Julius-Maximilians-
UNIVERSITÄT
WÜRZBURG

Subdivided Module Catalogue

for the Subject

Biology

with the degree "Erweiterungsprüfung für das Lehramt an Gymnasien"

(ECTS credits)

Examination regulations version: 2015
Responsible: Faculty of Biology

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:

LASPO2015

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

20-Oct-2015 (2015-194)

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

The subject is divided into

Abbreviation	Module title	ECTS credits	Method of grading	page
Scientific Discipline (92 ECTS credits)				
Area 1 (80 ECTS credits)				
07-LA-BIO1-ZE-152-m01	Structure and Function of Cells	4	NUM	26
07-LA-BIO1-PF-152-m01	Plant Kingdom	4	NUM	25
07-LA-1A1TI-152-m01	Evolution and the Animal Kingdom	5	NUM	18
07-LA-2A2PHY-PR-152-m01	Physiology of Prokaryotes	4	NUM	21
07-LA-2A2PHYPF-152-m01	Plant Physiology	4	NUM	20
07-LA-2A2PHYTI-152-m01	Animal Physiology	4	NUM	22
07-LA-2A2GENV-152-m01	Genetics, Neurobiology, Behaviour	5	NUM	19
07-3A3OEKO-152-m01	Plant and Animal Ecology	6	NUM	7
07-3A3GMOT-152-m01	Genes, Molecules, Technologies	6	NUM	5
07-LA-FLORA-152-m01	The Flora of Germany	5	NUM	35
07-LA-FAUNA-152-m01	The Fauna of Germany	5	NUM	29
07-GY-BFM-152-m01	Research Methods in Biology	5	B/NB	10
07-GY-FOP-152-m01	Research-oriented working in Biology	7	NUM	16
07-LA-HUBIO-1-152-m01	Basic Human Biology I - GY	6	NUM	36
07-LA-HUBIO-2-152-m01	Basic Human Biology II	5	B/NB	37
07-GY-MIBI-152-m01	Advanced Microbiology - GY	5	NUM	17
Area 2 (12 ECTS credits)				
Developmental biology (4 ECTS credits)				
07-LA-3A3EBIO-TI-152-m01	Developmental Biology of Animals	4	NUM	24
07-LA-3A3E-BIOPF-152-m01	Developmental Biology of Plants	4	NUM	23
Advanced Biology (8 ECTS credits)				
07-GY-FBW-B-152-m01	Advanced Biology - Botany	8	NUM	11
07-GY-FBW-Z-152-m01	Advanced Biology - Zoology	8	NUM	12
Teaching (10 ECTS credits)				
Area 1 (10 ECTS credits)				
07-GY-FDBIO-1-152-m01	Didactics in Biology I: Basics	5	NUM	13
07-GY-FDBIO-2-152-m01	Didactics Biology II: Special Didactics	5	B/NB	15
Freier Bereich (general as well as subject-specific electives)				
Biology (Freier Bereich (general as well as subject-specific electives) -- subject specific)				
07-GY-FBW-B-152-m01	Advanced Biology - Botany	8	NUM	11
07-GY-FBW-Z-152-m01	Advanced Biology - Zoology	8	NUM	12
07-SQF-TFB3-152-m01	Supervising Tutorial for Basic Courses 3	3	B/NB	43
07-SQF-TFB4-152-m01	Supervising Tutorial for Basic Courses 4	4	B/NB	44
07-SQF-TFB5-152-m01	Supervising Tutorial for Basic Courses 5	5	B/NB	45
07-SQF-TSB2-152-m01	Supervising Tutorial for Biology 2	2	B/NB	46
07-SQF-TSB3-152-m01	Supervising Tutorial for Biology 3	3	B/NB	47
07-LA-ZQN2-152-m01	Additional Qualification MINT 2	2	B/NB	38

07-LA-ZQN3-152-m01	Additional Qualification MINT 3	3	B/NB	39
07-LA-ZQN4-152-m01	Additional Qualification MINT 4	4	B/NB	40
07-LA-ZQN5-152-m01	Additional Qualification MINT 5	5	B/NB	41
07-LA-ZQN6-152-m01	Additional Qualification MINT 6	5	B/NB	42
07-4S1MEER-152-m01	Ecology and Developmental Biology of Marine Organisms	5	NUM	8
07-LA-EXKURS1-152-m01	Excursion on Zoology or Botany I	2	B/NB	27
07-LA-EXKURS2-152-m01	Excursion on Zoology or Botany II	4	B/NB	28
07-LA-FB-ASL-152-m01	Extracurricular Places of Learning in Biology	5	B/NB	30
07-LA-FB-KO-152-m01	Skills Orientated Learning in Biology	5	B/NB	32
07-LA-FB-EL-152-m01	Habitats of Germany	5	B/NB	31
07-LA-FB-VFD-152-m01	Advanced Didactics in Biology	4	B/NB	34

Module title			Abbreviation
Genes, Molecules, Technologies			07-3A3GMOT-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)**	
6	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

The module *Gene, Moleküle, Technologien* (*Genes, Molecules, Technologies*) will include lectures on the following topics: The section *Spezielle Genetik* (*Special Genetics*) will build on *Einführung in die Genetik* (*Introduction to Genetics*) and will deepen the students' knowledge of topics from the following areas: structure and evolution of the eukaryotic genome, regulatory RNA, epigenetically and evolutionarily significant genetic mechanisms. The section will also focus on methods of gene expression profiling, reverse genetics and modern methods of gene function and gene sequence analysis. In the lecture *Einführung in die Bioinformatik* (*Introduction to Bioinformatics*), students will acquire an overview of major areas in the field of bioinformatics: protein sequence and protein domain analysis, phylogeny and evolution of sequences, protein structure, RNA/DNA sequences and structures, cellular networks (regulation, metabolism) and systems biology. During the section *Einführung in die Biotechnologie* (*Introduction to Biotechnology*), students will acquire an overview of the following topics: history of biotechnology, DNA and RNA technologies, recombinant antibodies, molecular diagnostics, nanobiotechnology, biomaterials, bioprocess engineering, microbial biotechnology, transgenic animals and plants, microfluidics. The lecture *Einführung in die Pharmakokinetik* (*Introduction to Pharmacokinetics*) will provide students with an overview of the rational development of drugs and active agents. The module component will discuss an important aspect for biologists in more detail: the optimisation of the pharmacokinetics of small molecules and proteins. Pharmacokinetics describes the uptake, distribution, metabolism and elimination of a drug or xenobiotic in an organism.

