

Module Catalogue

for the Subject

Biology

as a Master's with 1 major with the degree "Master of Science" (120 ECTS credits)

> Examination regulations version: 2010 Responsible: Faculty of Biology



Contents

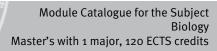
The subject is divided into	6
Content and Objectives of the Programme	7
Abbreviations used, Conventions, Notes, In accordance with	8
Thesis	9
Final Examination in Biology	10
Compulsory Electives	12
Compulsory Electives 1	13
Focus 1	14
Neurosciences	15
Neurobiology, Behavior and Animal Ecology (Lecture)	16
Molecular and Clinical Neurobiology (Lecture and Seminar)	17
Neurobiology (Practical Course and Seminar 1)	18
Neurobiology (Practical Course and Seminar 2)	19
Animal Ecology and Tropical Biology	20
Neurobiology, Behavior and Animal Ecology (Lecture) Animal Ecology and Tropical Biology (Lecture and Seminar)	21 22
Animal Ecology and Hopical Biology (Ecclure and Seminar) Animal Ecology F1 (Practical Course and Seminar 1)	23
Animal Ecology and Tropical Biology F2 (Practical Course and Seminar 2)	25
Behavioral Physiology and Sociobiology	27
Neurobiology, Behavior and Animal Ecology (Lecture)	28
Communication Biology (Lecture)	29
Behavioral Biology (Practical Course and Seminar 1) Behavioral Biology (Practical Course and Seminar 2)	30
Focus 2	31 32
Molecular Cell- and Developmental Biology Molecular Biology (Lecture)	33 34
Cell- and Developmental Biology Master 1 (Lecture and Seminar 1)	36 36
Cell- and Developmental Biology Master 2 (Lecture and Seminar 2)	37
Cell- and Developmental Biology Practical Course and Seminar 1	39
Cell- and Developmental Biology Practical Course and Seminar 2	40
Microbiology	41
Molecular Biology (Lecture) Microbiology (Lecture and Seminar)	42
Microbiology (Practical Course and Seminar 1)	44 45
Microbiology (Practical Course and Seminar 2)	46
Cellular and Molecular Biotechnology	47
Molecular Biology (Lecture)	48
Biophysics and Molecular Biotechnology (Lecture and Seminar)	50
Biophysics and Molecular Biotechnology (Practical Course and Seminar 1) Biophysics and Molecular Biotechnology (Practical Course and Seminar 2)	51
Bioinformatics	52
Neurobiology, Behavior and Animal Ecology (Lecture)	53 54
Molecular and Clinical Neurobiology (Lecture and Seminar)	55
Animal Ecology and Tropical Biology (Lecture and Seminar)	56
Communication Biology (Lecture)	57
Molecular Biology (Lecture) Coll. and Davidonmental Piology Macter 4 (Lecture and Seminar 4)	58
Cell- and Developmental Biology Master 1 (Lecture and Seminar 1) Cell- and Developmental Biology Master 2 (Lecture and Seminar 2)	60 61
Microbiology (Lecture and Seminar)	63
Bioinformatics (Lecture and Seminar)	64



Immunology 1 (Lecture and Seminar)	65
Immunology 2 (Lecture and Seminar)	66
Virology 1 (Lecture and Seminar)	67
Virology 2 (Lecture and Seminar)	68
Human Genetics (Lecture and Seminar)	69
Methodologies of Quantitative Biology (Lecture) Developmental Physiology and Adaption of Plants (Lecture and Seminar)	70
Biophysics and Biochemistry	72 73
Response towards Biotic and Abiotic Factors	73 74
System Biology (Lecture and Seminar)	75
Bioinformatics (Practical Course and Seminar 1)	76
Bioinformatics (Practical Course and Seminar 2)	77
Immunology	78
Immunology 1 (Lecture and Seminar)	79
Immunology 2 (Lecture and Seminar)	80
Immunology (Practical Course and Seminar 1)	81
Immunology (Practical Course and Seminar 2)	82
Virology	83
Virology 1 (Lecture and Seminar)	84
Virology 2 (Lecture and Seminar)	85
Virology (Practical Course and Seminar 1)	86
Virology (Practical Course and Seminar 2)	87
Human Genetics	88
Molecular Biology (Lecture)	89
Cell- and Developmental Biology Master 1 (Lecture and Seminar 1)	91
Cell- and Developmental Biology Master 2 (Lecture and Seminar 2) Microbiology (Lecture and Seminar)	92
Immunology (Lecture and Seminar)	94 95
Immunology 2 (Lecture and Seminar)	95 96
Virology 1 (Lecture and Seminar)	97
Virology 2 (Lecture and Seminar)	98
Human Genetics (Lecture and Seminar)	99
Human Genetics (Practical Course and Seminar 1)	100
Human Genetics (Practical Course and Seminar 2)	101
Physiological Chemistry	102
Molecular Biology (Lecture)	103
Cell- and Developmental Biology Master 1 (Lecture and Seminar 1)	105
Cell- and Developmental Biology Master 2 (Lecture and Seminar 2)	106
Cell- and Developmental Biology Practical Course and Seminar 1	108
Physiological Chemistry (Practical Course and Seminar 2) Laboratory practical course 2	109 110
Focus 3	
	111
Molecular Cell- and Developmental Biology of Plants	112
Methodologies of Quantitative Biology (Lecture)	113
Developmental Physiology and Adaption of Plants (Lecture and Seminar) Molecular Biology of Plants (Practical Course and Seminar 1)	115
Specific Molecular-, Cell- and Developmental Biology of Plants (Practical Course and Seminar 1)	116 117
Biochemistry and Structural Biology	118
Methodologies of Quantitative Biology (Lecture)	
Biophysics and Biochemistry	119 121
Biochemistry and Structural Biology (Practical Course and Seminar 1)	121
Biochemistry and Structural Biology (Practical Course and Seminar 2)	123
Biophysics	124
Methodologies of Quantitative Biology (Lecture)	125
Biophysics and Biochemistry	127



Specific Molecular-, Cell- and Developmental Biology of Plants (Practical Course and Seminar 1)	128
Biophysics of Membraneproteins of Plants (Practical Course and Seminar 1)	129
Pharmaceutical Biology	130
Methodologies of Quantitative Biology (Lecture)	131
Response towards Biotic and Abiotic Factors	133
Pharmaceutical Biology (Practical Course and Seminar 1)	134
Pharmaceutical Biology (Practical Course and Seminar 2)	136
Ecology and Ecophysiology of Plants	137
Methodologies of Quantitative Biology (Lecture)	138
Developmental Physiology and Adaption of Plants (Lecture and Seminar)	140
Specific Ecology and Ecophysiology of Plants (Practical Course and Seminar 1)	141
Specific Ecology and Ecophysiology of Plants (Practical Course and Seminar 2)	142
Microbial and Chemical Ecology	143
Methodologies of Quantitative Biology (Lecture)	144
Response towards Biotic and Abiotic Factors	146
Microbial and Chemical Ecology (Practical Course and Seminar 1)	147
Microbial and Chemical Ecology (Practical Course and Seminar 2)	148
System Biology	149
Neurobiology, Behavior and Animal Ecology (Lecture)	150
Molecular and Clinical Neurobiology (Lecture and Seminar)	151
Animal Ecology and Tropical Biology (Lecture and Seminar)	152
Communication Biology (Lecture)	153
Molecular Biology (Lecture)	154
Cell- and Developmental Biology Master 1 (Lecture and Seminar 1)	156
Cell- and Developmental Biology Master 2 (Lecture and Seminar 2)	157
Microbiology (Lecture and Seminar)	159
Bioinformatics (Lecture and Seminar)	160
Immunology 1 (Lecture and Seminar)	161
Immunology 2 (Lecture and Seminar)	162
Virology 1 (Lecture and Seminar) Virology 2 (Lecture and Seminar)	163 164
Human Genetics (Lecture and Seminar)	165
Methodologies of Quantitative Biology (Lecture)	166
Developmental Physiology and Adaption of Plants (Lecture and Seminar)	168
Biophysics and Biochemistry	169
Response towards Biotic and Abiotic Factors	170
System Biology (Lecture and Seminar)	171
System Biology (Practical Course and Seminar 1)	172
System Biology (Practical Course and Seminar 2)	173
Non-focus Lab Course	174
Laboratory practical course 1	175
Laboratory practical course 2	176
Laboratory practical course 3	177
Practical Course as exchange student 1	178
Practical Course as exchange student 2	179
Practical Course as exchange student 3	180
Compulsory Electives 2	181
Presentation of Scientific Data	182
Good Practice, Biosafety and Nature Conservation	184
Epistemology, Biopsychology	186
Entrepreneurial Spirit in Biosciences	188
Specific Curricular Activities in Biological Sciences 1 Specific Curricular Activities in Biological Sciences 2	190
Specific Curricular Activities in Biological Sciences 2 Specific Curricular Activities in Biological Sciences 3	191 102
Specific Curricular Activities in Biological Sciences 4	192 193
Specific Carried in Protogram Sciences 4	193





Extracurricular Activities Outside of Natural Sciences 1	194
Extracurricular Activities Outside of Natural Sciences 2	
	195
Extracurricular Activities Outside of Natural Sciences 3	196
Extracurricular Activities Outside of Natural Sciences 4	197
Entrepreneurial Management in Biosciences	198
Scientific Teaching 1	200
Scientific Teaching 2	201
Scientific Teaching 3	202
Scientific Teaching 4	203
Supervising Tutorial Master 1	204
Supervising Tutorial Master 2	205
Supervising Tutorial Master 3	206



The subject is divided into

section / sub-section	ECTS credits	starting page
Thesis	30	9
Compulsory Electives	90	12
Compulsory Electives 1	75	13
Focus 1		14
Neurosciences	30	15
Animal Ecology and Tropical Biology	30	20
Behavioral Physiology and Sociobiology	30	27
Focus 2		32
Molecular Cell- and Developmental Biology	30	33
Microbiology	30	41
Cellular and Molecular Biotechnology	30	47
Bioinformatics	30	53
Immunology	30	78
Virology	30	83
Human Genetics	30	88
Physiological Chemistry	30	102
Focus 3		111
Molecular Cell- and Developmental Biology of Plants	30	112
Biochemistry and Structural Biology	30	118
Biophysics	30	124
Pharmaceutical Biology	30	130
Ecology and Ecophysiology of Plants	30	137
Microbial and Chemical Ecology	30	143
System Biology	30	149
Non-focus Lab Course		174
Compulsory Electives 2	15	181



Content and Objectives of the Programme

The study program requires the intensive theoretical and practical training in scientific topics in Biology and Life Sciences. The graduate is able to use appropriate methods to answer scientific questions and to conduct research projects.



Abbreviations used

Course types: $\mathbf{E} = \text{field trip}$, $\mathbf{K} = \text{colloquium}$, $\mathbf{O} = \text{conversatorium}$, $\mathbf{P} = \text{placement/lab course}$, $\mathbf{R} = \text{project}$, $\mathbf{S} = \text{seminar}$, $\mathbf{T} = \text{tutorial}$, $\ddot{\mathbf{U}} = \text{exercise}$, $\mathbf{V} = \text{lecture}$

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:

ASP02009

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

22-Jul-2010 (2010-37)

12-Jan-2011 (2011-5)

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.

Thesis

(30 ECTS credits)



Module title			Abbreviation		
Final Examination in Biology			07-MT-102-m01		
Module coordinator				Module offered by	
chairperson of examination committee Biologie (Biology)			ee Biologie (Biology)	Faculty of Biology	
ECTS	Metho	od of grading	Only after succ. cor	mpl. of module(s)	
30	nume	rical grade			
Duration Module level Other prerequisites					
1 seme	ster	graduate	By way of exception, additional prerequisites are listed in the section on assessments.		

Contents

Applying adequate techniques, students address a defined scientific question. They plan and perform experiments to solve problems or summarise and interpret existing data. Students have to develop a research plan and apply advanced and novel techniques in the context of a given research project, adhering to the principles of good scientific practice. The results are summarised in a written thesis and defended in a colloquium. The project is to be completed within a time frame of six months.

Intended learning outcomes

Students are able to independently carry out scientific experiments and to modify them according to the outcome. They are able to independently approach current scientific topics and to perform, interpret and document experiments, adhering to accepted rules of scientific practice. Students are able to discuss and defend their work in the scientific community, drawing on their knowledge of similar or related topics.

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

This module comprises 2 module components. Information on courses will be listed separately for each module component.

- o7-MT-1-102: no courses assigned
- 07-MK-1-102: no courses assigned

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

Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

Assessment in module component o7-MT-1-102: Thesis

- 25 ECTS, Method of grading: numerical grade
- written thesis
- · Language of assessment: German or English
- Other prerequisites: F2 lab course on topic of thesis

Assessment in module component o7-MK-1-102: Final Colloquium Biology

- 5 ECTS, Method of grading: numerical grade
- final colloquium (approx. 45 minutes)
- Only after successful completion of module components: 07-MT-1

Allocation of places

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Additional information

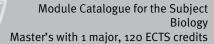
Additional information will be listed separately for each module component.

