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

The module imparts theoretical and methodological knowledge of plant membrane transport, structural biology and biochemistry which is illustrated with specific examples from current research. Depending on the number of participants and their interests, practical demonstrations of methods that are currently used give students an opportunity to experience the practical aspects of biophysical and biochemical research.

Intended learning outcomes

Students are able to use methods dealing with soluble proteins or membrane proteins in the fields of biophysics, structural biology and biochemistry. They are able to interpret the data and to discuss the results within the context of current knowledge.

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

V (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 is creditable for 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

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) 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) Biosciences (2018)
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
Biophysics and Molecular Biotechnology B			07-MS2BTB-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)**	
5	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, electrokinetic techniques, 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)
Module taught in: English

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

a) written examination (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

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) 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) Biosciences (2018)

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
Neurobiology, Behavioural Physiology and Animal Ecology B	07-MS1B-152-m01

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

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Timing matters: Temporal organisation in the animal kingdom. Timing plays an important role in all living systems. Animals make use of endogenous clocks to predict and adapt to daily or seasonal changes in environmental parameters. To be at the right place at the right time is of great fitness relevance if -for example- a mating partner or enough food has to be found. Many mutualistic, antagonistic or social interactions can only take place if animals are at the same place at the same time and in the appropriate developmental stage. The lecture gives an introduction to the mechanisms underlying the temporal organisation in the animal kingdom. Adopting an integrative approach, the lecture goes from timing mechanisms on the neuronal level to individual behaviour and then to interactions in social groups, populations or partners in complex and variable ecosystems.

Intended learning outcomes

Students get to know the advantages of an integrative approach when analysing complex biological systems. They learn to relate and integrate different fields within biology.

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 is creditable for 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

210 h

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Neurogenetics of Behaviour B			07-MNBB-152-m01

Module coordinator	Module offered by
holder of the Chair of Neurobiology and Genetics	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

To understand how the brain controls behaviour is at the heart of neuroscience. Both brain and behaviour can be overwhelmingly complex and plastic, yet neurogenetic methods are powerful tools to dissect the principles of how the brain controls behaviour. The lecture and seminar will give a state-of-the art view on current and important topics of behavioural neurobiology (incl. e. g. sleep, control of appetite and feeding, social behaviour, mating, mirror neurons, molecular mechanisms of auditory-guided behaviour, neurogenetic techniques) focusing on genetic model systems such as the fruit fly Drosophila, the mouse, and the nematode C. elegans.

Intended learning outcomes

In the lecture, students acquire theoretical and methodological insights into current topics in the field of neurogenetics in general and the neurogenetics of behaviour.

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 is creditable for 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

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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Neuromodulation and Neuronal Development B			07-MENMNDB-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Neurobiology and Genetics		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Neuromodulation: cellular and molecular biology of neuromodulators and their receptors, modulation of synaptic transmission and membrane potential, theoretical and functional aspects of neuromodulation, model systems used to study modulation of neuronal circuits. Fundamental principles of molecular developmental neurobiology. Focus is on the establishment of the neuroectoderm, pattern generation and regional specification, neuronal precursors, neuronal growth, differentiation of neurons, axonal pathfinding, neuronal connectivity.

Intended learning outcomes

The students learn fundamental principles underlying neuromodulation and neuronal development and obtain an insight into current research in the field.

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 is creditable for 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

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) 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) Biosciences (2018)
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
Endogenous Clocks B			07-MECB-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Neurobiology and Genetics		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Introduction into endogenous clocks of unicellular organisms, fungi, plants and animals, with a focus on the neuronal organisation of the clock in the brain of mammals and insects. The biological functions of endogenous clocks and the underlying mechanisms will be discussed on the molecular, cellular and organismic levels. It will be explained how clocks adjust to a 24h day with variable photoperiods. Applied aspects regarding e. g. shift work or jetlag will also be discussed.

Intended learning outcomes

The students learn fundamental principles underlying chronobiology/endogenous clocks and obtain an insight into current research in the field.

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

V (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 is creditable for 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

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) FOKUS Life Sciences (2015)
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) Biosciences (2018)
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) 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
Animal Ecology and Tropical Biology B	07-MTÖB-152-m01

Module coordinator	Module offered by
holder of the Chair of Animal Ecology and Tropical Biology	Faculty of Biology

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 consists of a lecture and a seminar. The lecture gives an overview of the theoretical foundations and current issues in animal ecology. Focus will be on biodiversity and ecosystem functions, multi-trophic interactions and food nets, evolutionary ecology, chemical ecology, tropical ecology, agricultural ecology, and global change.

Intended learning outcomes

The students will acquire an advanced knowledge of ecological theories and current research issues in the field of animal ecology. They will be able to interpret scientific publications and apply the acquired knowledge to the solution of current environmental risks.

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

V (2)
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 is creditable for 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

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) Biology (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) Biosciences (2018)
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)

Module title	Abbreviation
Animal Ecology and Tropical Biology 2 B	07-MTÖ2B-152-m01

Module coordinator	Module offered by
holder of the Chair of Animal Ecology and Tropical Biology	Faculty of Biology

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 provides the fundamentals of the biology of tropical habitats and tropical communities. A special focus is on the global significance of tropical systems (ecosystem goods and ecosystem services), but the biological features of these highly diverse biomes are also highlighted.