Intended learning outcomes

Students possess an advanced knowledge on genome evolution and the regulation of gene expression and are familiar with current methods in genetics as well as methods for the analysis of DNA and protein databases. They have acquired an overview of both traditional and modern methods in biotechnology and are familiar with fundamental topics in biotechnology. Students have acquired an overview of the fundamental principles of the development and review of active agents in research, clinical practice and the pharmaceutical industry. They are familiar with methods and technologies in biology and are able to evaluate potential applications of these in research and industry.

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

V (4)

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

written examination (approx. 90 minutes)
creditable for bonus

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)
§ 61 I Nr. 1

Module title			Abbreviation
Plant and Animal Ecology			07-3A3OEKO-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)**	
6	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module will provide students with an overview of the interactions of plants and animals with their abiotic and biotic environments. The module will focus on the functional adaptation to environmental conditions as well as on the structure and dynamics of populations, communities and ecosystems. Students will be introduced to fundamental model concepts of ecology, will become familiar with examples of research findings and will acquire the fundamental knowledge necessary to develop an understanding of current ecological problems.

Intended learning outcomes

Students are familiar with the fundamental principles of research in the field of ecology and with the most important abiotic and biotic factors that influence the distribution and frequency of occurrence of organisms in their environment. In addition, they understand the scientific relevance ecology has to the assessment of environmental issues.

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

V (2) + Ü (2)

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

written examination (approx. 90 minutes)
creditable for bonus

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)

§ 61 I Nr. 4

Module title			Abbreviation
Ecology and Developmental Biology of Marine Organisms			07-4S1MEER-152-m01
Module coordinator		**Module offered by**	
head of the Department of Electronmicroscopy		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

A combination of lab work and field trips, this module will provide students with an insight both into the organismal diversity of a marine ecosystem and into the biocenosis of the littoral of the island of Helgoland in the North Sea.

Intended learning outcomes

Students will have enhanced their knowledge of form as well as their understanding of concepts in synecology. In addition, they will have learned how to systematically collect ecological field data.

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

Ü (4) + E (2) + S (2)

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

Log (approx. 10 to 20 pages)
creditable for bonus

Allocation of places

18 places.
Should the number of applications exceed the number of available places, places will be allocated as follows: Students of the Bachelor's degree subject Biologie (Biology) with 180 ECTS credits will be given preferential consideration. Should the module be used in other subjects, there will be two quotas: 95% of places will be allocated to students of the Bachelor's degree subject Biologie (Biology) with 180 ECTS credits and 5% of places (a minimum of one place in total) will be allocated to students of the Bachelor's degree subject Biologie (Biology) with 60 ECTS credits and to students of the Bachelor's degree subjects Computational Mathematics and Mathematik (Mathematics), each with 180 ECTS credits, as part of the application-oriented subject Biology (as well as potentially to students of other 'importing' subjects). Should the number of places available in one quota exceed the number of applications, the remaining places will be allocated to applicants from the other quota. Should there be, within one module, several courses with a restricted number of places, there will be a uniform regulation for the courses of one module. In this case, places on all courses of a module that are concerned will be allocated in the same procedure.
A waiting list will be maintained and places re-allocated as they become available.
Selection process group 1 (95%): Places will primarily be allocated according to the applicants' previous academic achievements.
For this purpose, applicants will be ranked according to the number of ECTS credits they have achieved and their average grade of all assessments taken in all modules in the subject of Biologie (Biology) (excluding Chemie (Chemistry), Physik (Physics), Mathematik (Mathematics)) at the time of application. This will be done as follows: First, applicants will be ranked, firstly, according to their average grade weighted according to the number of ECTS credits (qualitative ranking) and, secondly, according to their total number of ECTS credits achieved (quantitative ranking). The applicants' position in a third ranking will be calculated as the sum of these two rankings, and places will be allocated according to this third ranking.
Among applicants with the same ranking, places will be allocated according to the qualitative ranking or otherwise by lot.
Selection process group 2 (5%): Places will be allocated according to the following quotas: Quota 1 (50 % of places): total number of ECTS credits already achieved in modules of the Faculty of Biology; among applicants with the same number of ECTS credits achieved, places will be allocated by lot. Quota 2 (25 % of places): number of subject semesters of the respective applicant; among applicants with the same number of subject semesters,

places will be allocated by lot. Quota 3 (25 % of places): lottery. Should the module be used only in the Bachelor's degree subject Biologie (Biology) with 180 ECTS credits, places will be allocated according to the selection process of group 1.
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 title			Abbreviation
Research Methods in Biology			07-GY-BFM-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	--	

Contents

Overview of important traditional and modern methods in biology that are applied at the Chairs at the Biocentre, ranging from microscopy and chromatography to polymerase chain reaction (PCR).

Intended learning outcomes

Knowledge of the fields of research the Faculty of Biology at the University of Würzburg is investigating.

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

S (3)

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

a) written examination (approx. 45 to 60 minutes) or
b) log (approx. 10 to 20 pages) or
c) oral examination of one candidate each (approx. 30 minutes) or
d) oral examination in groups of up to 3 candidates (approx. 20 minutes per candidate) or
e) presentation (approx. 20 to 30 minutes) or
f) practical examination (on average approx. 2 hours; time to complete will vary according to subject area but will not exceed a maximum of 4 hours) or
g) term paper (approx. 10 to 30 pages) or
h) project (approx. 10 to 30 pages) or
i) portfolio
Students will be informed about the method and length of the assessment prior to the course.
creditable for bonus

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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

§ 61 I Nr. 7

Module title			Abbreviation
Advanced Biology - Botany			07-GY-FBW-B-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)**	
8	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Students may complete the practical course *Schwerpunkt-Praktikum* either in zoology or in botany. The course will build on the knowledge and skills students have acquired in previous courses and will revisit selected aspects. Students will perform experiments to explore these aspects in more detail. The seminar will address classical and current topics in biology with students delivering presentations and discussing the respective topics.