- o7-MT-1-102: Additional information on module duration: 6 months.
- 07-MK-1-102: --

Workload

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Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 10 / 206
	rog data record Master (400 ECTS) Biologic 2040	





Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)

Master's degree (1 major) Biology (2014)



Compulsory Electives

(90 ECTS credits)



Compulsory Electives 1

(75 ECTS credits)



Focus 1

(ECTS credits)

Neurosciences

(30 ECTS credits)



Module title Abbreviation					Abbreviation	
Neurobiology, Behavior and Animal Ecology (Lecture)				07-MS1-102-m01		
Modul	e coord	inator		Module offered by		
holder	of the (Chair of Neurobiology an	d Genetics	Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
10	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ester	graduate				
Conter	nts					
It will p	orovide	students with insights in	nto these fields, helpi	ng them select their	Physiology and Animal Ecology. F1 and F2 practical courses and anced modules of this focus.	
Intend	ed lear	ning outcomes				
		to know the advantages of the contract of the			g complex biological systems.	
Course	es (type, r	number of weekly contact hours,	language — if other than Ge	rman)		
V (no i	nformat	tion on SWS (weekly con	tact hours) and cours	e language availabl	e)	
		sessment (type, scope, langualle for bonus)	age — if other than German,	examination offered — if n	ot every semester, information on whether	
one of question	the foll ons) or	owing options will be ch	osen: a) written exam ne candidate each (30	ination (30 to 60 mi	ent prior to the course. Usually, inutes, including multiple choice or or al examination in groups of	
	tion of p					
Additio	onal inf	ormation				
Worklo	oad					
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
Master	r's degr	ee (1 major) Biology (201	11)			
Master	Master's degree (1 major) Biology (2010)					

Master's degree (1 major) Biology (2014)



Module title					Abbreviation
Molecular and Clinical Neurobiology (Lecture and Seminar)			07-MS1N-102-m01		
Module coordinator Module offered by			l .		
Prof. Dr. M. Sendtner Faculty of Biology		Faculty of Biology			
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)	
10	nume	rical grade			
Duratio	uration Module level Other prerequisites				
1 seme	ester	ster graduate			
Conter	Contents				

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

Intended learning outcomes

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

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

S + V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

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Additional information

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Workload

--

Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)

Master's degree (1 major) Biology (2014)

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 17 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



Module	Module title Abbreviation				
Neurob	Neurobiology (Practical Course and Seminar 1) 07-MS1NF1-102-m01				07-MS1NF1-102-m01
Module coordinator				Module offered by	L
holder	of the	Chair of Neurobiology and	l Genetics	Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	graduate			
Conten	ts				
addition histoch stems	on to a l nemistr are offe	iterature search, a variety y, molecular biological te	of neurobiological r chniques, clinical an	nethods (for exampl d neurogenetic tech	robiology or in neurogenetics. In e: electrophysiology, immuno- niques) and different model sy- in the form of a scientific talk, a
Intend	ed lear	ning outcomes			
knowle	edge an I, gener	d skills (e.g. basic and a	dvanced knowledge,	special knowledge,	biology. They have acquired the advanced methodological backal experiments according to best
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	rman)	
S + P (r	no infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)
		sessment (type, scope, langua ele for bonus)	ge — if other than German, (examination offered — if no	ot every semester, information on whether
followi or b) lo	ng opti g (app	ons will be chosen: a) wri rox. 10 to 30 pages) or c)	tten examination (3co	o to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Workload					
Teaching cycle					
					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					

Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Module title Abbreviation					Abbreviation	
Neurobiology (Practical Course and Seminar 2)					07-MS1NF2-102-m01	
Module coordinator				Module offered by	,	
holder	of the	Chair of Neurobiology and	d Genetics	Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. con	ıpl. of module(s)		
15	(not)	successfully completed				
Durati	on	Module level	Other prerequisites			
1 seme	ester	graduate				
Conte	nts					
gress of scienti	of the e ific talk	xperiments and the curre , a publication or a semin	nt line of research wi		ng to the research aim. The pro- nd presented in the form of a	
		ning outcomes	•		e field of neurobiology and to ad-	
fic met practio	thods) t		t, document and inte	rpret neurobiologica	background, general and speci- al experiments according to best	
		rmation on SWS (weekly			lablo)	
Metho	d of as	sessment (type, scope, langua	-		ot every semester, information on whether	
following or b) lo	Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)					
Alloca	tion of	places				
Additional information						
Workle	Workload					
Teachi	ing cycl	e				

Module appears in

Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)

 $\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$



Animal Ecology and Tropical Biology

(30 ECTS credits)



Module title Abbreviation					
Neurol	biology	, Behavior and Animal Ec	ology (Lecture)		07-MS1-102-m01
Modul	e coord	inator		Module offered by	L
holder	of the (Chair of Neurobiology and	d Genetics	Faculty of Biology	
ECTS	Metho	od of grading	Only after succ. con	pl. of module(s)	
10	nume	rical grade			
Durati	on	Module level	Other prerequisites		
1 seme	ester	graduate			
Conter	nts				
It will p	orovide	students with insights in	to these fields, helpi	ng them select their	Physiology and Animal Ecology. F1 and F2 practical courses and anced modules of this focus.
Intend	ed lear	ning outcomes			
	_	o know the advantages of relate and integrate differ		,	g complex biological systems.
Course	es (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)	
V (no i	nformat	tion on SWS (weekly cont	act hours) and cours	e language available	e)
		sessment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether
one of questi	the foll ons) or	owing options will be cho	osen: a) written exam ne candidate each (30	ination (30 to 60 mi	ent prior to the course. Usually, nutes, including multiple choice) oral examination in groups of
Alloca	tion of p	olaces			
Additio	onal inf	ormation	•		
			,		
Workle	oad				
Teachi	ing cycl	e			
Referr	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)	
Modul	e appea	ars in			

Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Modul	e title				Abbreviation
Anima	l Ecolog	gy and Tropical Biology (l	ecture and Seminar)		07-MS1TÖ-102-m01
Modul	e coord	inator		Module offered by	
holder	of the	Chair of Animal Ecology a	nd Tropical Biology	Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ester	graduate			
Conter	nts				
tions a	ind food e. In the	d nets, evolutionary ecolo	gy, chemical ecology	, tropical ecology, a	unctions, multi-trophic interacgricultural ecology, and global ed above will be presented and
Intend	ed lear	ning outcomes			
of anin	nal eco		interpret scientific pu		rrent research issues in the field y the acquired knowledge to the
Course	es (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)	
S + V (no info	mation on SWS (weekly o	contact hours) and co	urse language avail	able)
		sessment (type, scope, langua ole for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether
one of questi	the foll ons) or	owing options will be cho	osen: a) written exam e candidate each (30	ination (30 to 60 mi	ent prior to the course. Usually, nutes, including multiple choice) oral examination in groups of
Alloca	tion of	places			
Additio	onal inf	ormation			
Worklo	oad				
	1				
Teachi	ng cycl	e			
Referre	ed to in	LPO I (examination regulations	s for teaching-degree progra	mmes)	
Modul	e appea	ars in			
		ee (1 major) Biology (201:	1)		
NA 4		() D: 1 (`		

Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Module title					Abbreviation
Animal Ecology F1 (Practical Course and Seminar 1)					07-MS1TÖF1-102-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. o		Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 semester		graduate	Admission prerequisite to assessment: regular attendance of lab course and successful completion of the respective exercises as specified at beginning of the course.		

Contents

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

Intended learning outcomes

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

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

S + P (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 23 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)

Master's degree (1 major) Biology (2014)



Module	e title		Abbreviation		
Animal	Ecolog	gy and Tropical Biology F	nd Seminar 2)	07-MS1TÖF2-102-m01	
Module	e coord	inator		Module offered by	
holder	holder of the Chair of Animal Ecology and Tropical Biology			Faculty of Biology	
ECTS	Metho	Method of grading Only after succ. co		npl. of module(s)	
15	(not)	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 semester		graduate	Admission prerequisite to assessment: regular attendance of lab cours and successful completion of the respective exercises as specified at the beginning of the course.		

Contents

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

Intended learning outcomes

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

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

S + P (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 25 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



Master's degree (1 major) Biology (2014)



Behavioral Physiology and Sociobiology

(30 ECTS credits)



Modul	e title				Abbreviation
Neuro	biology	, Behavior and Animal E	cology (Lecture)		07-MS1-102-m01
Modul	e coord	inator		Module offered by	l.
holder	of the	Chair of Neurobiology a	nd Genetics	Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Durati	on	Module level	Other prerequisites		
1 seme	ester	graduate			
Conte	nts				
It will provid	orovide ing thei	students with insights i n with the fundamental	nto these fields, helpi	ng them select their	Physiology and Animal Ecology. F1 and F2 practical courses and anced modules of this focus.
		ning outcomes			
		o know the advantages relate and integrate diffe			g complex biological systems.
Course	es (type, r	number of weekly contact hours	, language — if other than Ge	rman)	
V (no i	nforma	tion on SWS (weekly co	ntact hours) and cours	e language availabl	e)
		sessment (type, scope, langule for bonus)	uage — if other than German,	examination offered — if n	ot every semester, information on whether
one of questi	the foll ons) or	owing options will be cl	nosen: a) written exam one candidate each (30	ination (30 to 60 mi	ent prior to the course. Usually, inutes, including multiple choice c) oral examination in groups of
Alloca	tion of	olaces			
Additi	onal inf	ormation			
Workle	oad				
Teachi	ing cycl	e			
Referr	ed to in	LPO I (examination regulation	ns for teaching-degree progra	ımmes)	
		_			
Modul	e appea	ars in			
		ee (1 major) Biology (20	11)		
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Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Module title					Abbreviation
Commu	ınicatio	on Biology (Lecture)			07-MS1K-102-m01
Module	coord	inator		Module offered by	
holder logy	of the (Chair of Behavioral Physi	ology and Sociobio-	Faculty of Biology	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	graduate			
Conten	ts				
semina the top	r sessi ic of th	on, students will deepen e lecture.			f animal signalling. In a follow-up ussing current papers related to
Intende	ed lear	ning outcomes			
logical sent ar Course	conditi Id disci S (type, r	ions, in order to gain a muss current scientific pub number of weekly contact hours, l	ore complete picture lications within a bro anguage — if other than Ger	of a topic. In additionader theoretical framman)	
		mation on SWS (weekly o			
		sessment (type, scope, langua _e le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether
following or b) lo aminat	ng opti g (appı ion in g	ons will be chosen: a) wr rox. 10 to 30 pages) or c) groups of up to 3 candida	itten examination (3c oral examination of c	to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral ex- entation (20 to 45 minutes)
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teachi	ng cycl	е			
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	mmes)	
Module					
Master	's degr	ee (1 major) Biology (201	1)		

Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Module title					Abbreviation
Behavio	oral Biolo	gy (Practical Cou	rse and Seminar 1)		07-MS1VF1-102-m01
Module	coordina	ator		Module offered by	
holder o	of the Ch	air of Behavioral P	hysiology and Sociobio-	Faculty of Biology	
logy			Г		
		of grading	Only after succ. con	npl. of module(s)	
	numeric				
Duration		lodule level	Other prerequisites		
1 semes	ster g	raduate			regular attendance of lab course respective exercises.
Content	s				
physiolo ly analys Chair fo	ogical, no sed, sum r availab	eurobiological and nmarised in a scie le topics and opp	I behavioural methods. The ntific report and presente	ne results obtained v	will gain an insight into the lates will be graphically and statistical ontact the research groups at the
		ig outcomes			
sociobio		addition, they are			eld of behavioural physiology and tained and to present them to a
Courses	(type, num	nber of weekly contact h	ours, language — if other than Ger	rman)	
S + P (no	o inform	ation on SWS (wee	ekly contact hours) and co	ourse language avail	able)
	of asses		anguage — if other than German,	examination offered — if no	ot every semester, information on whether
followin or b) log aminatio	ng option g (approx on in gro	s will be chosen: a a 10 to 30 pages) o ups of up to 3 can	a) written examination (3corc) oral examination of c	o to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral ex- entation (20 to 45 minutes)
Allocati	on of pla	ces			
Addition	nal infor	mation			
Workloa	ad				
Teachin	g cycle				

 $\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

Module appears in

Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



	Module title				Abbreviation	
Behav	rioral Bi	ology (Practical Course a	nd Seminar 2)		07-MS1VF2-102-m01	
Modu	le coord	linator		Module offered by		
holdei logy	r of the	Chair of Behavioral Physi	ology and Sociobio-	Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
15	(not)	successfully completed				
Durati	ion	Module level	Other prerequisites			
1 sem	ester	graduate			regular attendance of lab course respective exercises.	
Conte	nts					
series be gra tact th	and to phically ne resea	apply the latest physiolo	gical, neurobiologicaled, summarised in a s	l and behavioural m cientific report and	will learn to plan experimental ethods. The results obtained will presented in a talk. Please con-	
	-		u narfarm scientific a	va orimants in the fic	eld of behavioural physiology and	
sociob	oiology.		arned to interpret the	results obtained, ta	aking into account current litera-	
Cours	es (type,	number of weekly contact hours,	language — if other than Ger	rman)		
S + P ((no info	rmation on SWS (weekly	contact hours) and co	urse language avail	able)	
		sessment (type, scope, langua ole for bonus)	age — if other than German, o	examination offered — if n	ot every semester, information on whether	
follow or b) lo amina	ing opti og (app ition in s	ons will be chosen: a) wr rox. 10 to 30 pages) or c) groups of up to 3 candida	itten examination (3c oral examination of c	to 60 minutes, incl one candidate each	to the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)	
Allaga	LION OI	places	-			
Alloca						
	onal inf					
	onal inf	ormation				
 Additi 		ormation				
		ormation				
 Additi Workl	oad					
 Additi Workl						

Module appears in

Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)

Focus 2

(ECTS credits)



Molecular Cell- and Developmental Biology

(30 ECTS credits)



Module	e title				Abbreviation
Molecu	ılar Bio	logy (Lecture)			07-MS2-102-m01
Module coordinator				Module offered by	
Bioinfo	holder of the Chair of Microbiology, holder of the Chair of Bioinformatics, holder of the Chair of Cell Biology and De- velopmental Biology, Prof. Dr. M. Sauer			Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Duration Module level		Other prerequisites			
1 semester graduate					
Conten	ıts				

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

Intended learning outcomes

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

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

V (no information on SWS (weekly contact hours) and course language available)

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ module is creditable for bonus)

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

Additional information

Workload

Teaching cycle

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

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 34 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)

Master's degree (1 major) Biology (2014)