Intended learning outcomes

The students will acquire deep knowledge of ecological theories and up-to-date research issues in the field of tropical ecology. They will be qualified to interpret scientific work and apply the knowledge they have acquired to the solution of current environmental risks.

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

V (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 is creditable for 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

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) 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) Biosciences (2018)
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
Animal Communication B	07-MKB-152-m01

Module coordinator	Module offered by
holder of the Chair of Behavioral Physiology and Sociobiology	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

The lectures deal with physiological and neurobiological principles of the different communication channels used by animals, but also highlight adaptive values and evolutionary aspects of animal signalling.

Intended learning outcomes

Students understand the value of an integrative approach when looking at complex issues in biology. They have learned to connect findings from different research areas, such as physiology, neurobiology, behaviour and ecological conditions, in order to gain a more complete picture of a topic. In addition, students have learned to present and discuss current scientific publications within a broader theoretical framework.

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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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Workload

210 h

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Experimental Sociobiology B			07-MESB-152-m01

Module coordinator	Module offered by
holder of the Chair of Behavioral Physiology and Sociobiology	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

The lectures highlight the diversity and the evolution of social behaviour, but also focus on the physiological, neurobiological and behavioural mechanisms underlying the organisation of social groups. In a follow-up seminar session, students will deepen their knowledge by presenting and discussing current papers related to the topic of the lecture.

Intended learning outcomes

Students understand the value of an integrative approach when looking at complex correlations in behavioural biology. Students are able to recognise and interpret relationships between various aspects of sociobiology. They are able to formulate scientific questions in the context of sociobiology and are able to discuss cutting edge literature in depth.

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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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Workload

210 h

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (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) Biosciences (2018)

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) 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)

Module title			Abbreviation
Molecular Biology B			07-MS2B-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
7	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Molecular biology of the eukaryotic and prokaryotic cell. The lecture is a joint activity of the Chairs of Cell- and Developmental Biology, Microbiology, Biophysics and Bioinformatics and deals with concepts of modern molecular biology from the point of view of these different disciplines. Participants are recommended to read the textbook "Essential Cell Biology". The section on cell biology (app. a quarter of the lecture) mainly discusses the eukaryotic cell and intends to elucidate the vast diversity in structure and function of molecules, organelles and cells in addition to fundamental principles of modern molecular cell biology. The bioinformatics section (app. a quarter of the lecture) contains a large amount of examples for applications which allow the investigation of the molecular biology of a cell with bioinformatic tools. We closely adhere to the contents of the book "Essential Cell Biology" and present many clear and useful examples for the application of our tools when working on the topics of the other three Chairs. Our vision: bioinformatics essentially is molecular biology based on computing technology (time consuming "wet" experiments can be planned more easily and thus bioinformatics saves precious time). The microbiological section (app. a quarter of the lecture) deals with fundamental molecular aspects of prokaryotic cells. Key aspects include the organisation of the bacterial genome, the transcription and translation machinery, mechanisms of regulation of gene expression, transport of small molecules and macromolecules, cell division and differentiation, bacterial motility and chemotaxis, signal transduction and bacterial communication mechanisms. Recommended reading: (a) Allgemeine Mikrobiologie (Fuchs) and (b) Biology of Microorganisms (Brock).

Intended learning outcomes

Master level knowledge about the molecular biology of the eukaryotic and prokaryotic cell.

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

V (3)
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 is creditable for 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

210 h

Teaching cycle

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

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Module appears in
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) Biosciences (2018)
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
Infection Biology B			07-MS2INF-B-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)**	
5	(not) successfully completed	--	
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)
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 is creditable for 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

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) Biology (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) Biomedicine (2018)
Master's degree (1 major) Biosciences (2018)
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)

Module title			Abbreviation
Pathogenicity of Microorganisms B			07-MS2PA-B-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)**	
5	(not) successfully completed	--	
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)
Module taught in: English

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

a) written examination (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

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) Biology (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) Biomedicine (2018)
Master's degree (1 major) Biosciences (2018)
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)

Module title			Abbreviation
Cell and Developmental Biology Master 1 B			07-MZE1-B-152-m01

Module coordinator	Module offered by
holder of the Chair of Cell Biology and Developmental Biology	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

The lecture *Zellpathologie* (Cytopathology) describes pathological states of the cell and unravels their biological causes and consequences, such as infection, apoptosis, senescence, metabolic disorders and cancer.

Intended learning outcomes

Participants possess scientific background knowledge on cytopathology and are able to put this into the broader context of cell biology research.

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

V (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 is creditable for 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

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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Cell and Developmental Biology Master 2 B			07-MZE2-B-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Cell Biology and Developmental Biology		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

The lecture *Signale und Differenzierung* (*Signals and Differentiation*) does not attempt to impart pure textbook knowledge. Instead, historically important as well as particularly interesting and important trend-setting topics in developmental biology are presented. The topics range from classical developmental subjects such as tissue regeneration and morphogenetic cell migration to molecular stem cell biology, epigenetic plasticity, origins of multicellularity and development within changing environments.

Intended learning outcomes

Participants possess a knowledge of the theoretical and molecular biological principles underlying developmental biology and are able to put this into the broader context of cell and developmental biology research.