Intended learning outcomes

Students completing the practical course in botany will become familiar with plant molecular physiology. They will learn how to investigate problems related to the development and adaptation of plants in/to different environmental conditions, using methods in molecular biology, cell biology and biophysics. In addition, students will become familiar with the challenges biotic and abiotic environmental factors pose to plants as well as with mechanisms for overcoming these. Students will be introduced to current topics in biology and will learn how to use research literature. They will be able to extract key facts from a scientific text and to present these in a comprehensible way.

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

Ü (5) + S (2)

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

written examination (approx. 60 minutes)
creditable for bonus

Allocation of places

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Additional information

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Workload

240 h

Teaching cycle

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

§ 61 I Nr. 6

Module title			Abbreviation
Advanced Biology - Zoology			07-GY-FBW-Z-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)**	
8	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Students may complete the practical course *Schwerpunkt-Praktikum* either in zoology or in botany. The course will build on the knowledge and skills students have acquired in previous courses and will revisit selected aspects. Students will perform experiments to explore these aspects in more detail. The seminar will address classical and current topics in biology with students delivering presentations and discussing the respective topics.

Intended learning outcomes

Students completing the practical course in zoology will have become familiar with the circulatory system of different classes of vertebrates as well as with the internal structures of the organs of a range of vertebrates. In addition, they will know how to address problems in behavioural biology.

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

Ü (5) + S (2)

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

written examination (approx. 60 minutes)
creditable for bonus

Allocation of places

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Additional information

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Workload

240 h

Teaching cycle

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

§ 61 I Nr. 6

Module title			Abbreviation
Didactics in Biology I: Basics			07-GY-FDBIO-1-152-m01
Module coordinator		**Module offered by**	
head of group Didactics of Biology		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

The lecture *Einführung in die Fachdidaktik Biologie* (*Introduction to Biology Didactics*) will discuss central concepts and principles of biology lessons as well as methods in biology and teaching aids. Building on this knowledge, students will learn how to outline problem-based biology lessons. The course will discuss topics such as modes of interaction in the classroom, teaching methods and approaches, the definition of learning outcomes, out-of-classroom learning environments, topics and theories in biology didactics etc. The seminar *Biologieunterricht* (*The Biology Classroom*) will equip students with detailed knowledge on how to plan and design classes for the respective type of school. Students will prepare didactic analyses on topics from the curriculum. They will discuss general aspects of curriculum theory and, working in small teams, will translate the material to be taught, in a didactically reduced manner, into teaching sequences and lessons. At the same time, students will integrate different teaching methods and modes of interaction in the classroom (as well as teaching aids) into their lessons, keeping in mind what is and what is not possible in the respective type of school, and will deliver their lessons or parts of these in the seminar. Didactic aspects will be evaluated and discussed in class. There will be separate seminars for each type of school; please select the seminar for the school type for which you are pursuing a teaching degree. Using examples from the classroom, the seminar *Unterrichtsmittel* (*Teaching Aids*) will acquaint students with specific teaching aids (originals, preparations and media) for use in the biology classroom and will assess these with regard to the media literacy skills to be developed. The seminar will discuss both traditional aids used in the biology classroom (models, blackboard, OHP, transparencies, textbook and worksheets etc.) and modern aids (computer simulations, ppt presentations etc.). After having received a theoretical introduction to teaching aids, students will be arranged into small teams that will deliver lessons or individual phases of lessons on specific topics from the curriculum. They will focus on a teaching aid of their choice which will subsequently be assessed with regard to aspects of media didactics.

Intended learning outcomes

- Ability to name relevant aspects of biology didactics.
- Ability to design lively biology lessons, using original objects and teaching aids.
- Ability to prepare scientific and didactic analyses on selected topics from the curriculum for the respective type of school and to present these topics in a manner that is tailored to the target group.
- Ability to translate, with the help of didactic analyses, selected topics from the curriculum into teaching sequences and lessons as well as to deliver these teaching sequences and lessons, applying problem-based and/or open teaching methods.
- Ability to evaluate and reflect on lessons, taking didactic aspects into account.
- Knowledge of the fact that the term "teaching aids in the biology classroom" refers to originals, preparations and media.
- Familiarity with a biology-specific, didactic definition of the term "media".
- Overview of classifications of media, factors that influence the choice of media as well as the function of media.
- Familiarity with the limitations and problems associated with the use of media in the classroom.
- Practical skills using media of all kinds (hardware side).
- Ability to independently prepare teaching aids.
- Ability to use teaching aids in classroom situations in a way that is appropriate for pupils and the material taught.
- Advantages and disadvantages of specific teaching aids; limitations associated with the use of media in the classroom.

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

V (2) + S (3)

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)
written examination (approx. 60 minutes) creditable for bonus
Allocation of places
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Additional information
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Workload
150 h
Teaching cycle
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Referred to in LPO I (examination regulations for teaching-degree programmes)
§ 61 I Nr. 8

Module title			Abbreviation
Didactics Biology II: Special Didactics			07-GY-FDBIO-2-152-m01
Module coordinator		**Module offered by**	
head of group Didactics of 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	--	

Contents

The seminar *Arbeiten im Lehr-Lern-Labor* (*Working in the Teach'n'Learn Lab*) or *Arbeiten im Lehr-Lern-Garten* (*Working in the Teach'n'Learn Garden*) will provide students with an overview of selected methods in biology. They will learn to prepare these methods, in a didactically reduced manner, for pupils and, having been arranged into teams, will deliver the respective units to groups of pupils. Students will thus learn to tailor research-oriented experiments to the age group they are teaching and will acquire practical experience in the supervision of a group of pupils. In the seminar *Arbeitstechniken und Schulversuche* (*Methods and Experiments in the Classroom*), students will be arranged into small teams and will perform a variety of experiments on classic topics in biology. The experiments, which will be tailored to the requirements of *Sekundarstufe I* and *II*, will subsequently be assessed in class with regard to didactic aspects and/or will be integrated into concrete classroom situations. Students will thus acquire techniques and background knowledge that will enable them to deliver lively and motivating lessons to different age groups. The seminar *Arbeiten im Lehr-Lern-Labor* (*Working in the Teach'n'Learn Lab*) or *Arbeiten im Lehr-Lern-Garten* (*Working in the Teach'n'Learn Garden*) will provide students with an overview of selected methods in biology. They will learn to prepare these methods, in a didactically reduced manner, for pupils and, having been arranged into teams, will deliver the respective units to groups of pupils. Students will thus learn to tailor research-oriented experiments to the age group they are teaching and will acquire practical experience in the supervision of a group of pupils.