Module title					Abbreviation			
Cell- and Developmental Biology Master 1 (Lecture and Semi				ninar 1)	07-MS2ZE1-102-m01			
Module coordinator				Module offered by				
holder of the Chair of Cell Biology and Developmental Biology								
ECTS Method of grading		Only after succ. compl. of module(s)						
10	numerical grade							
Duratio	n Module leve	·l	Other prerequisites					
1 seme	ster graduate							
Contents								
und Perspektiven (Milestones and Perspectives of Cell Biology). The lecture describes pathological states of the cell and unravels their biological causes and consequences, such as infection, apoptosis, senescence, metabolic disorders and cancer. In the seminar Milestones and Perspectives of Cell Biology, classic ground-breaking publications in the field of cell biology are discussed from an unusual point of view.								
Intended learning outcomes								
Participants possess scientific background knowledge on cytopathology and are able to put this into the broader context of cell biology research.								
Courses (type, number of weekly contact hours, language — if other than German)								
S + V (no information on SWS (weekly contact hours) and course language available)								
	d of assessment (type screditable for bonus)	e, scope, langua	ge — if other than German,	examination offered	- if not every semester, information on whether			
Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)								
Allocat	ion of places							
Additio	nal information							
<u> </u>								
Workload								
[
Teaching cycle								
<u></u>								
Referred to in LPO I (examination regulations for teaching-degree programmes)								
	appears in							
Master	's degree (1 major) B	Biology (2011	Master's degree (1 major) Biology (2011)					

Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Module title					Abbreviation	
Cell- and Developmental Biology Master 2 (Lecture and Seminar 2)				minar 2)	07-MS2ZE2-102-m01	
Modul	e coord	inator		Module offered by		
holder logy	holder of the Chair of Cell Biology and Developme logy			Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
10	nume	rical grade				
Duration Module level		Other prerequisites				
1 semester graduate						
Conter	Contents					

&& The module comprises the lecture Signale und Differenzierung (Signals and Differentiation) and the seminar Entwicklungsbiologie-Meilensteine und Perspektiven (Milestones and Perspectives of Developmental Bioloqy). The lecture Signale und Differenzierung (Signals and Differentiation) is not designed to merely impart textbook knowledge to students. It will rather introduce students to particularly interesting and current topics in developmental biology. Topics covered in the lecture (subject to change): - Cooperation: Development and consequences of multicellularity. - Sex: More than just ? +? =. - On the move: Morphogenetic migration. - All-rounders?: Opportunities and limitations of stem cell research. - Growing new hearts?: Animals and their ability to regenerate. - Disasters: What do we actually know about metamorphoses? - Always the same?: Plasticity and epigenetics. - Metaorganisms: We are never alone. - Development in changing environments: Ecology and polyphenism. - Developmental biology of behaviour: Everything is learned. Or isn't it? - Evo-devo: A fad? No, been around for ages. In the seminar Entwicklungsbiologie-Meilensteine und Perspektiven (Developmental Biology - Milestones and Outlook), classical ground-breaking scientific articles in the field of developmental biology will be discussed from an unusual point of view.

Intended learning outcomes

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

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

S + V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

Additional information

Workload

Teaching cycle

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

Module appears in

Master's degree (1 major) Biology (2011)

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 37 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	





Module	e title	'			Abbreviation
Cell- ar	nd Deve	elopmental Biology Pract	ical Course and Sem	inar 1	07-MS2ZEF1-102-m01
Module	e coord	inator		Module offered by	
holder logy	holder of the Chair of Cell Biology and Developmentalogy			Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. con	mpl. of module(s)	
10	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 semester		graduate		pletion of the respec	regular attendance of lab course ctive exercises as specified at the
Conten	ts	ı	, 5		

This 5 week full-time practical course provides an introduction to modern cell and developmental biology-related methods with a focus on bio-imaging techniques. A broad variety of model organisms is covered and the participants are encouraged to independently design and perform their own experiments. Participants use their acquired technological skills to analyse important basic biological processes. In addition, the importance of cell and developmental biology for medicine and the economy is highlighted. During the fifth and final week of the course, students acquire sustained insights into current research activities of the Chair and, interacting with Master's students, doctoral researchers and post-docs, gain first-hand experience of research activities.

Intended learning outcomes

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

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

S + P (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 39 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



Modul	e title				Abbreviation	
Cell- a	Cell- and Developmental Biology Practical Course and Sem			inar 2	07-MS2ZEF2-102-m01	
Madul	Module coordinator			Madula affared by		
				Module offered by		
logy	· · · · · · · · · · · · · · · · · ·		Faculty of Biology			
ECTS	Meth	od of grading	Only after succ. compl. of module(s)			
15	(not)	successfully completed				
Duration Module level Other prerequisites						
1 seme	ester	graduate		pletion of the respec	regular attendance of lab course ctive exercises as specified at the	
Conter	nts					
text of luated	current on the	research projects in the basis of the results obtai	field of cell and deve ned and modified wh	lopmental biology. T nere necessary. The i	esigned experiments in the con- The techniques applied are eva- results of all experiments as well s report seminar within the team.	
Intend	ed lear	ning outcomes				
tal bio	logy an	d to modify them accordi	ng to the outcome. Th	ney are able to indep	e fields of cell and developmen- pendently approach current scien cepted rules of scientific practice	
Course	es (type, i	number of weekly contact hours, I	anguage — if other than Ger	man)		
S + P (no info	rmation on SWS (weekly o	contact hours) and co	urse language avail	able)	
		sessment (type, scope, langua ble for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
followi or b) lo	ing opti og (app	ons will be chosen: a) wr rox. 10 to 30 pages) or c)	itten examination (30 oral examination of c	o to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)	
	tion of			· · · · · ·		
Additio	onal inf	ormation				
Worklo	oad					
Teachi	ing cycl	e				
	<u> </u>					
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Modul	e appe	ars in				
		ee (1 major) Biology (201	1)			
Maste	r's degr	ee (1 major) Biology (201	o)			
Master	r's degr	ee (1 major) Biology (201	4)			



Microbiology

(30 ECTS credits)



Module title					Abbreviation
Molecular Biology (Lecture)					07-MS2-102-m01
Modul	e coord	inator		Module offered by	
holder of the Chair of Microbiology, holder of the Chair of Bioinformatics, holder of the Chair of Cell Biology and De- velopmental Biology, Prof. Dr. M. Sauer			Cell Biology and De-	Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Duration Module level		Other prerequisites			
1 semester graduate					
Conter	nts				

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

Intended learning outcomes

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

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

V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

Master's with 1 ma

najor Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 42 /
	reg. data record Master (120 ECTS) Biologie - 2010	



Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)



Module title					Abbreviation	
Microbiology (Lecture and Seminar)				07-MS2M-102-m01		
Module coordinator				Module offered by		
holder	of the (Chair of Microbiology		Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. com	ipl. of module(s)		
10	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	its		,			
al path	ogenici				adherence and invasion, bacterind pathogen interference, current	
Intende	ed learr	ning outcomes				
		are able to understand fu infectious diseases.	ndamental theories o	of molecular microbi	ology and infection biology,	
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
V + S (r	no infor	mation on SWS (weekly o	contact hours) and co	urse language avail	able)	
		eessment (type, scope, langua le for bonus)	ge $-$ if other than German, ϵ	examination offered — if no	ot every semester, information on whether	
one of questic	the follons) or	owing options will be cho	osen: a) written exam e candidate each (3c	ination (30 to 60 mi	nt prior to the course. Usually, nutes, including multiple choice) oral examination in groups of	
Allocat	ion of p	olaces				
Additio	nal info	ormation				
Worklo	ad					
Teaching cycle						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module	e appea	rs in				
Master	's degre	ee (1 major) Biology (2010	0)	-		



Modul	Module title				Abbreviation	
Microl	oiology	(Practical Course and So	eminar 1)		07-MS2MF1-102-m01	
Modul	e coord	inator		Module offered by	I.	
holder	of the (Chair of Microbiology		Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
10	nume	rical grade				
Durati	on	Module level	Other prerequisites			
1 seme	ester	graduate				
Conte	nts					
interac lecular ques.	ctions w r biolog Results	ith the host. Participant y, microbiology, cell bio will be documented and	s will employ a variety logy, and immunology	of state-of-the-art r as well as data ana	th microbial pathogens and their nethods within the fields of molyysis and literature search technipresentation.	
		ning outcomes				
					s in molecular biology and infections of good scientific practice.	
		number of weekly contact hours,			υ ο ο ο ο ο ο ο ο ο ο ο ο ο ο ο ο ο ο ο	
S + P (no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)	
		sessment (type, scope, langu	age — if other than German,	examination offered — if n	ot every semester, information on whether	
one of questi	the foll ons) or	owing options will be ch	osen: a) written exam ne candidate each (30	ination (30 to 60 m	ent prior to the course. Usually, inutes, including multiple choice c) oral examination in groups of	
Alloca	tion of p	olaces				
Additio	onal inf	ormation				
Workle	oad					
Teachi	ing cycl	e				
Referr	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Modul	e appea	ars in				
	_	ee (1 major) Biology (20:				
Macto	r'c doar	ee (1 major) Riology (20	(0)			

Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Module title		Abbreviation						
Microbiology (Practical Course and Seminar 2)			07-MS2MF2-102-m01					
Module coordinator		Module offered by						
holder of the Chair of Microbiology		Faculty of Biology						
ECTS Method of grading	Only after succ. con	ipl. of module(s)						
15 (not) successfully completed								
Duration Module level	Other prerequisites							
1 semester graduate		pletion of the respec	regular attendance of lab course ctive exercises as specified at the					
Contents								
Participants will independently work or gy. They will apply advanced experime ding to the project requirements. Prog paper or an oral presentation.	ental techniques in mi	crobiology, cell biol	ogy and molecular biology accor-					
Intended learning outcomes								
The participants will acquire the skills biology according to the standards of experimental results.								
Courses (type, number of weekly contact hours,	, language — if other than Ger	man)						
S + P (no information on SWS (weekly	contact hours) and co	urse language avail	able)					
Method of assessment (type, scope, langumodule is creditable for bonus)	uage — if other than German, o	examination offered — if no	ot every semester, information on whether					
Students will be informed about the lot following options will be chosen: a) worb) log (approx. 10 to 30 pages) or c) amination in groups of up to 3 candid	ritten examination (3c) oral examination of c	to 60 minutes, incl ne candidate each (uding multiple choice questions) (30 to 60 minutes) or d) oral ex-					
Allocation of places								
Additional information								
Workload								
Teaching cycle								
								
Referred to in LPO I (examination regulation	ns for teaching-degree progra	mmes)	Referred to in LPO I (examination regulations for teaching-degree programmes)					

Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Cellular and Molecular Biotechnology

(30 ECTS credits)



Module title					Abbreviation
Molecular Biology (Lecture)					07-MS2-102-m01
Modul	e coord	inator		Module offered by	
holder of the Chair of Microbiology, holder of the Chair of Bioinformatics, holder of the Chair of Cell Biology and De- velopmental Biology, Prof. Dr. M. Sauer			Cell Biology and De-	Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Duration Module level		Other prerequisites			
1 semester graduate					
Conter	nts				

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

Intended learning outcomes

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

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

V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 48 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)



Modul	Module title				Abbreviation	
Biophy	Biophysics and Molecular Biotechnology (Lecture and Seminar)				07-MS2BT-102-m01	
Modul	e coord	inator	Module offered by			
holder	of the	Chair of Biotechnology a	nd Biophysics	Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. cor	compl. of module(s)		
10	nume	rical grade				
Duratio	Duration Module level		Other prerequisites			
1 seme	1 semester graduate					
Conter	Contents					

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

Intended learning outcomes

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

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

V + S (no information on SWS (weekly contact hours) and course language available)

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ module is creditable for bonus)

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

Biochemistry Master's: 4 places. Places will be allocated by lot.

Additional information

Workload

Teaching cycle

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

Module appears in

Master's degree (1 major) Biochemistry (2012)

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)



Modul	Module title				Abbreviation
Biophy	Biophysics and Molecular Biotechnology (Practical Course and Seminar 1) 07-MS2BTF1-102-m01				
Modul	e coord	inator		Module offered by	Į.
holder	of the	Chair of Biotechnology ar	ıd Biophysics	Faculty of Biology	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Durati	on	Module level	Other prerequisites		
1 seme	ester	graduate			
Conter	nts				
and m	olecula uoresce	r biotechnology, nano an nce microscopy, fluoresc	d microsystems biote	echnology, biomater	n the following topics: cellular rials and biosensors, high-resolunanipulation of cells.
Intend	ed lear	ning outcomes			
chanis tools.	ms. Stu In the s	idents will have acquired	practical experience e acquired detailed t	performing experim heoretical knowledg	nemselves with - biophysical metents, using a variety of scientific ge on these experiments and will y performed.
Course	es (type, r	number of weekly contact hours, l	anguage — if other than Ge	rman)	
S + P (no infor	mation on SWS (weekly o	contact hours) and co	urse language avail	able)
		sessment (type, scope, langua ble for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether
followi or b) lo	ing opti og (app	ons will be chosen: a) wr rox. 10 to 30 pages) or c)	itten examination (30 oral examination of c	o to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)
Alloca	tion of _I	olaces			
Additio	onal inf	ormation			
Workload					
Teachi	Teaching cycle				
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)				
Modul	e appea	ars in			

Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Modul	e title		Abbreviation			
Biophysics and Molecular Biotechnology (Practical Course and Seminar 2)					07-MS2BTF2-102-m01	
Module coordinator Module offered b				Module offered by	-	
holder	of the	Chair of Biotechnology ar	nd Biophysics	Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
15	(not)	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 semester		graduate	Admission prerequisite to assessment: regular attendance of lab cours and successful completion of the respective exercises as specified at t beginning of the course.			
Conter	nte		, -			

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

Intended learning outcomes

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

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

S + P (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

Allocation of places

Additional information

Workload

Teaching cycle

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

Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 52 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



Bioinformatics

(30 ECTS credits)