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

V (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 is creditable for 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

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) Biology (2015)
Master's degree (1 major) FOKUS Life Sciences (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
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 degree (1 major) FOKUS Life Sciences (2025)

Module title			Abbreviation
Bioinformatics B			07-MBI-B-152-m01

Module coordinator	Module offered by
holder of the Chair of Bioinformatics	Faculty of Biology

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

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)
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 is creditable for 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

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) Biology (2015)
Master's degree (1 major) Biomedicine (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) Biomedicine (2018)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Computational Mathematics (2019)

Master's degree (1 major) Mathematics (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) 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
Systems Biology B			07-MS-B-152-m01

Module coordinator	Module offered by
holder of the Chair of Bioinformatics	Faculty of Biology

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

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)
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 is creditable for 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

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) Biology (2015)
Master's degree (1 major) Biomedicine (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) Biomedicine (2018)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Computational Mathematics (2019)

Master's degree (1 major) Mathematics (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
Immunology 1 B	03-MIM1-B-152-m01

Module coordinator	Module offered by
Managing Director of the Institute of Virology and Immunobiology	Faculty of Medicine

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Foundations of molecular and cellular immunology as well as infection biology which allow a deeper understanding of immune-mediated defence mechanisms against infectious diseases. For more information, please visit http://www.virologie.uni-wuerzburg.de/lehrveranstaltungen/vorlesungen_und_praktika/immunologie/immunologie_biologie_master/.

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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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Workload

210 h

Teaching cycle

Teaching cycle: Winter semester only

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

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Module appears in

Master's degree (1 major) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
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)

Module title			Abbreviation
Immunology 2 B			03-MIM2-B-152-m01
Module coordinator		**Module offered by**	
Managing Director of the Institute of Virology and Immunobiology		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
7	(not) successfully completed	--	
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.

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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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Workload

210 h

Teaching cycle

Teaching cycle: Summer semester only

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

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Module appears in

Master's degree (1 major) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title	Abbreviation
Immunology 1 BS	03-MIM1-BS-152-m01

Module coordinator	Module offered by
Managing Director of the Institute of Virology and Immunobiology	Faculty of Medicine

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Foundations of molecular and cellular immunology as well as infection biology which allow a deeper understanding of immune-mediated defence mechanisms against infectious diseases. For more information, please visit http://www.virologie.uni-wuerzburg.de/lehrveranstaltungen/vorlesungen_und_praktika/immunologie/immunologie_biologie_master/.

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)

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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 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

Teaching cycle: Winter semester only

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

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Module appears in

Master's degree (1 major) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Immunology 2 BS			03-MIM2-BS-152-m01
Module coordinator		**Module offered by**	
Managing Director of the Institute of Virology and Immunobiology		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	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.

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)

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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 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

Teaching cycle: Summer semester only

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

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Module appears in

Master's degree (1 major) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Molecular Virology B			03-MSMV-B-171-m01
Module coordinator		**Module offered by**	
unknown		Faculty of Medicine	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
7	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	unknown	--	

Contents

No information on contents available.

Intended learning outcomes

No information on intended learning outcomes available.

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

V (1) + S (2)
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 is creditable for 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

210 h

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
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)

Module title			Abbreviation
Nucleus Workshop			07-MKEWO-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)**	
7	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

This course will use a combination of lectures (daily) and practical experiments. Topics to be covered in the lecture (subject to change): - nuclear envelope, nuclear pores and nuclear-cytoplasmic transport. - nuclear envelope, nuclear lamina and their role in chromatin organisation and genetic diseases. - DNA, chromatin and chromosomes. - structure and function of nucleoli. - nuclear-cytoskeletal interactions.

Intended learning outcomes

Students are able to perform practical experiments, applying their theoretical knowledge.

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

Ü (5) + V (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 is creditable for 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

210 h

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Gene Regulation and Signal Transduction			07-MGRSD-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

In this lecture, important aspects of gene regulation and signal transduction of bacteria will be described and discussed. The lecture will discuss regulatory mechanisms on the transcriptional and post transcriptional level. Whenever appropriate, special emphasis will be placed on regulatory phenomena in pathogenic bacteria.

Intended learning outcomes

The lecture will discuss aspects covered in the lecture *Molekulare Biologie* (*Molecular Biology*, course no. 0610200) and in the special lecture *Mikrobiologie/Infektionsbiologie* (Microbiology/Infection Biology, course no. 0610220) in more detail and will explore some additional aspects.

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

V (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 is creditable for 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

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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
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)

Module title	Abbreviation
Microbial Ecology	07-MMIÖK-152-m01

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

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

This lecture discusses fundamental principles of the interaction of bacteria with their environment. A major emphasis is on the interaction of mutualistic bacteria with other organisms including bacteria, invertebrates and vertebrates and, where appropriate, the comparison with commensal and pathogenic interactions. The lecture complements the focus Infektionsbiologie (Infection Biology) of the degree programme Zelluläre und Molekulare Mikrobiologie / Infektionsbiologie (Cellular and Molecular Biology / Infection Biology) in which mainly human pathogens and their host interaction mechanisms are presented. Thus, the lecture intends to identify and describe fundamental concepts of the interaction of bacteria with different host organisms and their evolution.

Intended learning outcomes

Students understand the fundamental principles and evolution of the mechanisms of interaction between bacteria and eukaryotic host organisms.

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

V (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 is creditable for 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

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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
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)

Module title			Abbreviation
Ecology of Honey Bees and Wild Bees			07-MHWB-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Animal Ecology and Tropical Biology		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Introduction to the life of honeybees and wild bees; principles and techniques of beekeeping (colony management, breeding, diseases); resource use of honeybees and wild bees (bee dances, flower visiting, pollen analysis, foraging behaviour, nesting aid); taxonomy of wild bees, opponents of bees, wild bees in different habitats (field trip), honeybee field trip, e. g. visit to the bee centre in Veitshöchheim.