Intended learning outcomes

- Ability to didactically adapt selected traditional and modern methods in biology.
- Ability to prepare, deliver and evaluate teach'n'learn units.
- Ability to independently supervise teach'n'learn units

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

S (2) + S (2)

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

portfolio (approx. 30 hours)
creditable for bonus

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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

§ 61 I Nr. 8

Module title			Abbreviation
Research-oriented working in Biology			07-GY-FOP-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
7	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module will acquaint students with procedures in biological laboratories. In the research-oriented practical course, students may choose from a range of topics offered by the Faculty of Biology. They will complete a scientific lab course.

Intended learning outcomes

Familiarity with fundamental concepts in statistics, e. g. mean value, standard deviation, standard error, creating graphs from raw data, insight into procedures in biological laboratories, deeper familiarity with research methods in a branch of biology, ability to experimentally address scientific problems, ability to design, perform and analyse experiments.

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

Ü (4)

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

a) written examination (approx. 45 to 60 minutes) or
b) log (approx. 10 to 20 pages) or
c) oral examination of one candidate each (approx. 30 minutes) or
d) oral examination in groups of up to 3 candidates (approx. 20 minutes per candidate) or
e) presentation (approx. 20 to 30 minutes) or
f) practical examination (on average approx. 2 hours; time to complete will vary according to subject area but will not exceed a maximum of 4 hours) or
g) term paper (approx. 10 to 30 pages) or
h) project (approx. 10 to 30 pages) or
i) portfolio
Students will be informed about the method and length of the assessment prior to the course.
creditable for bonus

Allocation of places

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Additional information

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Workload

210 h

Teaching cycle

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

§ 61 I Nr. 7

Module title			Abbreviation
Advanced Microbiology - GY			07-GY-MIBI-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	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	Admission prerequisite to assessment: exercises. Regular attendance (minimum 80%) and successful completion of exercises (approx. 25 to 30 hours) are prerequisites for admission to assessment.	

Contents

During this lab course, students will deepen their knowledge of the topics covered in the module *Grundlagen der Mikrobiologie* (*Basic Microbiology*). Performing practical laboratory work, students will become familiar with molecular biological methods and approaches.

Intended learning outcomes

Students have acquired a fundamental knowledge of methods in both classical microbiology and molecular biology. They are able to use these methods and to discuss current problems in these fields.

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

Ü (3)

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

written examination (approx. 60 minutes)
creditable for bonus

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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

§ 61 I Nr. 3

Module title			Abbreviation
Evolution and the Animal Kingdom			07-LA-1A1TI-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

The lecture *Evolution* will acquaint students with fundamental concepts and mechanisms of evolutionary biology: the origins of diversity; natural and sexual selection; speciation; population genetics. It will provide students with an introduction to phylogenetic reconstruction and will thus enable them to develop an understanding of the system of plants and animals. During the exercise, students will complete exercises on mechanistic evolution and evolutionary history. The lecture *Tierreich* (*Animal Kingdom*) will discuss the diversity of animal organisms on the basis of the phyla of the animal kingdom focusing on phylogenetic criteria. It will address the ecological constraints that led to the development of different types of body plans with their different structures and functions. In this context, the lecture will also develop an awareness in students of how important a knowledge of the fundamental principles of zoology is for research and applications not only but in particular in biology and medicine. In the exercise, students will prepare and/or examine selected species and histological preparations and will thus become familiar with the functional and morphological characteristics of the major multicellular animal phyla. In this context, students will practise working with light microscopes and stereo microscopes and will acquire fundamental preparation skills. They will prepare drawings, documenting and interpreting what they have seen.

Intended learning outcomes

Students will be familiar with the fundamental concepts and mechanisms of evolutionary biology and will know that these are key to understanding biological processes. They will have gained an overview of the diversity of animals on the basis of different types of body plans and will understand important structures in both a functional and an ecological context.

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

V (2) + Ü (3)

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

written examination (approx. 60 minutes)
creditable for bonus

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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

§ 41 I Nr. 1 (4 ECTS credits), § 41 I Nr. 4 (1 ECTS credits)
§ 61 I Nr. 1 (4 ECTS credits), § 61 I Nr. 4 (1 ECTS credits)

Module title			Abbreviation
Genetics, Neurobiology, Behaviour			07-LA-2A2GENV-152-m01
Module coordinator		**Module offered by**	
Dean of Studies Biologie (Biology)		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents
Fundamental principles of genetics, neurobiology and behavioural biology.
Intended learning outcomes
Students will understand that there are molecular, cellular and system biological mechanisms and processes involved in animal behaviour and will be able to relate animal behaviour to the molecular and formal bases of inheritance.
Courses (type, number of weekly contact hours, language — if other than German)
V (3) + Ü (2.5)
Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)
written examination (approx. 60 to 90 minutes) creditable for bonus
Allocation of places
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Additional information
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Workload
150 h
Teaching cycle
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Referred to in LPO I (examination regulations for teaching-degree programmes)
§ 61 I Nr. 2 (1 ECTS credits), § 61 I Nr. 3 (2 ECTS credits), § 61 I Nr. 4 (2 ECTS credits)

Module title			Abbreviation
Plant Physiology			07-LA-2A2PHYPF-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Molecular Plant Physiology and Biophysics		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
4	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module will acquaint students with the principles of general plant physiology and will provide them with an opportunity to develop the fundamental skills for working in a biological laboratory. The module will first address the biochemistry of the cell and will then move on to discuss the physiological processes that regulate the internal environment of plants in particular. Using the example of plants, the module will introduce students to the general principles of physiology. The module will also elaborate on the characteristic peculiarities of plants in comparison with animals and prokaryotes.

Intended learning outcomes

- Familiarity with general physiological processes in plants and the regulation of these. - Familiarity with the factors that distinguish plant physiology from animal and prokaryotic physiology. - Fundamental knowledge and skills on how to perform, analyse and present scientific experiments. - Essential lab skills. - Familiarity with methods for the investigation of fundamental physiological processes in plants.