Modul	Module title Abbreviation				
Neurobiology, Behavior and Animal Ecology (Lecture)					07-MS1-102-m01
Module coordinator				Module offered by	J.
holder	of the	Chair of Neurobiology a	nd Genetics	Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Durati	on	Module level	Other prerequisites		
1 seme	ester	graduate			
Conte	nts				
ا It will provid	provide ing the	students with insights m with the fundamental	into these fields, helpi	ng them select their	Physiology and Animal Ecology. F1 and F2 practical courses and ranced modules of this focus.
		ning outcomes			
		to know the advantages relate and integrate diff			g complex biological systems.
Course	es (type, i	number of weekly contact hours	s, language — if other than Ge	rman)	
V (no i	nforma	tion on SWS (weekly co	ntact hours) and cours	e language availabl	e)
		sessment (type, scope, lang	uage — if other than German,	examination offered — if n	ot every semester, information on whether
one of questi	the follons) or	owing options will be c	hosen: a) written exam one candidate each (30	ination (30 to 60 m	ent prior to the course. Usually, inutes, including multiple choice c) oral examination in groups of
Alloca	tion of	places			
Additio	onal inf	ormation			
Workle	Workload				
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Modul	e appe	ars in			
Maste	r's degr	ee (1 major) Biology (20	11)		

Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Module	e title		Abbreviation		
Molecu	ılar and	d Clinical Neurobiol	07-MS1N-102-m01		
Module	e coord	inator		Module offered by	
Prof. D	r. M. Se	endtner		Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)	
10	nume	rical grade			
Duratio	Duration Module level Other prereq		Other prerequisites	3	
1 seme	1 semester graduate				
Contents					

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

Intended learning outcomes

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

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

S + V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

--

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

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Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)



Module title					Abbreviation	
Animal Ecology and Tropical Biology (Lecture and Seminar)					07-MS1TÖ-102-m01	
Modul	Module coordinator			Module offered by		
holder	of the	Chair of Animal Ecology a	nd Tropical Biology	Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. com	ipl. of module(s)		
10	nume	rical grade				
Durati	on	Module level	Other prerequisites			
1 seme	ester	graduate				
Conte	nts					
curren tions a	t issues and food e. In the	s in animal ecology. Focus d nets, evolutionary ecolo	s will be on biodivers ogy, chemical ecology	ity and ecosystem fu , tropical ecology, a	of the theoretical foundations and inctions, multi-trophic interacgricultural ecology, and global ed above will be presented and	
Intend	led lear	ning outcomes				
of anir	nal eco		interpret scientific pu		rrent research issues in the field y the acquired knowledge to the	
Course	es (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)		
S + V (no info	mation on SWS (weekly o	contact hours) and co	urse language avail	able)	
		sessment (type, scope, langua ble for bonus)	ge $-$ if other than German, ϵ	examination offered — if no	ot every semester, information on whether	
one of questi	the foll ons) or	owing options will be cho	osen: a) written exam e candidate each (30	ination (30 to 60 mi	nt prior to the course. Usually, nutes, including multiple choice) oral examination in groups of	
Alloca	tion of _I	places				
Additi	onal inf	ormation				
Workload						
<u></u>						
Teachi	Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Modul	Module appears in					
Maste	Master's degree (1 major) Biology (2011)					

Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Module	e title			Abbreviation		
Communication Biology (Lecture)					07-MS1K-102-m01	
Module	e coord	inator		Module offered by		
holder logy	of the (Chair of Behavioral Physi	ology and Sociobio-	Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
10	nume	rical grade				
Duratio	on .	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	its					
semina the top	r sessi	on, students will deepen e lecture.			f animal signalling. In a follow-up ussing current papers related to	
		ning outcomes			plex issues in biology. They have	
learned logical	d to cor conditi	nnect findings from differ	ent research areas, s ore complete picture	uch as physiology, r of a topic. In additic	neurobiology, behaviour and eco- on, students have learned to pre-	
Course	S (type, r	number of weekly contact hours,	language — if other than Ge	rman)		
S + V (1	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	lable)	
		sessment (type, scope, langua ole for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether	
followi or b) lo	ng opti g (appı	ons will be chosen: a) wr rox. 10 to 30 pages) or c)	itten examination (30 oral examination of c	o to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)	
Allocat	ion of p	places				
Additio	nal inf	ormation				
Worklo	Workload					
Teaching cycle						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
			0 220.22 6100.0			
Module	e appea	ars in				

Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Module title					Abbreviation
Molecular Biology (Lecture)					07-MS2-102-m01
Module coordinator				Module offered by	
holder of the Chair of Microbiology, holder of the Chair of Bioinformatics, holder of the Chair of Cell Biology and De- velopmental Biology, Prof. Dr. M. Sauer			Cell Biology and De-	Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Duration Module level		Other prerequisites			
1 semester graduate					
Conter	nts				

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

Intended learning outcomes

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

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

V (no information on SWS (weekly contact hours) and course language available)

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ module is creditable for bonus)

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

Additional information

Workload

Teaching cycle

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

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 58 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)



Module	Module title				Abbreviation	
Cell- and Developmental Biology Master 1 (Lecture and Ser				ninar 1)	07-MS2ZE1-102-m01	
Module	e coord	inator		Module offer	ed by	
holder logy	of the (Chair of Cell Biology and	Developmental Bio-	Faculty of Bio	logy	
ECTS	Metho	od of grading	Only after succ. con	npl. of module	(s)	
10	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts		•			
cell and lic diso blicatio	d unrav orders a ons in t	els their biological cause nd cancer. In the semina he field of cell biology ar	es and consequences ar <i>Milestones and Per</i>	s, such as infectives of Ce	e describes pathological states of the ction, apoptosis, senescence, metabo- ell Biology, classic ground-breaking pu- of view.	
	-	ning outcomes				
		ossess scientific backgro biology research.	ound knowledge on c 	ytopathology a	and are able to put this into the broader	
Course	S (type, r	number of weekly contact hours,	language — if other than Ge	rman)		
S + V (r	no infor	mation on SWS (weekly	contact hours) and co	ourse language	e available)	
		sessment (type, scope, langua le for bonus)	age — if other than German,	examination offere	d-if not every semester, information on whether	
one of questic	the foll ons) or	owing options will be ch	osen: a) written exam ne candidate each (30	ination (30 to	essment prior to the course. Usually, 60 minutes, including multiple choice s) or c) oral examination in groups of	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module	Module appears in					
Master	Master's degree (1 major) Biology (2011)					
Mactar	Agetayla dagrag (4 majay) Dialogy (2010)					

Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Module title					Abbreviation
Cell- and Developmental Biology Master 2 (Lecture and Seminar 2)				07-MS2ZE2-102-m01	
Modul	e coord	inator		Module offered by	
holder logy	holder of the Chair of Cell Biology and Developmental Biology			Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Duration Module level		Other prerequisites			
1 semester graduate					
Conter	Contents				

&& The module comprises the lecture Signale und Differenzierung (Signals and Differentiation) and the seminar Entwicklungsbiologie-Meilensteine und Perspektiven (Milestones and Perspectives of Developmental Bioloqy). The lecture Signale und Differenzierung (Signals and Differentiation) is not designed to merely impart textbook knowledge to students. It will rather introduce students to particularly interesting and current topics in developmental biology. Topics covered in the lecture (subject to change): - Cooperation: Development and consequences of multicellularity. - Sex: More than just ? +? =. - On the move: Morphogenetic migration. - All-rounders?: Opportunities and limitations of stem cell research. - Growing new hearts?: Animals and their ability to regenerate. - Disasters: What do we actually know about metamorphoses? - Always the same?: Plasticity and epigenetics. - Metaorganisms: We are never alone. - Development in changing environments: Ecology and polyphenism. - Developmental biology of behaviour: Everything is learned. Or isn't it? - Evo-devo: A fad? No, been around for ages. In the seminar Entwicklungsbiologie-Meilensteine und Perspektiven (Developmental Biology - Milestones and Outlook), classical ground-breaking scientific articles in the field of developmental biology will be discussed from an unusual point of view.

Intended learning outcomes

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

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

S + V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

Additional information

Workload

Teaching cycle

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

Module appears in

Master's degree (1 major) Biology (2011)

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 61 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



Module title Abbreviation					Abbreviation
Microb	iology	(Lecture and Seminar)			07-MS2M-102-m01
Module coordinator Module offered				Module offered by	
holder	of the (Chair of Microbiology		Faculty of Biology	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	graduate			
Conten	its		-		
al path method	ogenic ds in in	ity factors, regulation of vection biology.			adherence and invasion, bacterind pathogen interference, current
Intend	ed lear	ning outcomes			
		are able to understand fu infectious diseases.	ındamental theories o	of molecular microbi	iology and infection biology,
Course	S (type, r	number of weekly contact hours,	language — if other than Ger	rman)	
V + S (1	no infor	rmation on SWS (weekly	contact hours) and co	urse language avail	lable)
		sessment (type, scope, langua ble for bonus)	age — if other than German, o	examination offered — if no	ot every semester, information on whether
one of question	the foll ons) or	owing options will be ch	osen: a) written exam ne candidate each (30	ination (30 to 60 mi	ent prior to the course. Usually, inutes, including multiple choice c) oral examination in groups of
Allocat	ion of p	places			
Additio	nal inf	ormation			
Worklo	ad				
Teaching cycle					
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)	
-					

Module appears in



Module title					Abbreviation
Bioinfo	Bioinformatics (Lecture and Seminar)				07-MS2BI-102-m01
Module coordinator Module offered to			Module offered by		
holder of the Chair of Bioinformatics Fac			Faculty of Biology		
ECTS	Method of grading Only after succ. co		Only after succ. con	npl. of module(s)	
10 numerical grade					
Duration Module level Other prerequisites					
1 semester graduate					
Contents					

Contents

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

Intended learning outcomes

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

 $\textbf{Courses} \ (\textbf{type, number of weekly contact hours, language} - \textbf{if other than German})$

S + V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Biochemistry (2012)

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)

Master's degree (1 major) Biology (2014)

Master's degree (1 major) Mathematics (2012)

Master's degree (1 major) Computational Mathematics (2012)



Modul	Module title				Abbreviation	
Immun	Immunology 1 (Lecture and Seminar)				07-MS2lM1-102-m01	
Modul	Module coordinator			Module offered by		
Manag biology	Managing Director of the Institute of Virology and Immuno- biology			Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
10	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate				
Conter	its					
www.v	irologie				ormation is available at http:// ka/immunologie/immunolo-	
Intend	ed learı	ning outcomes				
		gain knowledge about, a llular immunology.	nd will be able to pre	sent and discuss ba	sic concepts and methods in mo-	
Course	S (type, r	number of weekly contact hours,	language — if other than Ge	rman)		
S + V (ı	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)	
		sessment (type, scope, langua le for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether	
followi or b) lo	ng opti g (appı	ons will be chosen: a) wi ox. 10 to 30 pages) or c)	ritten examination (30 oral examination of c	to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teachi	ng cycl	 e				
Referre	ed to in	LPO I (examination regulation	ns for teaching-degree progra	mmes)		
			0 0 1 1 201			
Module	e appea	nrs in				
		ee (1 major) Biology (201	.1)			
	_	ee (1 major) Biology (201				
Mactar	Postor's dograp (a major) Piology (2011)					



Module	e title			Abbreviation			
Immun	ology 2 (Lecture and Seminar)		07-MS2IM2-102-m01				
Module coordinator			Module offered by	<u> </u>			
Manag biology	ing Director of the Institute of V	irology and Immuno-	Faculty of Biology				
ECTS	Method of grading	Only after succ. con	npl. of module(s)				
10	numerical grade						
Duratio	on Module level	Other prerequisites					
1 seme	ster graduate						
Conten	ts						
as auto	immunity and immunomodulat nune system, infection immuno	tion, development of		ected immunology chapters, such immunogenetics, evolution of			
	ed learning outcomes						
	ts are able to understand curre		•	ese in detail.			
	S (type, number of weekly contact hours,						
S + V (r	no information on SWS (weekly	contact hours) and co	ourse language avail	able)			
	d of assessment (type, scope, langua s creditable for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether			
followi or b) lo	ng options will be chosen: a) w	ritten examination (30 oral examination of c	o to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)			
Allocat	ion of places						
Additio	nal information						
Worklo	ad						
Teachi	ng cycle						
Referre	ed to in LPO I (examination regulation	ns for teaching-degree progra	ımmes)				
Module	e appears in						
	's degree (1 major) Biology (201	1)					
Master	's degree (1 major) Biology (201	.0)					
Master	Master's degree (1 major) Biology (2014)						



Module title					Abbreviation
Virolog	y 1 (Le	cture and Seminar)			07-MS2V1-102-m01
Module	e coord	inator		Module offered by	I.
Manag biology	Managing Director of the Institute of Virology and Immoiology			Faculty of Biology	
ECTS Method of grading Only after succ. compl. of module(s)					
10	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	graduate			
Conten	ts		,		
This co	urse of	fers an introduction to vi	rology and current re	search in the field of	virology.
Intended learning outcomes					
Students will have gained the ability to understand current issues in virology and to discuss these in depth.					
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	rman)	
S + V (r	no infor	mation on SWS (weekly o	contact hours) and co	urse language avail	able)
		sessment (type, scope, langua lle for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether
one of questic	the foll ons) or	owing options will be cho	osen: a) written exam e candidate each (30	ination (30 to 60 mi	ent prior to the course. Usually, nutes, including multiple choice) oral examination in groups of
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module	e appea	ars in			
	_	ee (1 major) Biology (201: ee (1 major) Biology (201:			
	_	ee (1 major) Biology (2014)			