Intended learning outcomes

The students will expand their knowledge on the biology and ecology of wild and honeybees, on interactions between bees and plants, and on aspects of nature conservation. They will be proficient in experimental methods of pollination ecology, the management of trial colonies, pollen analysis, and the determination of wild bees.

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

Ü (5)
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 is creditable for bonus)

a) written examination (approx. 30 to 60 minutes, including multiple choice questions) or
b) log (approx. 15 to 30 pages) 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) or
e) presentation (approx. 20 to 45 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)

Module title	Abbreviation
Ecology and Taxonomy of Insects	07-METI-152-m01

Module coordinator	Module offered by
holder of the Chair of Animal Ecology and Tropical Biology	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Identification and classification of the characteristics of different groups of arthropods, especially insects. Knowledge of special form is provided. Observation and recording of arthropods in habitat. Experimental laboratory and field work on ecological or behaviour biological characteristics of the respective groups of arthropods. In addition, compilation of species richness and niche differentiation. The aim is to link the phylogenetic and morphological characteristics of arthropods with their ecological functions.

Intended learning outcomes

The students will be able to identify typical families and representatives of major insect orders. They will be able to apply special identification keys as well as to record and evaluate special behaviours. They will be able to design and evaluate experimental approaches in ecological laboratory and field studies.

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

Ü (5)
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 is creditable for bonus)

a) written examination (approx. 30 to 60 minutes, including multiple choice questions) or
b) log (approx. 15 to 30 pages) 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) or
e) presentation (approx. 20 to 45 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)

Module title			Abbreviation
Modelling in Ecology			07-MMIE-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Animal Ecology and Tropical Biology		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

On the basis of exemplary tasks in ecology, the students will learn about different simulation techniques and modelling methods. At the same time, they will develop their own simulation program to address demographical or evolutionary questions.

Intended learning outcomes

The students will expand their knowledge in the theory and practice of ecological modelling. They will be able to develop, apply and interpret adequate modelling techniques.

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

Ü (5)
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 is creditable for bonus)

a) written examination (approx. 30 to 60 minutes, including multiple choice questions) or
b) log (approx. 15 to 30 pages) 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) or
e) presentation (approx. 20 to 45 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)

Module title	Abbreviation
Agroecology	07-MAGRE-152-m01

Module coordinator	Module offered by
holder of the Chair of Animal Ecology and Tropical Biology	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Biodiversity and ecosystem functioning in agricultural ecosystems. Insect communities in different crops, pest-beneficial organisms-interactions, and biological pest control. Experiment in comparison of organically and conventionally farmed agricultural land (plant diversity, herbivore, predator, pollinator diversity). Field trip to nature conservation-related agricultural areas (e. g. semi-arid grassland), presentation of agri-environmental measures.

Intended learning outcomes

The students will acquire knowledge about the species diversity, structure and functional role of arthropod communities in agricultural ecosystems. They will be able to perform scientific work in agricultural ecosystems, to perform statistical analyses, and to interpret the results. They will be familiar with problems and possible solutions in agricultural ecosystems in the context of a sustainable use of biodiversity and ecosystem services.

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

Ü (3)
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 is creditable for bonus)

a) written examination (approx. 30 to 60 minutes, including multiple choice questions) or
b) log (approx. 15 to 30 pages) 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) or
e) presentation (approx. 20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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Workload

60 h

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)

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

Contents

Arthropod communities in forest ecosystems, methods for detection, influence of management on diversity patterns and functional groups. The course includes field studies in forest ecosystems and work of determination as well as the statistical analysis of data.

Intended learning outcomes

The students will acquire knowledge of the species diversity, structure and functional role of arthropod communities in forests. On the basis of complex data sets, they will learn to analyse and discuss the structuring patterns of communities. In this context, the course will also discuss associated conservation-related aspects.

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

Ü (3)
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 is creditable for bonus)

a) written examination (approx. 30 to 60 minutes, including multiple choice questions) or
b) log (approx. 15 to 30 pages) 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) or
e) presentation (approx. 20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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Workload

60 h

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)

Module title			Abbreviation
Tropical Ecology			07-MTROP-152-m01

Module coordinator	Module offered by
holder of the Chair of Animal Ecology and Tropical Biology	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Small projects on ecological or nature conservation-related issues will be implemented in a tropical ecosystem. Students should become familiar with different project stages from experiment design, implementation and data analysis through to data presentation. In evening seminars, recent publications in the field of tropical ecology will be presented and discussed.

Intended learning outcomes

The students will learn about various tropical ecosystems and will acquire advanced knowledge of ecological and nature conservation-related research in the tropics. They will learn field ecological methods for the quantitative detection of insects and their biotic interactions and will acquire statistical knowledge in the field of data analysis.

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

Ü (3)
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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 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) Biology (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) Biosciences (2018)
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) 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)

Module title	Abbreviation
Seminar Experimental Animal Ecology	07-MSET-152-m01

Module coordinator	Module offered by
holder of the Chair of Animal Ecology and Tropical Biology	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Introduction to and discussion of current research in: Honigbienen- und Wildbienenökologie (Ecology of Wild Bees and Honeybees, 07-MHWB), Ökologie und Taxonomie der Insekten (Ecology and Taxonomy of Insects, 07-METI), Modellierung in der Ökologie (Ecological Modelling, 07-MMIE), Agrarökologie (Agroecology, 07-MAGRE), Waldökologie (Forest Ecology, 07-MFEC), Tropenökologie (Tropical Ecology, 07-MTROP).