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

V (1) + Ü (2)

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

written examination (approx. 60 minutes)
creditable for bonus

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

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

§ 61 I Nr. 2

Module title			Abbreviation
Physiology of Prokaryotes			07-LA-2A2PHYPR-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)**	
4	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module comprises a lecture and accompanying exercises. During the theoretical part, students will acquire an overview of the structure of bacterial cells and different metabolic performances of bacteria; during exercises, these will be illustrated by help of suitable experiments.

Intended learning outcomes

Students are familiar with the fundamental principles of the anatomy and metabolic performance of bacteria. They are proficient in basic methods in microbiology.

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

V (1) + Ü (2)

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

written examination (approx. 60 minutes)
creditable for bonus

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

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

§ 61 I Nr. 3

Module title			Abbreviation
Animal Physiology			07-LA-2A2PHYTI-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)**	
4	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module will acquaint students with the principles of general and comparative animal physiology and will provide them with an opportunity to develop the fundamental skills for working in a physiological laboratory. The module will focus on neurophysiology and sensory physiology as well as aspects of metabolic physiology (respiration and excretion).

Intended learning outcomes

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

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

V (1) + Ü (2)

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

written examination (approx. 60 minutes)
creditable for bonus

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

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

§ 41 I Nr. 2
§ 61 I Nr. 2

Module title			Abbreviation
Developmental Biology of Plants			07-LA-3A3EBIOPF-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Molecular Plant Physiology and Biophysics		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
4	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

In this module, students will acquire an insight into the fundamental processes of plant developmental biology over a plant's entire life cycle from germination to reproduction. The module will discuss the molecular determination and regulation of different developmental biological processes in plants as well as their plasticity.

Intended learning outcomes

1. Fundamental concepts in plant developmental biology. 2. Developmental biology of selected plant model organisms. 3. Developmental biological processes at specific stages in the life cycle of plants. 4. Molecular mechanisms underlying pattern formation, morphogenesis and organogenesis in plants. 5. Establishment of plant embryonic axes. 6. Physiological aspects of the developmental processes in plants that were discussed. 7. Plasticity of developmental biological processes: regulation by endogenous and environmental factors.

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

V (1) + Ü (3)

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

written examination (approx. 60 minutes)
creditable for bonus

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

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

§ 61 I Nr. 6

Module title			Abbreviation
Developmental Biology of Animals			07-LA-3A3EBIOTI-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	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

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

Intended learning outcomes

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

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

V (1) + Ü (3)

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

written examination (approx. 60 minutes)
creditable for bonus

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

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

§ 61 I Nr. 6

Module title			Abbreviation
Plant Kingdom			07-LA-BIO1-PF-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Molecular Plant Physiology and Biophysics		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
4	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

The lecture will discuss the evolution and systematics of plants and fungi as well as the anatomy of higher plants. Students will acquire a fundamental knowledge of the major cell and tissue types of higher plants from germination to reproduction. In addition, important groups of fungi, algae, mosses and vascular plants will be discussed in the context of evolutionary biology. Using the example of selected species, the course will investigate the anatomy and evolutionary biology of lower and higher plants. In this context, students will practise working with light microscopes and magnifying glasses and will acquire fundamental preparation skills. They will prepare drawings, documenting and interpreting what they have seen. Media aids will also be used in the exercise.

Intended learning outcomes

Students have acquired an advanced knowledge in the area of animal ecology. They are able to design simple ecological lab and field experiments as well as to interpret and present their findings.

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

V (1.5) + Ü (2.5)

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

written examination (approx. 60 minutes)
creditable for bonus

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

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

§ 41 I Nr. 1
§ 61 I Nr. 1

Module title			Abbreviation
Structure and Function of Cells			07-LA-BIO1-ZE-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Botany I		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
4	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

The first part of this lecture series will provide you with an overview of the physical and chemical bases of life. We will then explore the internal organisation and the morphology of the cell, the fundamental unit of life. In this context, we will discuss the "general" functional elements of the cell, comparing prokaryotic, animal and plant cells. After having discussed cell evolution, we will set out on a journey through the cell, exploring the extracellular matrix/cell wall, cytoskeleton, organelles and nucleus. To help you understand how a cell functions, we will discuss the functions of these components. During exercises, practical examples will provide you with an opportunity to explore the material in more detail: we will work with microscopic preparations, complete exercises and use multimedia aids. You will learn and practise preparation and light microscopy techniques that you will apply in the exercise of the module *Das Pflanzen- und Tierreich* (*The Plant and Animal Kingdoms*). In addition, we will discuss aspects related to everyday procedures in biological laboratories.

Intended learning outcomes

Students will be able to recognise, describe and evaluate interactions between plants and their environment. They will be able to perform basic experiments to analyse these interactions.

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

V (2) + Ü (3)

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

written examination (approx. 60 minutes)
creditable for bonus

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

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

§ 41 I Nr. 1 (3 ECTS credits), § 41 I Nr. 3 (1 ECTS credits) (The major part of exercises in the field of Biology at the University of Würzburg is of practical typ and correspond to to the lab courses given in LPO I.)
§ 61 I Nr. 1 (3 ECTS credits), § 61 I Nr. 3 (1 ECTS credits) (The major part of exercises in the field of Biology at the University of Würzburg is of practical typ and correspond to to the lab courses given in LPO I.)

Module title			Abbreviation
Excursion on Zoology or Botany I			07-LA-EXKURS1-152-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	--	

Contents

During this multi-day botanical or zoological teaching hike, students will explore selected habitats and communities of plants and animals in Germany and abroad.

Intended learning outcomes

Students are familiar with terrestrial plant and animal communities, their habitat requirements as well as the factors that influence the composition of these communities.

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

Ü (2)

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

a) written examination (approx. 45 to 90 minutes) or
b) oral examination of one candidate each (30 to 60 minutes) or
c) term paper (approx. 10 to 30 pages) or
d) portfolio
Students will be informed about the method and length of the assessment prior to the course.
creditable for bonus

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 title			Abbreviation
Excursion on Zoology or Botany II			07-LA-EXKURS2-152-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	--	

Contents

During this multi-day botanical or zoological teaching hike, students will explore selected habitats and communities of plants and animals in Germany and abroad.