Module title					Abbreviation		
Virolog	y 2 (Le	cture and Seminar)			07-MS2V2-102-m01		
Module	e coord	inator		Module offered by			
Manag biology	Managing Director of the Institute of Virology and Imm piology			Faculty of Biology			
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
10	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	graduate					
Conten	ts						
This co	urse of	fers an introduction to vi	rology and current re	search in the field of	virology.		
Intend	ed lear	ning outcomes					
Students will have gained the ability to understand current issues in virology and to discuss these in depth.							
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)			
S + V (r	no infor	mation on SWS (weekly o	contact hours) and co	urse language avail	able)		
Studen	creditab ts will the foll	be for bonus) be informed about the mowing options will be cho	ethod, length and scoosen: a) written exam	ope of the assessme ination (30 to 60 mi	nt prior to the course. Usually, nutes, including multiple choice) oral examination in groups of		
up to 3	candic	lates (approx. 30 to 60 m	inutes)				
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
Teachi	Teaching cycle						
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	mmes)			
Module	e appea	ars in					
	_	ee (1 major) Biology (201					
	_	ee (1 major) Biology (201					
waster	Master's degree (1 major) Biology (2014)						



Module	Module title Abbreviation					
Human	Genet	ics (Lecture and Semina		07-MS2HG-102-m01		
Module	Module coordinator			Module offered by		
Manag	ing Dire	ector of the Institute of H	uman Genetics	Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	ıpl. of module(s)		
10	10 numerical grade					
Duratio	on	Module level	Other prerequisites			
2 seme	ester	graduate				
Contents						
This mo	odule v	vill discuss current topics	s in human genetics.			
Intend	ed lear	ning outcomes				
Studen depth.		have gained the ability to	understand current	issues in human ger	netics and to discuss these in	
Courses (type, number of weekly contact hours, language — if other than German)						
S + V (r	no infor	mation on SWS (weekly	contact hours) and co	urse language avail	able)	
		sessment (type, scope, langua le for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether	
one of questic	the foll ons) or	owing options will be ch	osen: a) written exam ne candidate each (30	ination (30 to 60 mi	nt prior to the course. Usually, nutes, including multiple choice) oral examination in groups of	
Allocat	ion of p	olaces	-			
Additio	nal inf	ormation				
	_					
Worklo	ad					
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
	_	ee (1 major) Biology (201				
	_	ee (1 major) Biology (201	· ·			
Master	Master's degree (1 major) Biology (2014)					



Module title			Abbreviation			
Methodologies of Quantitative Biology (Lecture)			07-MS3-102-m01			
Module coordinator Module offered by					l .	
holder of the Chair of Plant Physiology and Biophysics			gy and Biophysics	Faculty of Biology		
ECTS	Method of grading Only after suc		Only after succ. co	mpl. of module(s)		
10	o numerical grade					
Duration Module level Other pro		Other prerequisite	es .			
1 seme	ester	graduate				
C 4	-4-		`			

Contents

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

Intended learning outcomes

The students are qualified to perform and organize their scientific laboratory work independently and document the obtained results. They are able to design a research project and are prepared to work on a scientific question for their thesis.

 $\textbf{Courses} \ (\text{type, number of weekly contact hours, language} - \text{if other than German})$

V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 70 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



Module appears in



Module title					Abbreviation	
Developmental Physiology and Adaption of Plants (Lecture and Seminar)					07-MS3PA-102-m01	
Module coordinator Module offered by					y	
holder	holder of the Chair of Pharmaceutical Biology			Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. co	Only after succ. compl. of module(s)		
10	nume	rical grade				
Duration Module level		Other prerequisite	Other prerequisites			
1 semester graduate						
Conten	Contents					

Section Developmental Physiology: The lecture will discuss the physiological processes occurring during ontogeny as well as the reaction of plants to various environmental parameters. It will focus on introducing students to the molecular components (ABA, auxin, ethylene etc.) of signalling networks and explaining their biosynthesis, regulation and functioning. Current journal articles on the topics will be presented and discussed in the seminar. Section Adaptation: The lecture will deal with the ecological and environmental constraints under which plants grow and develop (biogeography, biodiversity) and with the interactions of plants with abiotic and biotic environmental factors (e. g. plant-insect, plant-fungus interactions). The evolutionary adaptations on the physiological and organismic level will be emphasised in particular (stress and defence reactions, carnivory, plant protection). Based on selected examples from current research, the seminar will address the topics covered in the lecture in more detail. It will be complemented by topic-related guided tours in the Botanical Garden of the University of Würzburg.

Intended learning outcomes

Students are qualified to recognise ecological and physiological relations and are able to interpret and discuss these relations in the context of the current state of knowledge.

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

S + V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)



Modul	e title		Abbreviation				
Biophysics and Biochemistry					07-MS3BB-102-m01		
Module coordinator				Module offered by	l.		
holder of the Chair of Plant Physiology and Biophysics			and Biophysics	Faculty of Biology	Faculty of Biology		
ECTS	Meth	od of grading Only after succ. compl. of		npl. of module(s)			
10	nume	rical grade					
Duratio	on	Module level	Other prerequisites	3			
1 seme	ster	graduate					
Contents							
	The module imparts theoretical and methodological knowledge of plant membrane transport, structural biology and biochemistry which is illustrated with specific examples from current research. Depending on the number						

Intended learning outcomes

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

of participants and their interests, practical demonstrations of methods that are currently used give students an

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

S + V (no information on SWS (weekly contact hours) and course language available)

opportunity to experience the practical aspects of biophysical and biochemical research.

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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$\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

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Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)



Module title Abbreviation							
Response towards Biotic and Abiotic Factors					07-MS3BA-102-m01		
Module coordinator				Module offered by	J.		
holder	of the	Chair of Pharmaceutical	Biology	Faculty of Biology			
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)			
10	nume	rical grade					
Durati	on	Module level	Other prerequisites	,			
1 seme	ester	graduate					
Conte	nts						
leranc and si as a so	e. The lagnal tra	ecture and seminar will nsduction. They will als nutrients.	not only discuss these	e plant responses ar	to increased stress resistance/to- nd the mechanisms of perception ns and herbivores for using plants		
		ning outcomes					
		able to understand the i ppic in the context of the			nment on a molecular level and to		
Course	es (type, i	number of weekly contact hours	, language — if other than Ge	rman)			
S + V (no info	rmation on SWS (weekly	contact hours) and co	ourse language avai	lable)		
		sessment (type, scope, languole for bonus)	uage — if other than German,	examination offered — if n	ot every semester, information on whether		
one of questi	the follons) or	owing options will be cl	nosen: a) written exam one candidate each (30	nination (30 to 60 m	ent prior to the course. Usually, inutes, including multiple choice c) oral examination in groups of		
Alloca	tion of	places					
Additi	onal inf	ormation					
Workl	Workload						
Teachi	Teaching cycle						
Referr	Referred to in LPO I (examination regulations for teaching-degree programmes)						

Module appears in

Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Module	Module title Abbreviation						
System	n Biolo	gy (Lecture and Sem	inar)		07-MS3S-102-m01		
Module	e coord	linator		Module offered	d by		
holder	of the	Chair of Bioinformati	cs	Faculty of Biolo	ogy		
ECTS	Meth	od of grading	Only after succ. co	mpl. of module(s	s)		
10	nume	erical grade					
Duratio	on	Module level	Other prerequisites	5			
1 seme	ster	graduate					
Conten	ts	,	,				
sults fr	om fun				ed and discussed, this includes re- ism and metabolic networks as well		
Intend	ed lear	ning outcomes					
		•	ms biology. Discuss thei research questions of sys	•	ave an advanced (Master) level know		
Course	S (type,	number of weekly contact h	ours, language — if other than Ge	erman)			
S + V (r	no info	rmation on SWS (wee	ekly contact hours) and c	ourse language a	available)		
Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)							
Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice							

questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)

Master's degree (1 major) Biology (2014)

Master's degree (1 major) Mathematics (2012)

up to 3 candidates (approx. 30 to 60 minutes)

Master's degree (1 major) Computational Mathematics (2012)



Module	e title		Abbreviation				
Bioinfo	rmatic	s (Practical Course and S	07-MS2BIF1-102-m01				
Module coordinator Module offer							
holder	holder of the Chair of Bioinformatics			Faculty of Biology			
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
10	nume	rical grade					
Duratio	on	Module level	Other prerequisites				
1 seme	1 semester graduate						
Conten	Contents						

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

Intended learning outcomes

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

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

S + P (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)

Master's degree (1 major) Biology (2014)

Master's degree (1 major) Mathematics (2012)

Master's degree (1 major) Computational Mathematics (2012)



Module title					Abbreviation		
Bioinfo	ormatic	s (Practical Course and S	07-MS2BIF2-102-m01				
Module	e coord	linator		Module offered by			
holder	of the	Chair of Bioinformatics	Faculty of Biology				
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)			
15	(not)	successfully completed					
Duratio	on	Module level	Other prerequisites				
1 semester		graduate		pletion of the respec	regular attendance of lab course ctive exercises as specified at the		
Conter	Contents						

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

Intended learning outcomes

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

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

S + P (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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$\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

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Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)

Master's degree (1 major) Biology (2014)

Master's degree (1 major) Mathematics (2012)

Master's degree (1 major) Computational Mathematics (2012)



Immunology

(30 ECTS credits)



Module title					Abbreviation		
Immunology 1 (Lecture and Seminar)					07-MS2IM1-102-m01		
Module coordinator				Module offered by			
Manag biology	_	ector of the Institute of	Virology and Immuno-	Faculty of Biology			
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
10	nume	rical grade					
Duratio	on	Module level	Other prerequisites	i			
1 seme	ster	graduate					
Conter	ıts		•				
www.v	irologie				formation is available at http:// ika/immunologie/immunolo-		
Intend	ed lear	ning outcomes					
		gain knowledge about, Ilular immunology.	and will be able to pre	sent and discuss ba	asic concepts and methods in mo		
Course	S (type, r	number of weekly contact hour	s, language — if other than Ge	rman)			
S + V (ı	no infor	mation on SWS (weekl	y contact hours) and co	ourse language avai	lable)		
		sessment (type, scope, lang le for bonus)	guage — if other than German,	examination offered — if n	ot every semester, information on whether		
followi or b) lo	ng opti og (appi	ons will be chosen: a) vox. 10 to 30 pages) or	written examination (30 c) oral examination of 0	o to 60 minutes, inc one candidate each	to the course. Usually, one of the luding multiple choice questions) (30 to 60 minutes) or d) oral exsentation (20 to 45 minutes)		
	tion of p				, ,		
			,				
Additio	onal inf	ormation					
Worklo	ad						
			,				
Teachi	ng cycl	e					
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Module appears in							
		ee (1 major) Biology (20	011)				
	Naster's degree (1 major) Biology (2010)						
Mastar	Agetor's dogree (a major) Pielogy (2044)						



Module title					Abbreviation		
Immun	Immunology 2 (Lecture and Seminar)				07-MS2IM2-102-m01		
Modul	e coord	inator		Module offered by	l .		
Manag biolog	_	ector of the Institute of Vi	rology and Immuno-	Faculty of Biology			
ECTS	Meth	od of grading	Only after succ. com	ipl. of module(s)			
10	nume	rical grade					
Duration	on	Module level	Other prerequisites				
1 seme	ester	graduate					
Conter	ıts						
as auto	oimmur mune s		ion, development of t		ected immunology chapters, such immunogenetics, evolution of		
		able to understand currer	nt topics in immunolo	ony and to discuss th	acca in datail		
		number of weekly contact hours, l		<u> </u>	iese iii detait.		
	_	rmation on SWS (weekly o			ahle)		
Metho	d of ass	· · · · · · · · · · · · · · · · · · ·			ot every semester, information on whether		
followi or b) lo	ng opti og (app	ons will be chosen: a) wr rox. 10 to 30 pages) or c)	itten examination (3c oral examination of o	o to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)		
Alloca	tion of	places					
Additio	onal inf	ormation					
Worklo	oad						
Teachi	ng cycl	e					
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)						
Modul	Module appears in						
Master	Master's degree (1 major) Biology (2011)						
	_	ee (1 major) Biology (201					
Mastei	Master's degree (1 major) Biology (2014)						



Module title					Abbreviation	
Immunology (Practical Course and Seminar 1)					07-MS2IMF1-102-m01	
Module	Module coordinator			Module offered by	L	
Manag biology	_	ector of the Institute of Vi	rology and Immuno-	Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
10	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	its					
lect a la infection course	aborato on imm and lal	ory at the Institute or one unology and others) and b project will be docume	of the participating in will spend three wee	nstitutions (e. g. clin ks working on a defi	ogy. Afterwards, students will seics, Virchow Center, molecular ned project. Results of the labend of the course.	
	-	ning outcomes				
		learn to apply experimen stions and to appropriate	•		ogy, to independently address	
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)		
S + P (r	no infor	mation on SWS (weekly o	contact hours) and co	urse language avail	able)	
Metho	d of ass	sessment (type, scope, langua	${\sf ge-if}$ other than German, ${\sf or}$	examination offered — if no	ot every semester, information on whether	
		le for bonus)				
followi or b) lo	ng opti g (appı	ons will be chosen: a) wr rox. 10 to 30 pages) or c)	itten examination (3c oral examination of c	to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teaching cycle						
						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
						
Module appears in						
	Master's degree (1 major) Biology (2011)					
Master	Master's degree (1 major) Biology (2010)					



Module title					Abbreviation		
Immun	ology (Practical Course and Ser	ninar 2)		07-MS2IMF2-102-m01		
Module coordinator Module offered by							
Manag biology	_	ector of the Institute of Vi	rology and Immuno-	Faculty of Biology			
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
15	(not)	successfully completed					
Duratio	on	Module level	Other prerequisites				
1 seme	ster	graduate		pletion of the respec	regular attendance of lab course ctive exercises as specified at the		
Conten	its		•				
investi	gate cu		ology. They will be in	volved in the develo	participants will independently pment of a research plan and will blogy.		
Intend	ed lear	ning outcomes					
nology and int	. This ir	ncludes competence to a their research according	ddress immunologica to good research prac	al problems on their ctice.	of cellular and molecular immuown and to conduct, document		
		number of weekly contact hours, I					
	_	mation on SWS (weekly o					
		sessment (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether		
followi or b) lo	ng opti og (appi	ons will be chosen: a) wr ox. 10 to 30 pages) or c)	itten examination (3c oral examination of c	o to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) 30 to 60 minutes) or d) oral exentation (20 to 45 minutes)		
	ion of		,	·			
Additio	onal inf	ormation					
Worklo	ad						
Teaching cycle							
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module	Module appears in						
	Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010)						