Intended learning outcomes

Students have acquired in-depth knowledge about current research in experimental animal ecology and are able to communicate and critically analyse methods and results of scientific publications.

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

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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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Workload

60 h

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title	Abbreviation
Presentation of Scientific Data	07-MPWD-152-m01

Module coordinator	Module offered by
Coordinator BioCareers	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Principles for the preparation of scientific manuscripts, citations and the presentation of scientific data. Students will write a scientific mini review and present this in a talk (15 minutes). Content, structure, coherence and the logical chain of arguments will be discussed. Students will write and publish (where possible) a scientific paper or review on a selected topic in a scientific journal. The students' work will be based on original papers as well as on reviews and will follow the instructions of a scientific journal of the students' choice. These instructions can be found on the website of the respective journal under "Instructions to Authors" or similar. Both length of chapters and structure of the article should be based on the style of the journal selected. Attendance of no less than 20 scientific talks (e. g. defences of doctoral theses, presentations of research projects, retreats) including presentations by guest speakers. Students are to obtain proof of attendance from the organisers or speakers.

Intended learning outcomes

The students are familiar with the details of publishing scientific data in written and oral form. They have become familiar with the methodology of scientific publishing in oral or written fashion. In addition, they have enhanced their English reading, speaking and writing skills.

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

S (2)
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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 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) Biology (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) Biosciences (2018)
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) 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)

Module title	Abbreviation
Quality Assurance, Good Practice, Biosafety and Biosecurity	07-MGLN-152-m01

Module coordinator	Module offered by
Coordinator BioCareers	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	--

Contents

Basic Rules of Good Practice in the Life Sciences including laboratory, manufacturing, clinical and manufacturing practices. DIN en iso 9000-9004 standards, environmental protection and Biological safety and security / dual use criteria. Management concepts in the Biosciences.

Intended learning outcomes

The students are aware of several regulations and standards in the Life Sciences field and are aware of Quality standards in the Bioscientific context. Furthermore, they deal with management concepts in the field of science, environmental context and industry.

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

V (1) + 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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions)
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

Teaching cycle: summer semester

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

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Module appears in

Master's degree (1 major) Biology (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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Brain and Mind			07-MGUG-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Philosophical foundations and scientific principles, history and theory of mind, human memory, intentional decision making and biochemical principles of cognitive and emotional processes. Fundamental terms and principles in biology are discussed.

Intended learning outcomes

The students are familiar with the hallmarks of the history of natural sciences. They have developed an increased awareness of how to use fundamental terms and definitions as well as of risks and concerns arising with knowledge and technical developments in the biosciences.

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

S (2)
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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Theory and History of Science			07-MWIG-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Philosophical foundations and scientific principles, history and theory of mind, human memory, intentional decision making and biochemical principles of cognitive and emotional processes. Fundamental terms and principles in biology are discussed.

Intended learning outcomes

The students are familiar with the hallmarks of the history of natural sciences. They have developed an increased awareness of how to use fundamental terms and definitions as well as of risks and concerns arising with knowledge and technical developments in the biosciences.

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

S (2)
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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Entrepreneurial Management in the Biosciences			07-MEMB-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
10	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Overview of the bioscience sector with a particular focus on research and development, fundamental methods and technologies, recent developments and trends in established as well as up-and-coming high-tech industries, legal framework, financing and business models, best practice examples of start-ups as well as established companies, criteria of project-based work, characteristics and elements of project work, case studies, project work in interdisciplinary teams of students where possible, selected guest lectures giving the course practical relevance.

Intended learning outcomes

Students have acquired an insight into industries and developments in the natural sciences. They are familiar with the characteristics of industries and established businesses as well as with specific characteristics of start-up companies and up-and-coming technologies. Students are also familiar with the criteria of project-based work and have gained experience working in interdisciplinary teams. They are better qualified to evaluate what approaches or methods from individual disciplines are most suitable for solving a particular problem. The experience of interdisciplinary project work students have acquired will help them enhance their entrepreneurial skills.

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

S (2)
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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)

Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Entrepreneurial Thinking in the Biosciences			07-MUDB-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	--	

Contents

Companies are presented to students opt. together with cooperative workshops. These workshops may also deal with the process of founding start-up companies in the biotech or biomedical sectors. Topics on intellectual property protection are discussed.

Intended learning outcomes

Students gained an insight into the business plans and market of companies. They gained an insight into industrial research and development.

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

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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Special Subject Studies Biology and Natural Sciences 1			07-MVMINT1-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
2	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with course advisory service in advance.	

Contents

Regular specific lectures or seminars (1 weekly contact hour) in biological or natural sciences; assessment ungraded, pass required.

Intended learning outcomes

Specific skills and knowledge on an interdisciplinary subject in the biological or natural sciences.

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

S (1)
Module taught in: German and/or English
Course type: might also be offered in V, Ü, P, R or E format

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

Successful completion as certified by the lecturer
Language of assessment: German and/or English

Allocation of places

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Additional information

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Workload

60 h

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Special Subject Studies Biology and Natural Sciences 2			07-MVMINT2-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with course advisory service in advance.	