Intended learning outcomes

Students are familiar with terrestrial plant and animal communities, their habitat requirements as well as the factors that influence the composition of these communities.

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

Ü (4)

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

a) written examination (approx. 45 to 90 minutes) or
b) oral examination of one candidate each (30 to 60 minutes) or
c) term paper (approx. 10 to 30 pages) or
d) portfolio
Students will be informed about the method and length of the assessment prior to the course.
creditable for bonus

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

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

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Module title			Abbreviation
The Fauna of Germany			07-LA-FAUNA-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	undergraduate	Admission prerequisite to assessment: regular attendance of field trips (minimum 80%).	

Contents

In this module, students will acquire an overview of selected groups of animals to be found in Central Europe. They will acquire a fundamental knowledge of the systematics and taxonomy of these animals and will practise identifying species, using specimens of animals. Selection of specimens will be taxon-specific and will represent specific habitats or lifestyles. Exercises in a variety of habitats will provide students with an opportunity to consolidate the knowledge and skills they acquired in the lab by identifying living specimens including their ecology and behavioural biology.

Intended learning outcomes

Students possess species identification skills. They know how to taxonomically classify selected representatives of the indigenous fauna (vertebrates, invertebrates) and use identification keys. They are familiar with selected Central European habitats as well as their faunas and phenology. On the basis of the morphology and habitats of species, students are able to predict the biology and ecology of these species as well as, where applicable, to predict whether they function as indicators and are of conservation concern.

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

V (1) + Ü (2) + E (2.5)

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

written examination (approx. 45 minutes) and practical identification assignment (approx. 45 minutes)
creditable for bonus

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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

§ 41 I Nr. 1 (3 ECTS credits), § 41 I Nr. 4 (2 ECTS credits)
§ 61 I Nr. 1 (3 ECTS credits), § 61 I Nr. 4 (2 ECTS credits)

Module title			Abbreviation
Extracurricular Places of Learning in Biology			07-LA-FB-ASL-152-m01
Module coordinator		**Module offered by**	
head of group Didactics of 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	--	

Contents

The seminar *Umweltbildung* (*Environmental Education*) will discuss approaches to environmental education as well as didactic components and will highlight the significance of out-of-classroom learning environments for biology lessons. In the Botanical Garden and indigenous habitats, students will try out practical methods for environmental education and will develop short teaching sequences to be delivered in out-of-classroom learning environments. In the seminar *PraxisPlus im LLL* (*Teach'n'Learn Lab: Intensive Practice*), students will be arranged into teams that will independently deliver existing lessons in a teach'n'learn lab. Applying a range of didactic methods, students will develop an understanding of research in biology didactics. Supervising groups of pupils of different ages, they will enhance their teaching skills. In the seminar *Biologiedidaktische Forschung* (*Research in Biology Didactics*), students will gain an overview of topics in current research on biology didactics and will become proficient in techniques for measuring the progress of pupils in acquiring knowledge and skills.

Intended learning outcomes

- Familiarity with current as well as older approaches to environmental education and ability to identify the factors that may encourage pupils to act responsibly towards nature.
- Ability to explore the scientific principles behind the respective topics.
- Ability to design experience-based lessons on these topics that are tailored to the age of pupils as well as to the respective type of school and local conditions.
- Ability to didactically adapt selected research methods for the age group students are teaching and the type of school at which they are teaching.
- Ability to describe current topics in didactics.
- Ability to assess and evaluate the cognitive learning achievement of pupils.

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

S (2) + S (2)

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

a) written examination (approx. 45 to 90 minutes) or
b) oral examination of one candidate each (30 to 60 minutes) or
c) term paper (approx. 10 to 30 pages) or
d) portfolio
Students will be informed about the method and length of the assessment prior to the course.
creditable for bonus

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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

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Module title			Abbreviation
Habitats of Germany			07-LA-FB-EL-152-m01
Module coordinator		**Module offered by**	
head of group Didactics of Biology		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	--	
Duration	**Module level**	**Other prerequisites**	
2 semester	undergraduate	--	

Contents

The exercise *Einheimische Lebensräume im Biologieunterricht* (*Indigenous Habitats in the Biology Classroom*) will provide students with an opportunity to explore the topic "teaching biology in out-of-classroom learning environments" in more detail. The course will focus on the methodological aspect of environmental education. Students will adapt existing teaching units on water, forest, grassland, farmland and/or hedgerow habitats, will deliver the respective units to groups of pupils, preferably during a project day at an environmental education centre, and will subsequently evaluate the sessions. Students will develop an activity and problem-based lesson on a concrete topic related to the respective habitat, a lesson that is tailored to their target group and develops their pupils' affective, methodological and cognitive skills.

Intended learning outcomes

- Ability to develop activity-based and multisensory lessons in out-of-classroom learning environments that are tailored to the target group as well as ability to adapt and evaluate lessons.
- Ability to independently organise and run project days.
- Ability to critically reflect on the respective lessons, taking aspects of environmental education into consideration.

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

Ü (3)

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

a) written examination (approx. 45 to 90 minutes) or
b) oral examination of one candidate each (30 to 60 minutes) or
c) term paper (approx. 10 to 30 pages) or
d) portfolio
Students will be informed about the method and length of the assessment prior to the course.
creditable for bonus

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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

§ 36 I Nr. 7

Module title			Abbreviation
Skills Orientated Learning in Biology			07-LA-FB-KO-152-m01
Module coordinator		**Module offered by**	
head of group Didactics of 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	--	

Contents

In the seminar *Gesundheitserziehung* (*Health Education*), we will explore the causes and reasons of a broad range of health issues faced by many children and adolescents in Germany today; we will discuss different types of these health issues as well as related theories. We will focus on the following topics: drugs and substance abuse, sex education, unhealthy eating habits and lack of exercise. We will develop lessons to promote a healthy lifestyle that are tailored to the requirements of the respective type of school and will discuss general measures as well as measures related to specific topics. In the seminar *Motivierte und disziplinierte Schüler im Biologieunterricht* (*Motivation and Discipline in the Biology Classroom*), you will learn how to handle difficult situations in class and will develop methodological skills for the biology classroom. We will discuss the duties and responsibilities of teachers as well as ways to effectively fulfil these. We will analyse typical causes of disruption and will discuss ways to deal with disruptive pupils and prevent disruption. The seminar *Kompetenzorientierte Unterrichtsmodelle am Beispiel HOBOS* (*Skill-Oriented Instructional Models: the HOBOS Learning Platform*) will provide you with an introduction to the HOBOS learning platform and will acquaint you with the concepts of skill-oriented learning and educational standards. Discussing concrete examples, we will find out what effects output orientation may have on teaching. In addition, you will learn to plan and implement lessons, observing the principle of individualisation. You will acquire broad range of methods that will allow you to do so.