Virology

(30 ECTS credits)



Module title					Abbreviation		
Virolog	y 1 (Le	cture and Seminar)			07-MS2V1-102-m01		
Module coordinator		Module offered by	,				
Managing Director of the Institute of Virology and Immuno- biology		Faculty of Biology					
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)			
10	nume	erical grade					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	graduate					
Conten	ts						
This co	urse o	ffers an introduction to v	irology and current re	search in the field of	virology.		
Intende	ed lear	ning outcomes					
Studen	ts will	have gained the ability to	o understand current	issues in virology an	d to discuss these in depth.		
Course	S (type,	number of weekly contact hours,	language — if other than Ge	man)			
S + V (r	no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)		
Studen one of questic	credital its will the fol ons) or	ole for bonus) be informed about the m lowing options will be ch	nethod, length and sc osen: a) written exam ne candidate each (30	ope of the assessme ination (30 to 60 mi	ent prior to the course. Usually, nutes, including multiple choice oral examination in groups of		
Allocat							
		P.C.	_				
Additio	nal inf						
Worklo	ad		_				
Teachi	ng cyc	le					
	<u> </u>						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in							
Master Master	Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)						



Module title					Abbreviation	
Virolog	Virology 2 (Lecture and Seminar)				07-MS2V2-102-m01	
Module coordinator M		Module offered by				
Managing Director of the Institute of Virology and Immuno- biology		Faculty of Biology				
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
10	nume	erical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts	,				
This co	urse o	ffers an introduction to v	irology and current re	search in the field of	virology.	
Intend	ed lear	ning outcomes				
Studen	ts will	have gained the ability to	o understand current	issues in virology an	d to discuss these in depth.	
Course	S (type,	number of weekly contact hours,	language — if other than Ge	man)	<u> </u>	
S + V (r	no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)	
Studen one of questic	credital its will the fol ons) or	ole for bonus) be informed about the m lowing options will be ch	nethod, length and scoosen: a) written exam ne candidate each (30	ope of the assessme ination (30 to 60 mi	nt prior to the course. Usually, nutes, including multiple choice oral examination in groups of	
Allocat						
		P.C.	_			
Additio	nal inf					
Worklo	ad					
Teachi	ng cyc	le				
	<u> </u>					
Referre	d to in	LPO I (examination regulation	ns for teaching-degree progra	ımmes)		
Module appears in						
Master Master	Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)					



Module title					Abbreviation		
Virology (Practical Course and Seminar 1)					07-MS2VF1-102-m01		
Module coordinator				Module offered by	l .		
Managi biology	_	ector of the Institute of Vi	rology and Immuno-	Faculty of Biology			
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
10	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 semes	ster	graduate					
Conten	ts						
Current	resear	rch topics in virology - on	e topic will be discus	sed in depth.			
Intende	ed lear	ning outcomes					
		able to perform small rese tice, work independently			familiar with the rules of good neir results.		
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	rman)			
S + P (n	o infor	mation on SWS (weekly o	contact hours) and co	ourse language avail	able)		
		Sessment (type, scope, langua	ge — if other than German,	examination offered — if no	ot every semester, information on whether		
followir or b) lo	ng opti g (appı	ons will be chosen: a) wr rox. 10 to 30 pages) or c)	itten examination (3c oral examination of c	o to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)		
Allocati	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
Teachir	ng cycl	e					
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in							
Master'	Master's degree (1 major) Biology (2011)						
	U	ee (1 major) Biology (201	•				
Master'	Master's degree (1 major) Biology (2014)						



Modul	e title	_			Abbreviation	
Virolog	gy (Pra	ctical Course and Semina	r 2)		07-MS2VF2-102-m01	
Modul	e coord	linator		Module offered by		
Manag biolog	_	ector of the Institute of Vi	rology and Immuno-	Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
15	(not)	successfully completed				
Durati	on	Module level	Other prerequisites			
1 seme	ester	graduate		pletion of the respe	regular attendance of lab course ctive exercises as specified at the	
Conte	nts	,	•			
Curren	t resea	rch topics in virology - on	e topic will be discus	sed in depth.		
Intend	ed lear	ning outcomes				
		able to perform small resectice, work independently	, ,	· ,	familiar with the rules of good heir results.	
Course	es (type,	number of weekly contact hours, l	anguage — if other than Ge	man)		
S + P (no info	rmation on SWS (weekly o	contact hours) and co	ourse language avail	able)	
		sessment (type, scope, langua	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
followi or b) lo	ing opti og (app	ions will be chosen: a) wr rox. 10 to 30 pages) or c)	itten examination (30 oral examination of c	to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral ex- entation (20 to 45 minutes)	
Alloca	tion of	places				
Additio	onal inf	formation				
Workle	oad					
	<u> </u>					
Teachi	Teaching cycle					
						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in						
	Master's degree (1 major) Biology (2011)					
	Master's degree (1 major) Biology (2010)					
Maste	Master's degree (1 major) Biology (2014)					



Human Genetics

(30 ECTS credits)



Module title					Abbreviation	
Molecular Biology (Lecture)					07-MS2-102-m01	
Module coordinator				Module offered by	l.	
holder of the Chair of Microbiology, holder of the Chair of Bioinformatics, holder of the Chair of Cell Biology and De- velopmental Biology, Prof. Dr. M. Sauer			Cell Biology and De-	Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
10	nume	rical grade				
Duration Module level		Other prerequisites				
1 seme	1 semester graduate					
Contents						

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

Intended learning outcomes

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

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

V (no information on SWS (weekly contact hours) and course language available)

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ module is creditable for bonus)

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

Additional information

Workload

Teaching cycle

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

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 89 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



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Modu	le a	nnea	rc ın
mouu	ıc u	ppcu	

Master's degree (1 major) Biology (2010)



Module	e title				Abbreviation
Cell- and Developmental Biology Master 1 (Lecture and Ser				ninar 1)	07-MS2ZE1-102-m01
Module	Module coordinator			Module offered b	y
holder logy	of the (Chair of Cell Biology and	Developmental Bio-	Faculty of Biology	,
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	graduate			
Conten	ts				
cell and	d unrav orders a	els their biological caus	es and consequences ar <i>Milestones and Per</i>	s, such as infection spectives of Cell Bi	scribes pathological states of the , apoptosis, senescence, metabo- ology, classic ground-breaking pu- ew.
Intende	ed lear	ning outcomes			
		ossess scientific backgr biology research.	ound knowledge on c	ytopathology and a	are able to put this into the broader
Course	S (type, r	number of weekly contact hours,	language — if other than Ge	rman)	
S + V (r	no info	rmation on SWS (weekly	contact hours) and co	ourse language ava	ilable)
		sessment (type, scope, langu ole for bonus)	age — if other than German,	examination offered — if	not every semester, information on whether
one of questic	the foll ons) or	owing options will be ch	osen: a) written exam ne candidate each (30	ination (30 to 60 n	nent prior to the course. Usually, ninutes, including multiple choice c) oral examination in groups of
Allocat	ion of p	places			
Additio	nal inf	ormation			
Workload					
Teaching cycle					
					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
Master	Master's degree (1 major) Biology (2011)				

Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Module title					Abbreviation
Cell- and Developmental Biology Master 2 (Lecture and Seminar 2)				07-MS2ZE2-102-m01	
Modul	e coord	inator		Module offered by	
holder logy	holder of the Chair of Cell Biology and Developmental Biology			Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Duration Module level Other		Other prerequisites			
1 semester graduate					
Contents					

&& The module comprises the lecture Signale und Differenzierung (Signals and Differentiation) and the seminar Entwicklungsbiologie-Meilensteine und Perspektiven (Milestones and Perspectives of Developmental Biology). The lecture Signale und Differenzierung (Signals and Differentiation) is not designed to merely impart textbook knowledge to students. It will rather introduce students to particularly interesting and current topics in developmental biology. Topics covered in the lecture (subject to change): - Cooperation: Development and consequences of multicellularity. - Sex: More than just ? + ? = . - On the move: Morphogenetic migration. - All-rounders?: Opportunities and limitations of stem cell research. - Growing new hearts?: Animals and their ability to regenerate. - Disasters: What do we actually know about metamorphoses? - Always the same?: Plasticity and epigenetics. - Metaorganisms: We are never alone. - Development in changing environments: Ecology and polyphenism. - Developmental biology of behaviour: Everything is learned. Or isn't it? - Evo-devo: A fad? No, been around

cussed from an unusual point of view.

Intended learning outcomes

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

for ages. In the seminar Entwicklungsbiologie-Meilensteine und Perspektiven (Developmental Biology - Milestones and Outlook), classical ground-breaking scientific articles in the field of developmental biology will be dis-

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

S + V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

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Additional information

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Workload

--

Teaching cycle

--

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

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Module appears in

Master's degree (1 major) Biology (2011)

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 92 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



Module title Abbreviation					Abbreviation	
Microb	Microbiology (Lecture and Seminar) 07-MS2M-102-m01					
Modul	Module coordinator Modu				Į.	
holder	of the	Chair of Microbiology		Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
10	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ester	graduate				
Conter	nts					
al path	ogenic				adherence and invasion, bacteri- nd pathogen interference, current	
Intend	ed lear	ning outcomes				
		are able to understand fu infectious diseases.	undamental theories (of molecular microbi	iology and infection biology,	
Course	S (type, i	number of weekly contact hours,	language — if other than Ger	man)		
V + S (no info	rmation on SWS (weekly	contact hours) and co	urse language avail	able)	
		sessment (type, scope, langua ole for bonus)	age — if other than German, o	examination offered — if no	ot every semester, information on whether	
one of question	the foll ons) or	lowing options will be ch	osen: a) written exam ne candidate each (30	ination (30 to 60 mi	ent prior to the course. Usually, inutes, including multiple choice oral examination in groups of	
Allocat	tion of	places				
Additio	onal inf	ormation	,			
Workload						
	_		-			
Teachi	Teaching cycle					
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		

Module appears in



Modul	e title				Abbreviation	
Immunology 1 (Lecture and Seminar)					07-MS2IM1-102-m01	
Modul	e coord	inator		Module offered by	•	
Manag biology	_	ector of the Institute of V	irology and Immuno-	Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
10	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate				
Conter	its					
www.v	irologie				ormation is available at http:// ka/immunologie/immunolo-	
Intend	ed learı	ning outcomes				
		gain knowledge about, a llular immunology.	nd will be able to pre	sent and discuss ba	sic concepts and methods in mo-	
Course	S (type, r	number of weekly contact hours,	language — if other than Ge	rman)		
S + V (ı	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)	
		sessment (type, scope, langua le for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether	
followi or b) lo	ng opti g (appı	ons will be chosen: a) wo rox. 10 to 30 pages) or c)	ritten examination (30 oral examination of c	to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral ex- entation (20 to 45 minutes)	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
-						
Module appears in						
		ee (1 major) Biology (201	1)			
Master	's degr	ee (1 major) Biology (201	.0)			
Mactor	Master's degree (4 major) Piology (2047)					



Module title Abbreviation					Abbreviation		
Immun	Immunology 2 (Lecture and Seminar) 07-MS2IM2-102-m01						
Module	e coord	inator		Module offered by	l .		
Manag biology	_	ector of the Institute of Vi	rology and Immuno-	Faculty of Biology			
ECTS	Metho	od of grading	Only after succ. con	ipl. of module(s)			
10	nume	rical grade					
Duratio	on	Module level	Other prerequisites				
1 seme	ster	graduate	-				
Conten	ıts						
as auto	oimmur mune s	nity and immunomodulat ystem, infection immuno	ion, development of t		ected immunology chapters, such immunogenetics, evolution of		
		ning outcomes		1. 11			
_		able to understand currer	•		iese in detail.		
	-	number of weekly contact hours, l			112		
		mation on SWS (weekly o					
		Gessment (type, scope, langua le for bonus)	ge — if other than German, (examination offered — if no	ot every semester, information on whether		
followi or b) lo	ng opti og (appi	ons will be chosen: a) wr ox. 10 to 30 pages) or c)	itten examination (3c oral examination of c	to 60 minutes, incl ne candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)		
Allocat	tion of p	olaces		·	···		
	-						
Additio	onal inf	ormation					
Worklo	ad						
Teachi	ng cycl	e					
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in							
Master	's degr	ee (1 major) Biology (201	1)				
	_	ee (1 major) Biology (2010					
Master	Master's degree (1 major) Biology (2014)						



Module title					Abbreviation	
Virolog	y 1 (Le	cture and Seminar)			07-MS2V1-102-m01	
Module	Module coordinator			Module offered by	·	
Manag	_	ector of the Institute o	f Virology and Immuno-	Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
10	nume	rical grade				
Duratio	n	Module level	Other prerequisites	i		
1 seme	ster	graduate				
Conten	ts					
This co	urse o	ffers an introduction to	o virology and current re	search in the field of	virology.	
Intende	ed lear	ning outcomes				
Studen	ts will	have gained the abilit	y to understand current	issues in virology an	d to discuss these in depth.	
Course	S (type,	number of weekly contact ho	urs, language — if other than Ge	rman)		
S + V (r	no info	rmation on SWS (weel	kly contact hours) and co	ourse language avail	able)	
module is	s credital	ole for bonus)			nt prior to the course. Usually,	
one of	the fol ons) or	lowing options will be	chosen: a) written exam f one candidate each (30	ination (30 to 60 mi	nutes, including multiple choice) oral examination in groups of	
Allocat	-		<u> </u>			
Additio	nal inf	ormation				
Worklo	ad					
			,			
Teachi	ng cycl	le	,			
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module	Module appears in					
Master	's degr	ree (1 major) Biology (2 ree (1 major) Biology (2				
	_	ee (1 major) Biology (2 ee (1 major) Biology (2				