Contents

Regular specific lecture, seminar, workshop, retreat or practical course (1 weekly contact hour) in biological or natural sciences with a graded assessment.

Intended learning outcomes

Specific skills and knowledge on an interdisciplinary subject in the biological or natural sciences.

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

S (1)
Module taught in: German and/or English
Course type: might also be offered in V, Ü, P, R or E format

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

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Special Subject Studies Biology and Natural Sciences 2B			07-MVMINT2B-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with course advisory service in advance.	

Contents

Regular specific lecture, seminar, workshop, retreat or practical course (1 weekly contact hour) in biological or natural sciences with a graded assessment.

Intended learning outcomes

Specific skills and knowledge on an interdisciplinary subject in the biological or natural sciences.

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

S (1)
Module taught in: German and/or English
Course type: might also be offered in V, Ü, P, R or E format

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

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Special Subject Studies Biology and Natural Sciences 3			07-MVMINT3-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
4	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with course advisory service in advance.	

Contents

Regular specific lecture, seminar, workshop, retreat or practical course (2 weekly contact hours) in biological or natural sciences; assessment ungraded, pass required.

Intended learning outcomes

Specific skills and knowledge on an interdisciplinary subject in the biological or natural sciences.

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

S (2)
Module taught in: German and/or English
Course type: might also be offered in V, Ü, P, R or E format

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

Successful completion as certified by the lecturer
Language of assessment: German and/or English

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Special Subject Studies Biology and Natural Sciences 4			07-MVMINT4-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with course advisory service in advance.	

Contents

Regular specific lecture, seminar, workshop, retreat or practical course (2 weekly contact hours) in biological or natural sciences with a graded assessment.

Intended learning outcomes

Specific skills and knowledge on an interdisciplinary subject in the biological or natural sciences.

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

S (2)
Module taught in: German and/or English
Course type: might also be offered in V, Ü, P, R or E format

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

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 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) Biology (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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Special Subject Studies Biology and Natural Sciences 4B			07-MVMINT4B-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
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 course advisory service in advance.	

Contents

Regular specific lecture, seminar, workshop, retreat or practical course (2 weekly contact hours) in biological or natural sciences; assessment ungraded, pass required.

Intended learning outcomes

Specific skills and knowledge on an interdisciplinary subject in the biological or natural sciences.

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

S (2)
Module taught in: German and/or English
Course type: might also be offered in V, Ü, P, R or E format

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

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 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) Biology (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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Special Subject Studies Biology and Natural Sciences 5			07-MVMINT5-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
6	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with course advisory service in advance.	

Contents

Regular specific lecture, seminar, workshop, retreat or practical course (3 weekly contact hours) in biological or natural sciences; assessment ungraded, pass required.

Intended learning outcomes

Specific skills and knowledge on an interdisciplinary subject in the biological or natural sciences.

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

S (3)
Module taught in: German and/or English
Course type: might also be offered in V, Ü, P, R or E format

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

Successful completion as certified by the lecturer
Language of assessment: German and/or English

Allocation of places

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Additional information

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Workload

180 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) Biology (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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Special Subject Studies outside Natural Sciences 1			07-MV1-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
2	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with course advisory service in advance.	

Contents

Regular specific lecture, seminar, workshop, retreat or practical course (1 weekly contact hour), offered by JMU or other institutions, in which students will acquire additional skills in areas other than biology or the natural sciences. Assessment ungraded, pass required (2 ECTS credits); decision on credit transfer to be made by module coordinators. Possible subjects are philosophy, pedagogy, history, languages, social studies, psychology, economics, and law.

Intended learning outcomes

Specific skills and knowledge on a specific subject in an area other than biology or the natural sciences.

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

S (1)
Module taught in: German and/or English
Course type: might also be offered in V, Ü, P, R or E format

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

Successful completion as certified by the lecturer
Language of assessment: German and/or English

Allocation of places

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Additional information

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Workload

60 h

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title	Abbreviation
Special Subject Studies outside Natural Sciences 2	07-MV2-152-m01

Module coordinator	Module offered by
Coordinator BioCareers	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	graduate	Please consult with course advisory service in advance.

Contents

Regular specific lecture, seminar, workshop, retreat or practical course (1-2 weekly contact hours), offered by JMU or other institutions, in which students will acquire additional skills in areas other than biology or the natural sciences. Assessment ungraded, pass required (3 ECTS credits); decision on credit transfer to be made by module coordinators. Possible subjects are philosophy, pedagogy, history, languages, social studies, psychology, economics, and law.

Intended learning outcomes

Specific skills and knowledge on a specific subject in an area other than biology or the natural sciences.

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

S (1)
Module taught in: German and/or English
Course type: might also be offered in V, Ü, P, R or E format

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

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Special Subject Studies outside Natural Sciences 2B			07-MV2B-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
3	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with course advisory service in advance.	

Contents

Regular specific lecture, seminar, workshop, retreat or practical course (1-2 weekly contact hours), offered by JMU or other institutions, in which students will acquire additional skills in areas other than biology or the natural sciences. Assessment ungraded, pass required (3 ECTS credits); decision on credit transfer to be made by module coordinators. Possible subjects are philosophy, pedagogy, history, languages, social studies, psychology, economics, and law.

Intended learning outcomes

Specific skills and knowledge on a specific subject in an area other than biology or the natural sciences.