Intended learning outcomes

- Ability to explain both selected explanatory approaches to understanding health-impairing behaviours and historical as well as current approaches to the prevention of these behaviours.
- Ability to translate topics in the area of health education and disease prevention from the curriculum for the respective type of school, in a didactically reduced manner, into lessons.
- Ability to name the duties and responsibilities of teachers as well as fundamental principles set out in the following acts and regulations: Bayerisches Gesetz über das Erziehungs- und Unterrichtswesen (Bavarian Education Act, BayEUG), Dienstordnung für Lehrkräfte an staatlichen Schulen in Bayern (Regulations for Teachers at State Schools in Bavaria, LDO) as well as Schulordnung für die Gymnasien/Volksschulen/Realschulen in Bayern (Regulations Governing Gymnasien/Volksschulen/Realschulen in Bavaria, GSO/VSO/RSO).
- Ability to recognise causes of disruption

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

S (2) + S (2)

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

a) written examination (approx. 45 to 90 minutes) or
b) oral examination of one candidate each (30 to 60 minutes) or
c) term paper (approx. 10 to 30 pages) or
d) portfolio
Students will be informed about the method and length of the assessment prior to the course.
creditable for bonus

Allocation of places

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Additional information

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Workload
150 h
Teaching cycle
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Referred to in LPO I (examination regulations for teaching-degree programmes)
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Module title			Abbreviation
Advanced Didactics in Biology			07-LA-FB-VFD-152-m01
Module coordinator		**Module offered by**	
head of group Didactics of 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	--	

Contents

This module will provide students with in-depth insights into the theory and practice of biology didactics.

Intended learning outcomes

Students will be able to apply the fundamental knowledge they have acquired to a range of aspects of biology didactics.

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

S (2)

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

a) written examination (approx. 45 to 90 minutes) or
b) oral examination of one candidate each (30 to 60 minutes) or
c) term paper (approx. 10 to 30 pages) or
d) portfolio
Students will be informed about the method and length of the assessment prior to the course.
creditable for bonus

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

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

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Module title			Abbreviation
The Flora of Germany			07-LA-FLORA-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Molecular Plant Physiology 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	undergraduate	Admission prerequisite to assessment: regular attendance of field trips (minimum 80%).	

Contents

The module will discuss the fundamental principles of the systematics and ecology of flowering plants. Students will acquire an overview of the major flowering plants to be found in the temperate zone as well as their ecological and economic importance. Using the field guide *Flora von Deutschland* by Schmeil-Fitschen, the course will demonstrate how dichotomous keys are used, and students will practise identifying freshly-gathered plants using dichotomous keys. Identifying plants, students will learn how to identify major morphological plant characteristics and will become familiar with the respective terminology. The module will also include field trips to typical habitats in the Botanical Garden and the vicinity of Würzburg. Students will become familiar with the common as well as scientific names of the plants found and will be introduced to the family- as well as species-specific characteristics of these plants. Students will practise using field guides and identification keys on site. Habitat ecological, geobotanical, climatic as well as conservation-relevant characteristics will also be discussed. The module will also include sessions at the Botanical Garden of the University of Würzburg with its outdoor facilities and greenhouses to help students acquire species identification skills.

Intended learning outcomes

Students have acquired knowledge and skills related to the ecology, systematics and taxonomy of indigenous flowering plants. They are familiar with the terminology of plant morphology and know how to use Floras and set up scientific herbaria.

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

E (2.5) + V (1) + Ü (2)

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

written examination (approx. 45 minutes) and practical identification assignment (approx. 45 minutes)
Assessment offered: Once a year, summer semester
creditable for bonus

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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

§ 41 I Nr. 1 (3 ECTS credits), § 41 I Nr. 4 (2 ECTS credits)
§ 61 I Nr. 1 (3 ECTS credits), § 61 I Nr. 4 (2 ECTS credits)

Module title			Abbreviation
Basic Human Biology I - GY			07-LA-HUBIO-1-152-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)**	
6	numerical grade	--	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

This module will be divided up into three sections covering the following topics:
- human genetics (genetic disease, inheritance),
- human physiology (human sensory physiology, nutrition, maintaining physical health),
- human developmental physiology (sex organs, impregnation, embryonic development, evolutionary history of modern humans).

Intended learning outcomes

- Familiarity with the fundamental principles of human genetics

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

V (3)

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

written examination (approx. 60 to 90 minutes)
creditable for bonus

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)

§ 61 I Nr. 5

Module title			Abbreviation
Basic Human Biology II			07-LA-HUBIO-2-152-m01
Module coordinator		**Module offered by**	
holder of the Chair of Zoology I		Faculty of Biology	
ECTS	**Method of grading**	**Only after succ. compl. of module(s)**	
5	(not) successfully completed	07-LA-HUBIO-1 or 07-GMR-HUBIO-1	
Duration	**Module level**	**Other prerequisites**	
1 semester	undergraduate	--	

Contents

Experiments to consolidate the students' knowledge of the topics covered in the lecture: We will examine preparations under the microscope, make drawings, develop genetic diagrams showing the inheritance of diseases, perform experiments on human physiology.

Intended learning outcomes

Students will be proficient in the theory and practice of research in the field of integrative behavioural biology and will have developed skills required for a career in research.