Module title					Abbreviation		
Virolog	gy 2 (Le	ecture and Seminar)			07-MS2V2-102-m01		
Module	Module coordinator			Module offered by	L		
Manag biology	_	ector of the Institute	of Virology and Immuno-	Faculty of Biology			
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)			
10	nume	rical grade					
Duratio	on	Module level	Other prerequisites	i			
1 seme	ster	graduate					
Conten	its						
This co	urse o	ffers an introduction	to virology and current re	search in the field of	virology.		
Intend	ed lear	ning outcomes					
Studer	nts will	have gained the abili	ty to understand current	issues in virology an	d to discuss these in depth.		
Course	S (type,	number of weekly contact ho	ours, language — if other than Ge	rman)			
S + V (1	no info	rmation on SWS (wee	kly contact hours) and co	ourse language avail	able)		
Studer one of questic	s credital nts will the fol ons) or	ble for bonus) be informed about the lowing options will be	e method, length and sc e chosen: a) written exam of one candidate each (30	ope of the assessme lination (30 to 60 mi	ent prior to the course. Usually, nutes, including multiple choice) oral examination in groups of		
Allocat	-		<u> </u>				
		-					
Additio	nal in	formation					
Worklo	ad						
	-						
Teachi	Teaching cycle						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in							
Master	's degi	ree (1 major) Biology (
	_	ree (1 major) Biology (· · · · · · · · · · · · · · · · · · ·				
เพลรเยโ	Master's degree (1 major) Biology (2014)						



Modul	e title	 		Abbreviation			
Humai	n Genet	ics (Lecture and Seminar		07-MS2HG-102-m01			
Modul	Module coordinator			Module offered by			
Manag	ging Dire	ector of the Institute of Hu	ıman Genetics	Faculty of Biology			
ECTS	Metho	od of grading	Only after succ. con	pl. of module(s)			
10	nume	rical grade					
Durati	on	Module level	Other prerequisites				
2 sem	ester	graduate					
Conte	nts						
This m	odule v	vill discuss current topics	in human genetics.				
Intend	ed lear	ning outcomes					
Stude depth.		have gained the ability to	understand current	issues in human ger	netics and to discuss these in		
Course	es (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)			
S + V (no infor	mation on SWS (weekly o	contact hours) and co	urse language avail	able)		
		sessment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether		
one of questi	the foll ons) or	owing options will be cho	osen: a) written exam e candidate each (30	ination (30 to 60 mi	ent prior to the course. Usually, nutes, including multiple choice) oral examination in groups of		
Alloca	tion of p	olaces					
Additi	onal inf	ormation					
Workle	oad						
Teachi	ing cycl	e					
Referr	Referred to in LPO I (examination regulations for teaching-degree programmes)						
Modul	Module appears in						
	Master's degree (1 major) Biology (2011)						
	_	ee (1 major) Biology (2010					
Maste	Master's degree (1 major) Biology (2014)						



Modul	e title				Abbreviation	
Human Genetics (Practical Course and Seminar 1) 07-MS2HGF1-102-mg					07-MS2HGF1-102-m01	
Module coordinator				Module offered by		
Manag	ging Dire	ector of the Institute of H	uman Genetics	Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
10	nume	rical grade				
Durati	on	Module level	Other prerequisites			
1 seme	ester	graduate				
Conte	nts					
tific lal learn t questi	b project o apply ons and	t and learn how to prese experimental procedure I to document their expe	ent their data. They le s and methods of hu	arn to discuss their of man genetics, to ind	ing on a small, well-defined scien data in a seminar. The students ependently address scientific	
		ning outcomes				
		able to independently in esults, adhering to the p			ell as to document, interpret and	
		number of weekly contact hours,		· · · · · · · · · · · · · · · · · · ·		
		mation on SWS (weekly			labla)	
	-	· · · · · · · · · · · · · · · · · · ·				
		le for bonus)	age — II other than German,	examination onered — ii ii	ot every semester, information on whether	
followi or b) lo	ing opti og (appi	ons will be chosen: a) w ox. 10 to 30 pages) or c)	ritten examination (30 oral examination of 0	o to 60 minutes, incl one candidate each	to the course. Usually, one of the luding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)	
Alloca	tion of p	olaces				
Additio	onal inf	ormation				
Worklo	oad					
Teachi	ing cycl	e				
Referre	ed to in	LPO I (examination regulation	ns for teaching-degree progra	ammes)		
Modul	e appea	nrs in				
		ee (1 major) Biology (201	.1)			
	Master's degree (1 major) Biology (2010)					
AA +	Acetayla dagga (4 majay) Dialogy (0044)					



Module title Abbreviation					Abbreviation	
Human	Genet	ics (Practical Course and	Seminar 2)		07-MS2HGF2-102-m01	
Module coordinator				Module offered by		
Manag	ing Dir	ector of the Institute of H	uman Genetics	Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
15	(not)	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ester	graduate		pletion of the respe	regular attendance of lab course ective exercises as specified at the	
Conter	ıts	,	•			
search vanced of 12 w	papers d techni veeks (t	s. The participants will be iques to answer a scientinhree months).	involved in the deve	lopment of a resear	reading and presenting original re ich plan and will learn to apply ad ctical course will have a duration	
Intend	ed lear	ning outcomes				
		able to independently invresults, adhering to the p			ell as to document, interpret and	
Course	es (type, i	number of weekly contact hours, I	anguage — if other than Ge	rman)		
S + P (1	no info	rmation on SWS (weekly o	contact hours) and co	ourse language avai	lable)	
		sessment (type, scope, langua	ge — if other than German,	examination offered — if n	ot every semester, information on whether	
followi or b) lo	ng opti og (app	ons will be chosen: a) wr rox. 10 to 30 pages) or c)	itten examination (30 oral examination of c	o to 60 minutes, inc one candidate each	to the course. Usually, one of the luding multiple choice questions) (30 to 60 minutes) or d) oral exertation (20 to 45 minutes)	
Allocat	tion of	places				
Additio	onal inf	ormation				
Worklo	oad					
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		
Modul	e appea	ars in				
Master	Master's degree (1 major) Biology (2011)					
11	Notate downs (a mais) Dislow (ass)					

Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Physiological Chemistry

(30 ECTS credits)



Module title					Abbreviation	
Molecular Biology (Lecture)					07-MS2-102-m01	
Modul	e coord	inator		Module offered by		
holder of the Chair of Microbiology, holder of the Ch Bioinformatics, holder of the Chair of Cell Biology a velopmental Biology, Prof. Dr. M. Sauer			Cell Biology and De-	Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)		
10	nume	rical grade				
Duration Module level C		Other prerequisites	}			
1 semester graduate						
Conter	nts					

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

Intended learning outcomes

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

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

V (no information on SWS (weekly contact hours) and course language available)

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ module is creditable for bonus)

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

Additional information

Workload

Teaching cycle

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

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 103 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)



Module	title				Abbreviation
Cell- and Developmental Biology Master 1 (Lecture and Se				ninar 1)	07-MS2ZE1-102-m01
Module coordinator				Module offer	ed by
holder logy	of the (Chair of Cell Biology and	Developmental Bio-	Faculty of Bio	logy
ECTS	Metho	od of grading	Only after succ. con	npl. of module	(s)
10	nume	rical grade			
Duratio	n	Module level	Other prerequisites	i	
1 seme	ster	graduate			
Conten	ts		•		
cell and lic diso blicatio	d unrav rders a ons in t	els their biological cause nd cancer. In the semina he field of cell biology ar	es and consequences or <i>Milestones and Per</i>	s, such as infectives of Ce	e describes pathological states of the tion, apoptosis, senescence, metaboll Biology, classic ground-breaking puof view.
		ning outcomes			
		ossess scientific backgro biology research.	ound knowledge on c	ytopathology a	and are able to put this into the broade
Course	S (type, r	number of weekly contact hours,	language — if other than Ge	rman)	
S + V (r	o infor	mation on SWS (weekly	contact hours) and co	ourse language	e available)
		sessment (type, scope, langua le for bonus)	age — if other than German,	examination offered	${\sf d}$ — if not every semester, information on whether
one of questic	the foll ons) or	owing options will be ch	osen: a) written exam ne candidate each (30	ination (30 to	essment prior to the course. Usually, 60 minutes, including multiple choice s) or c) oral examination in groups of
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	ammes)	
Module					
Master		ee (1 major) Biology (201	1)		
AA L		aa (4 maiar) Dialami (aa4	-1		

Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Modul	e title		Abbreviation			
Cell- and Developmental Biology Master 2 (Lecture and Semi				minar 2)	07-MS2ZE2-102-m01	
Modul	e coord	inator		Module offered by		
holder logy	holder of the Chair of Cell Biology and Developmental Biology			Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
10	nume	rical grade				
Duration Module level Other pre			Other prerequisites	i		
1 semester graduate						
Conter	Contents					

&& The module comprises the lecture Signale und Differenzierung (Signals and Differentiation) and the seminar Entwicklungsbiologie-Meilensteine und Perspektiven (Milestones and Perspectives of Developmental Bioloqy). The lecture Signale und Differenzierung (Signals and Differentiation) is not designed to merely impart textbook knowledge to students. It will rather introduce students to particularly interesting and current topics in developmental biology. Topics covered in the lecture (subject to change): - Cooperation: Development and consequences of multicellularity. - Sex: More than just ? +? =. - On the move: Morphogenetic migration. - All-rounders?: Opportunities and limitations of stem cell research. - Growing new hearts?: Animals and their ability to regenerate. - Disasters: What do we actually know about metamorphoses? - Always the same?: Plasticity and epigenetics. - Metaorganisms: We are never alone. - Development in changing environments: Ecology and polyphenism. - Developmental biology of behaviour: Everything is learned. Or isn't it? - Evo-devo: A fad? No, been around for ages. In the seminar Entwicklungsbiologie-Meilensteine und Perspektiven (Developmental Biology - Milestones and Outlook), classical ground-breaking scientific articles in the field of developmental biology will be discussed from an unusual point of view.

Intended learning outcomes

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

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

S + V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice

questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) Allocation of places

Additional information

Workload

Teaching cycle

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

Module appears in

Master's degree (1 major) Biology (2011)

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 106 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



W	JRZBU	JRG 1	5 (6 28 27) 8	Ma	ster's with 1 major, 120 ECTS credits		
Module title Abbreviation							
Cell- ar	nd Dev	elopmental Biology Pract	ical Course and Sem	inar 1	07-MS2ZEF1-102-m01		
Module	coord	inator		Module offered by	1		
holder logy	of the	Chair of Cell Biology and	Developmental Bio-	Faculty of Biology			
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)			
10	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 semester graduate			Admission prerequisite to assessment: regular attendance of lab course and successful completion of the respective exercises as specified at the beginning of the course.				
Conten	ts						
This 5 week full-time practical course provides an introduction to modern cell and developmental biology-related methods with a focus on bio-imaging techniques. A broad variety of model organisms is covered and the participants are encouraged to independently design and perform their own experiments. Participants use their acquired technological skills to analyse important basic biological processes. In addition, the importance of cell and developmental biology for medicine and the economy is highlighted. During the fifth and final week of the course, students acquire sustained insights into current research activities of the Chair and, interacting with Master's students, doctoral researchers and post-docs, gain first-hand experience of research activities.							
Intende	ed lear	ning outcomes					
The par	The participants are able to approach complex scientific questions in the fields of cell and developmental bio-						

to perform and document cell and developmental biology-related experiments, adhering to a generally accepted code of scientific practice.

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

S + P (no information on SWS (weekly contact hours) and course language available)

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

logy and to independently implement acquired methodological tools to answer these questions. They are able

Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

Allocation of places

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Additional information

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Workload

--

Teaching cycle

--

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

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Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 108 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



Modul	Module title Abbreviation					
		Chemistry (Practical Co	urse and Seminar 2)		07-MS2PHF2-102-m01	
	Module coordinator Module offered by					
				Module offered by		
_	1	Chair of Bioinformatics	Γο	Faculty of Biology		
ECTS	1	od of grading	Only after succ. con	npl. of module(s)		
15		successfully completed				
Durati		Module level	Other prerequisites			
1 seme	ester	graduate		pletion of the respec	regular attendance of lab course ctive exercises as specified at the	
Conte	nts					
investi plan a mistry	igate cu nd will i 	rrent problems in physio independently apply adv	logical chemistry. The	ey will be involved in	participants will independently the development of a research gy and/or developmental bioche-	
Intend	ed lear	ning outcomes				
	. They a				logy and developmental bioche- ent, interpret and discuss their	
Course	es (type, r	number of weekly contact hours,	language — if other than Ge	rman)		
S + P (no infor	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)	
		sessment (type, scope, langua ole for bonus)	ige — if other than German,	examination offered — if no	ot every semester, information on whether	
following or b) lo	ing opti og (app	ons will be chosen: a) wr rox. 10 to 30 pages) or c)	itten examination (30 oral examination of c	o to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)	
Alloca	tion of _I	places				
			-			
Additi	Additional information					
Workload						
						
Teaching cycle						
						
Referr	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Modul	Module appears in					
Maste	Master's degree (1 major) Biology (2011)					

Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Module title Abbrev					Abbreviation	
Labora	Laboratory practical course 2 07-MSL2-102-m01					
Module	e coord	inator		Module offered by		
Coordi	nator B	ioCareers		Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
10	(not)	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate	Please consult with	course advisory serv	vice in advance.	
Conten	its					
Practic	al cour	se, summer school or wo	rkshop on specific to	pics in biology (dura	ition: 4-6 weeks).	
Intend	ed lear	ning outcomes	,			
		specific methods and lab		ected fields of biolo	gy. Ability to apply these me-	
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)		
P (no ir	nformat	tion on SWS (weekly cont	act hours) and cours	e language available	e)	
		sessment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
followi or b) lo	ng opti og (appi	ons will be chosen: a) wr rox. 10 to 30 pages) or c)	itten examination (3c oral examination of c	to 60 minutes, incl ne candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)	
Allocat	ion of p	olaces				
Additio	onal inf	ormation				
Worklo	ad					
Teachi	Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module	Module appears in					
Master	Master's degree (1 major) Biology (2011)					
	Master's degree (1 major) Biology (2010)					
Master	Master's degree (1 major) Biology (2014)					



Focus 3

(ECTS credits)



Molecular Cell- and Developmental Biology of Plants

(30 ECTS credits)



Modul	e title	-	Abbreviation		
Methodologies of Quantitative Biology (Lecture)					07-MS3-102-m01
Modul	e coord	inator		Module offered by	
holder	of the	Chair of Plant Physiology	and Biophysics	Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)	
10	nume	rical grade			
Duratio	Duration Module level		Other prerequisites		
1 seme	1 semester graduate				
Contor	Contonte				

Contents

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

Intended learning outcomes

The students are qualified to perform and organize their scientific laboratory work independently and document the obtained results. They are able to design a research project and are prepared to work on a scientific question for their thesis.