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

S (1)
Module taught in: German and/or English
Course type: might also be offered in V, Ü, P, R or E format

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

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Special Subject Studies outside Natural Sciences 3			07-MV3-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
4	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with course advisory service in advance.	

Contents

Regular specific lecture, seminar, workshop, retreat or practical course (2 weekly contact hours), offered by JMU or other institutions, in which students will acquire additional skills in areas other than biology or the natural sciences. Assessment ungraded, pass required (4 ECTS credits); decision on credit transfer to be made by module coordinators. Possible subjects are philosophy, pedagogy, history, languages, social studies, psychology, economics, and law.

Intended learning outcomes

Specific skills and knowledge on a specific subject in an area other than biology or the natural sciences.

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

S (2)
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 is creditable for bonus)

Successful completion as certified by the lecturer
Language of assessment: German and/or English

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Special Subject Studies outside Natural Sciences 4			07-MV4-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with course advisory service in advance.	

Contents

Regular specific lecture, seminar, workshop, retreat or practical course (3 weekly contact hours), offered by JMU or other institutions, in which students will acquire additional skills in areas other than biology or the natural sciences. Assessment ungraded, pass required (5 ECTS credits); decision on credit transfer to be made by module coordinators. Possible subjects are philosophy, pedagogy, history, languages, social studies, psychology, economics, and law.

Intended learning outcomes

Specific skills and knowledge on a specific subject in an area other than biology or the natural sciences.

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

S (2)
Module taught in: German and/or English
Course type: might also be offered in V, Ü, P, R or E format

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

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 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) Biology (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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Special Subject Studies outside Natural Sciences 4B			07-MV4B-152-m01

Module coordinator	Module offered by
Coordinator BioCareers	Faculty of Biology

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 course advisory service in advance.

Contents

Regular specific lecture, seminar, workshop, retreat or practical course (3 weekly contact hours), offered by JMU or other institutions, in which students will acquire additional skills in areas other than biology or the natural sciences. Assessment ungraded, pass required (5 ECTS credits); decision on credit transfer to be made by module coordinators. Possible subjects are philosophy, pedagogy, history, languages, social studies, psychology, economics, and law.

Intended learning outcomes

Specific skills and knowledge on a specific subject in an area other than biology or the natural sciences.

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

S (2)
Module taught in: German and/or English
Course type: might also be offered in V, Ü, P, R or E format

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

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 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) Biology (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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Teaching 1			07-DR1-152-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)**	
2	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Please consult with course advisory service in advance.	

Contents

Students contribute to and/or independently organise courses for Bachelor's students or pupils. Students organising courses will receive advice on contents and organisation from the degree programme coordinator. The course will comprise 0.5 weekly contact hours.

Intended learning outcomes

Ability to independently organise, plan and deliver courses.

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

S (2)
Module taught in: German and/or English
Course type: might also be offered in V, Ü, P, R or E format

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

Successful completion as certified by the lecturer
Language of assessment: German and/or English

Allocation of places

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Additional information

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Workload

60 h

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Teaching 2			07-DR2-152-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)**	
3	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Please consult with course advisory service in advance.	

Contents

Students contribute to and/or independently organise lectures or seminars for Bachelor's students or pupils. Students organising courses will receive advice on contents and organisation from the degree programme coordinator. The course will comprise 1 weekly contact hour.

Intended learning outcomes

Ability to independently organise courses.

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

S (2)
Module taught in: German and/or English
Course type: might also be offered in V, Ü, P, R or E format

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

Successful completion as certified by the lecturer
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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Teaching 3			07-DR3-152-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)**	
4	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Please consult with course advisory service in advance.	

Contents

Students contribute to and/or independently organise courses for Bachelor's students or pupils. Students organising courses will receive advice on contents and organisation from the degree programme coordinator. The course will comprise 1.5 weekly contact hours.

Intended learning outcomes

Ability to independently organise courses.

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

S (2)
Module taught in: German and/or English
Course type: might also be offered in V, Ü, P, R or E format

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

Successful completion as certified by the lecturer
Language of assessment: German and/or English

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Teaching 4			07-DR4-152-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)
5	(not) successfully completed	--

Duration	Module level	Other prerequisites
1 semester	undergraduate	Please consult with course advisory service in advance.

Contents

Students contribute to and/or independently organise courses for Bachelor's students or pupils. Students organising courses will receive advice on contents and organisation from the degree programme coordinator. The course will comprise 2 weekly contact hours.

Intended learning outcomes

Ability to independently organise courses.

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

S (3)
Module taught in: German and/or English
Course type: might also be offered in V, Ü, P, R or E format

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

Successful completion as certified by the lecturer
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) Biology (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) Biosciences (2018)
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) 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)

Module title			Abbreviation
Tutorial 1			07-FT1-152-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)**	
3	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Please consult with course advisory service in advance.	

Contents

Working as tutors, students will mentor other students during courses in particular and will help organise and design courses, in particular exercises.

Intended learning outcomes

The tutors are able to communicate complex concepts in a clear and structured way. They have gained experience supervising a group and helping students with personal matters. The tutors have thus enhanced their own interpersonal skills and know how to share their expertise in exploring complex topics. In addition, the tutors have learned to plan and organise key elements of their own university education and the university education of the students they mentor.