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

Ü (3)

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

Logs (approx. 30 hours) and 10 to 15 drawings
creditable for bonus

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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

§ 41 I Nr. 5
§ 61 I Nr. 5

Module title			Abbreviation
Additional Qualification MINT 2			07-LA-ZQN2-152-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	--	

Contents

Courses in areas other than the natural sciences that are not offered as part of the pool of general transferable skills (ASQ) and that provide students with an opportunity to strengthen their general background in the natural sciences. These courses may be offered by the University of Würzburg or by external institutions. Decision on credit transfer to be made by examination committee. Will include one week of all-day courses.

Intended learning outcomes

Students have expanded their interdisciplinary knowledge and have thus enhanced their general scientific skills. They have acquired additional expertise and have developed additional skills in areas other than biology.

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

S (2)

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

written examination (approx. 60 minutes)
creditable for bonus

Allocation of places

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Additional information

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Workload

60 h

Teaching cycle

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

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Module title			Abbreviation
Additional Qualification MINT 3			07-LA-ZQN3-152-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	--	

Contents

Courses in areas other than the natural sciences that are not offered as part of the pool of general transferable skills (ASQ) and that provide students with an opportunity to strengthen their general background in the natural sciences. These courses may be offered by the University of Würzburg or by external institutions. Decision on credit transfer to be made by examination committee. Will include courses with 1 weekly contact hour.

Intended learning outcomes

Students have expanded their interdisciplinary knowledge and have thus enhanced their general scientific skills. They have acquired additional expertise and have developed additional skills in areas other than biology.

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

S (3)

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

written examination (approx. 60 minutes)
creditable for bonus

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 title			Abbreviation
Additional Qualification MINT 4			07-LA-ZQN4-152-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	--	

Contents

Courses in areas other than the natural sciences that are not offered as part of the pool of general transferable skills (ASQ) and that provide students with an opportunity to strengthen their general background in the natural sciences. These courses may be offered by the University of Würzburg or by external institutions. Decision on credit transfer to be made by examination committee. Will include one week of all-day courses.

Intended learning outcomes

Students have expanded their interdisciplinary knowledge and have thus enhanced their general scientific skills. They have acquired additional expertise and have developed additional skills in areas other than biology.

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

S (4)

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

written examination (approx. 60 minutes)
creditable for bonus

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

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

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Module title			Abbreviation
Additional Qualification MINT 5			07-LA-ZQN5-152-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	--	

Contents

Courses in areas other than the natural sciences that are not offered as part of the pool of general transferable skills (ASQ) and that provide students with an opportunity to strengthen their general background in the natural sciences. These courses may be offered by the University of Würzburg or by external institutions. Decision on credit transfer to be made by examination committee. Will include one week of all-day courses.

Intended learning outcomes

Students have expanded their interdisciplinary knowledge and have thus enhanced their general scientific skills. They have acquired additional expertise and have developed additional skills in areas other than biology.

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

S (4)

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

written examination (approx. 60 minutes)
creditable for bonus

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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

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Module title			Abbreviation
Additional Qualification MINT 6			07-LA-ZQN6-152-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	--	

Contents

Courses in the natural sciences not offered as part of the pool of general transferable skills (ASQ) that equip students with advanced knowledge in the natural sciences that is related to their discipline. These courses may be offered by the University of Würzburg or by external institutions. Decision on credit transfer to be made by examination committee.

Intended learning outcomes

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

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

S (4)

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

written examination (approx. 60 minutes)
creditable for bonus

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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

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Module title			Abbreviation
Supervising Tutorial for Basic Courses 3			07-SQF-TFB3-152-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	--	

Contents

Working as tutors, students will mentor other students during the modules *Allgemeine Biologie* (*General Biology*) I through III in particular. Tutors will help students improve upon their understanding of material, consolidate their knowledge and prepare for assessments. They will correct exercises, will discuss these with students and will help them fill gaps in their knowledge. Tutors will support other students on their way towards academic success.

Intended learning outcomes

The tutors are able to communicate complex concepts in a clear and structured way. They have gained experience supervising a group. Having prepared for answering specific questions and explaining material in detail, the tutors have also enhanced their own subject-specific skills. They have enhanced their teaching skills.

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

T (o)

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

Proof of tutoring activities and report (approx. 2 to 3 pages)
creditable for bonus

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 title			Abbreviation
Supervising Tutorial for Basic Courses 4			07-SQF-TFB4-152-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	--	

Contents

Working as tutors, students will mentor other students during the modules *Allgemeine Biologie* (*General Biology*) I through III in particular. Tutors will help students improve upon their understanding of material, consolidate their knowledge and prepare for assessments. They will correct exercises, will discuss these with students and will help them fill gaps in their knowledge. Tutors will support other students on their way towards academic success.

Intended learning outcomes

The tutors are able to communicate complex concepts in a clear and structured way. They have gained experience supervising a group. Having prepared for answering specific questions and explaining material in detail, the tutors have also enhanced their own subject-specific skills. They have enhanced their teaching skills.

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

T (o)

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

Proof of tutoring activities and report (approx. 2 to 3 pages)
creditable for bonus

Allocation of places

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Additional information

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Workload

120 h

Teaching cycle

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

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Module title			Abbreviation
Supervising Tutorial for Basic Courses 5			07-SQF-TFB5-152-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	--	

Contents

Working as tutors, students will mentor other students during the modules *Allgemeine Biologie* (*General Biology*) I through III in particular. Tutors will help students improve upon their understanding of material, consolidate their knowledge and prepare for assessments. They will correct exercises, will discuss these with students and will help them fill gaps in their knowledge. Tutors will support other students on their way towards academic success.

Intended learning outcomes

The tutors are able to communicate complex concepts in a clear and structured way. They have gained experience supervising a group. Having prepared for answering specific questions and explaining material in detail, the tutors have also enhanced their own subject-specific skills. They have enhanced their teaching skills.

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

T (o)

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

Proof of tutoring activities and report (approx. 2 to 3 pages)
creditable for bonus

Allocation of places

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Additional information

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Workload

150 h

Teaching cycle

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

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Module title			Abbreviation
Supervising Tutorial for Biology 2			07-SQF-TSB2-152-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	--	

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)

T (0)

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

Proof of tutoring activities and report (approx. 2 to 3 pages)
creditable for bonus

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 title			Abbreviation
Supervising Tutorial for Biology 3			07-SQF-TSB3-152-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

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)

T (0)

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

Proof of tutoring activities and report (approx. 2 to 3 pages)
creditable for bonus

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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