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

T (2)
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 is creditable for bonus)

Successful completion as certified by the lecturer
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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Tutorial 2			07-FT2-152-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)**	
4	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Please consult with course advisory service in advance.	

Contents

Working as tutors, students will mentor other students during courses in particular and will help organise and design courses, in particular exercises.

Intended learning outcomes

The tutors are able to communicate complex concepts in a clear and structured way. They have gained experience supervising a group and helping students with personal matters. The tutors have thus enhanced their own interpersonal skills and know how to share their expertise in exploring complex topics. In addition, the tutors have learned to plan and organise key elements of their own university education and the university education of the students they mentor.

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

T (2)
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 is creditable for bonus)

Successful completion as certified by the lecturer
Language of assessment: German and/or English

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Tutorial 3			07-FT3-152-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)
5	(not) successfully completed	--

Duration	Module level	Other prerequisites
1 semester	undergraduate	Please consult with course advisory service in advance.

Contents

Working as tutors, students will mentor other students during courses in particular and will help organise and design courses, in particular exercises.

Intended learning outcomes

The tutors are able to communicate complex concepts in a clear and structured way. They have gained experience supervising a group and helping students with personal matters. The tutors have thus enhanced their own interpersonal skills and know how to share their expertise in exploring complex topics. In addition, the tutors have learned to plan and organise key elements of their own university education and the university education of the students they mentor.

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

T (3)
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 is creditable for bonus)

Successful completion as certified by the lecturer
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) Biology (2015)
Master's degree (1 major) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Additional Laboratory Courses and Internships

(ECTS credits)

Module title			Abbreviation
Laboratory Course 2			07-MSL2-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
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 course advisory service in advance.	

Contents

Practical course, summer school or workshop on specific topics in biology (duration: 4-6 weeks).

Intended learning outcomes

Proficiency in specific methods and lab techniques from selected fields of biology. Ability to apply these methods and techniques later on in a research project.

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

P (15)
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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
Laboratory Course 3			07-MSL3-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with course advisory service in advance.	

Contents

Practical course, summer school or workshop on specific topics in biology (duration: 6-9 weeks).

Intended learning outcomes

Proficiency in specific methods and lab techniques from selected fields of biology. Ability to apply these methods and techniques later on in a research project.

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

P (30)
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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)
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)

Module title			Abbreviation
External Internship 2			07-MSA2-171-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
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 course advisory service in advance.	

Contents

External placement on a biological topic. Students spend 4-6 weeks working on a well-defined scientific project and learn how to present their data.

Intended learning outcomes

Proficiency in selected methods and lab techniques from selected fields of biology. Ability to apply these methods and techniques later on in a research project.

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

P (15)
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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 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) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
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)

Module title			Abbreviation
External Internship 3			07-MSA3-152-m01
Module coordinator		**Module offered by**	
Coordinator BioCareers		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
15	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	graduate	Please consult with course advisory service in advance.	

Contents

External placement on a biological topic. Students spend 6-9 weeks working on a well-defined scientific lab project and learn how to present their data.

Intended learning outcomes

Proficiency in selected methods and lab techniques from selected fields of biology. Ability to apply these methods and techniques later on in a research project.

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

P (30)
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 is creditable for bonus)

a) written examination (30 to 60 minutes, including multiple choice questions) or
b) log (15 to 30 pages) 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) or
e) presentation (20 to 45 minutes)
Language of assessment: German and/or English

Allocation of places

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Additional information

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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) Biology (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) Biosciences (2018)
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) 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)

Thesis

(30 ECTS credits)

Module title			Abbreviation
Master Thesis Biosciences			07-MT-T-162-m01

Module coordinator	Module offered by
chairperson of examination committee Biologie (Biology)	Faculty of Biology

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

Duration	Module level	Other prerequisites
1 semester	undergraduate	--

Contents

Applying adequate techniques, students address a defined scientific question. They plan and perform experiments to solve problems or summarise and interpret existing data. Students have to develop a research plan and apply advanced and novel techniques in the context of a given research project, adhering to the principles of good scientific practice. The results are summarised in a written thesis and defended in a colloquium. The project is to be completed within a time frame of six months.

Intended learning outcomes

Students are able to independently carry out scientific experiments and to modify them according to the outcome. They are able to independently approach current scientific topics and to perform, interpret and document experiments, adhering to accepted rules of scientific practice. Students are able to discuss and defend their work in the scientific community, drawing on their knowledge of similar or related topics.

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

No courses assigned to module
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 is creditable for bonus)

written thesis
Language of assessment: German and/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) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)

Module title			Abbreviation
Oral Examination Biosciences			07-MT-K-162-m01
Module coordinator		**Module offered by**	
chairperson of examination committee Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	07-MT-1	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Verification of thesis content through oral examination. Total length should not exceed 45 minutes (30 minutes plus 15 minutes of questions pertaining to the thesis as well as related subjects).

Intended learning outcomes

Students are able to discuss and defend their work in the scientific community, drawing on their knowledge of similar or related topics.

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

K (0)
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 is creditable for bonus)

final colloquium (approx. 45 minutes)
comprising: talk on thesis (30 minutes) and subsequent defence of thesis (15 minutes); defence usually public
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) Biosciences (2016)
Master's degree (1 major) Biosciences (2017)
Master's degree (1 major) Biosciences (2018)
Master's degree (1 major) Biosciences (2021)
Master's degree (1 major) Biosciences (2023)
Master's degree (1 major) Biosciences (2024)