 $\textbf{Courses} \ (\text{type, number of weekly contact hours, language} - \text{if other than German})$

V (no information on SWS (weekly contact hours) and course language available)

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ module is creditable for bonus)

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

Additional information

Workload

Teaching cycle

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

Naster's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 113 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



Module appears in



Module title					Abbreviation	
Developmental Physiology and Adaption of Plants (Lecture and Seminar)					07-MS3PA-102-m01	
Module	e coord	linator		Module offered by		
holder	of the	Chair of Pharmaceutic	al Biology	Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. cor	Only after succ. compl. of module(s)		
10	nume	erical grade				
Duratio	on	Module level	Other prerequisites	Other prerequisites		
1 semester graduate		graduate				
Contents						
Section Developmental Physicians, The lecture will discuss the physicianism processes accurring during entage						

Section Developmental Physiology: The lecture will discuss the physiological processes occurring during ontogeny as well as the reaction of plants to various environmental parameters. It will focus on introducing students to the molecular components (ABA, auxin, ethylene etc.) of signalling networks and explaining their biosynthesis, regulation and functioning. Current journal articles on the topics will be presented and discussed in the seminar. Section Adaptation: The lecture will deal with the ecological and environmental constraints under which plants grow and develop (biogeography, biodiversity) and with the interactions of plants with abiotic and biotic environmental factors (e. g. plant-insect, plant-fungus interactions). The evolutionary adaptations on the physiological and organismic level will be emphasised in particular (stress and defence reactions, carnivory, plant protection). Based on selected examples from current research, the seminar will address the topics covered in the lecture in more detail. It will be complemented by topic-related guided tours in the Botanical Garden of the University of Würzburg.

Intended learning outcomes

Students are qualified to recognise ecological and physiological relations and are able to interpret and discuss these relations in the context of the current state of knowledge.

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

S + V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)



Modul	Module title Abbreviation					
Molecular Biology of Plants (Practical Course and Seminar 1)				1)	07-MS3MF1-102-m01	
Modul	le coord	inator		Module offered by		
holder	r of the	 Chair of Plant Physiology	and Biophysics	Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
10	nume	rical grade				
Durati	on	Module level	Other prerequisites			
1 seme	ester	graduate				
Conte	nts					
The mo		rovides an in-depth insig	ht into molecular bio	logical strategies an	d methods applied in plant phy-	
Intend	led lear	ning outcomes				
siolog		are able to perform and o			nethods focusing on plant phydependently and document the	
Course	es (type, ı	number of weekly contact hours, l	anguage — if other than Ger	rman)		
S + P (no info	mation on SWS (weekly o	contact hours) and co	urse language avail	able)	
		sessment (type, scope, langua ole for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
followi	ing opti og (app	ons will be chosen: a) wr rox. 10 to 30 pages) or c)	itten examination (30 oral examination of c	o to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)	
Alloca	tion of	places				
Additio	onal inf	ormation				
Workle	oad					
Teachi	ing cycl	e				
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Modul	Module appears in					
Maste	Master's degree (1 major) Biology (2011)					
	_	ee (1 major) Biology (201				
Maste	Master's degree (1 major) Biology (2014)					



Module title					Abbreviation
	Specific Molecular-, Cell- and Developmental Biology of Plants (Practical Cour-				
se and	Semina	ar 1)			
Module	coord	inator		Module offered by	
holder	of the (Chair of Plant Physiology	and Biophysics	Faculty of Biology	
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)	
15	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	graduate		pletion of the respec	regular attendance of lab course ctive exercises as specified at the
Conten	ts				
					h project on molecular plant and of a principal investigator.
Intende	ed learr	ning outcomes			
		able to work on a scientif	ic question, to desigr	n an experimental se	tup as well as to interpret, docu-
Course	S (type, n	number of weekly contact hours, l	anguage — if other than Ger	rman)	
S + P (n	o infor	mation on SWS (weekly o	contact hours) and co	urse language avail	able)
		sessment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether
following or b) log	ng optio g (appr	ons will be chosen: a) wr ox. 10 to 30 pages) or c)	itten examination (3c oral examination of o	o to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)
Allocat	ion of p	olaces			
Additio	nal info	ormation			
Worklo	ad				
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
					
Module	Module appears in				
	Master's degree (1 major) Biology (2011)				
	Master's degree (1 major) Biology (2010)				
waster'	Master's degree (1 major) Biology (2014)				



Biochemistry and Structural Biology

(30 ECTS credits)



Module title					Abbreviation	
Methodologies of Quantitative Biology (Lecture)					07-MS3-102-m01	
Module coordinator				Module offered by		
holder	of the	Chair of Plant Physic	ology and Biophysics	Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. co	ompl. of module(s)		
10	nume	rical grade				
Durati	Duration Module level		Other prerequisit	Other prerequisites		
1 semester graduate		graduate				
Conto	ntc	•				

Contents

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

Intended learning outcomes

The students are qualified to perform and organize their scientific laboratory work independently and document the obtained results. They are able to design a research project and are prepared to work on a scientific question for their thesis.

 $\textbf{Courses} \ (\text{type, number of weekly contact hours, language} - \text{if other than German})$

V (no information on SWS (weekly contact hours) and course language available)

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ module is creditable for bonus)

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

Additional information

Workload

Teaching cycle

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

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 119 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



Module appears in



Module title					Abbreviation	
Biophysics and Biochemistry					07-MS3BB-102-m01	
Modul	e coord	inator		Module offered by		
holder	of the	Chair of Plant Physiology	and Biophysics	Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. cor	ompl. of module(s)		
10	nume	rical grade				
Duratio	on	Module level	Other prerequisites	3		
1 semester graduate		graduate				
Conten	its	-				
The mo	dule ir	mparts theoretical and m	ethodological knowle	edge of plant membr	ane transport, structural biolo	

Intended learning outcomes

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

and biochemistry which is illustrated with specific examples from current research. Depending on the number of participants and their interests, practical demonstrations of methods that are currently used give students an

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

S + V (no information on SWS (weekly contact hours) and course language available)

opportunity to experience the practical aspects of biophysical and biochemical research.

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

 $\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

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Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)



e title	,	Abbreviation			
emistry	and Structural Biology (I	Seminar 1)	07-MS3BSF1-102-m01		
e coord	inator		Module offered by		
of the (Chair of Plant Physiology	and Biophysics	Faculty of Biology		
Metho	od of grading	Only after succ. con	npl. of module(s)		
nume	rical grade				
on	Module level	Other prerequisites			
ester	graduate				
nts					
odule p	rovides an in-depth insig	ht into strategies and	l methods of protein	biochemistry and structural bio-	
ed lear	ning outcomes				
ith a foo	cus on membrane proteir	is. They are able to pe			
es (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)		
no infor	mation on SWS (weekly o	contact hours) and co	urse language avail	able)	
		ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
ing opti og (appi	ons will be chosen: a) wr rox. 10 to 30 pages) or c)	itten examination (3c oral examination of c	o to 60 minutes, incl one candidate each (uding multiple choice questions) 30 to 60 minutes) or d) oral ex-	
tion of p	olaces				
onal inf	ormation				
oad					
Teaching cycle					
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module appears in					
		1)			
Master's degree (1 major) Biology (2010)					
	emistry e coord of the G of the G nume on ester nts odule p ed learn udents lith a footendently es (type, r no infor d of ass s creditab nts will ing opti og (apprition in g tion of p	emistry and Structural Biology (Fe coordinator of the Chair of Plant Physiology Method of grading numerical grade on Module level ester graduate nts odule provides an in-depth insign ded learning outcomes udents have knowledge about get ith a focus on membrane protein endently and document the result endently and screditable for bonus) nts will be informed about the letting options will be chosen: a) wrong (approx. 10 to 30 pages) or c) tion in groups of up to 3 candidates tion of places onal information oad or g cycle ed to in LPO I (examination regulation experience) Biology (201:	e coordinator of the Chair of Plant Physiology and Biophysics Method of grading numerical grade on Module level or graduate on Module provides an in-depth insight into strategies and other and document the results obtained. Determine on the strategies and other provides and document the results obtained. Determine on SWS (weekly contact hours) and contact hours and contact hours are reductable for bonus. The strategies and the strategies and document the results obtained. Determine on SWS (weekly contact hours) and contact hours are able to prevent the strategies and	e coordinator for the Chair of Plant Physiology and Biophysics Method of grading numerical grade on Module level on Module level on Module level on Grading only after succ. compl. of module(s) numerical grade on Module level other prerequisites only after succ. compl. of module(s) on Module level other prerequisites only and a strategies and methods of protein and focus on membrane proteins. They are able to perform and organise endently and document the results obtained. So (type, number of weekly contact hours, language — if other than German) on information on SWS (weekly contact hours) and course language avail dof assessment (type, scope, language — if other than German, examination offered — if no sereditable for bonus) onts will be informed about the length and scope of the assessment prior to the grading options will be chosen: a) written examination (30 to 60 minutes, include (approx. 10 to 30 pages) or c) oral examination of one candidate each (approx. 10 to 30 pages) or c) oral examination of one candidate each (approx. 10 to 30 pages) or c) oral examination of one candidate each (approx. 10 to 30 pages) or c) oral examination of one candidate each (approx. 10 to 30 pages) or c) oral examination of one candidate each (approx. 10 to 30 pages) or c) oral examination of one candidate each (approx. 10 to 30 pages) or c) oral examination of one candidate each (approx. 30 to 60 minutes) or e) presention of places onal information onal information oral cycle ed to in LPO 1 (examination regulations for teaching-degree programmes)	



Module title Abbreviation					Abbreviation	
Biochemistry and Structural Biology (Practical Course and Seminar 2) 07-MS3BSF2-102-m01					07-MS3BSF2-102-m01	
Modu	le coord	inator		Module offere	ed by	
holde	r of the	Chair of Plant Physiology	and Biophysics	Faculty of Biol	logy	
ECTS	Meth	od of grading	Only after succ. con	pl. of module(s)	
15	(not)	successfully completed		•		
Durati	ion	Module level	Other prerequisites			
1 sem	ester	graduate		pletion of the r	nent: regular attendance of lab course espective exercises as specified at the	
Conte	nts					
		perform their research wo logy in a largely independ			on the topic of biochemistry and principal investigator.	
Intend	ded lear	ning outcomes				
chemi	istry and		document the resul	ts obtained. Th	ic laboratory work in the fields of bio- ey are able to design a research pro-	
Course	es (type, i	number of weekly contact hours, I	anguage — if other than Gei	rman)		
S + P ((no info	rmation on SWS (weekly o	contact hours) and co	urse language	available)	
		sessment (type, scope, langua ole for bonus)	ge — if other than German,	examination offered	- if not every semester, information on whether	
follow or b) le	ing opti og (app	ons will be chosen: a) wr rox. 10 to 30 pages) or c)	itten examination (30 oral examination of c	to 60 minutes one candidate e	prior to the course. Usually, one of the s, including multiple choice questions) each (30 to 60 minutes) or d) oral expresentation (20 to 45 minutes)	
	tion of					
Additi	onal inf	ormation				
Workl	oad					
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Modu	Module appears in					
	Master's degree (1 major) Biology (2011)					
Maste	Master's degree (1 major) Biology (2010)					
Macta	Mastar's dagrag (4 major) Pialogy (2047)					



Biophysics

(30 ECTS credits)



Module title				Abbreviation	
Metho	dologie	es of Quantitative B	iology (Lecture)		07-MS3-102-m01
Module coordinator				Module offered by	
holder of the Chair of Plant Physiology a			ology and Biophysics	Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. co	ompl. of module(s)	
10	nume	rical grade			
Duration Mo		Module level	Other prerequisit	es	
1 semester		graduate			
Contents					

Contents

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

Intended learning outcomes

The students are qualified to perform and organize their scientific laboratory work independently and document the obtained results. They are able to design a research project and are prepared to work on a scientific question for their thesis.

 $\textbf{Courses} \ (\text{type, number of weekly contact hours, language} - \text{if other than German})$

V (no information on SWS (weekly contact hours) and course language available)

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ module is creditable for bonus)

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

Additional information

Workload

Teaching cycle

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

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 125 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



Module appears in



Module	e title				Abbreviation
Biophy	Biophysics and Biochemistry				07-MS3BB-102-m01
Module coordinator				Module offered by	
holder	older of the Chair of Plant Physiology and Biophysic		ology and Biophysics	Faculty of Biology	
ECTS	Metho	d of grading	Only after succ. c	ompl. of module(s)	
10	numer	rical grade			
Duratio	on	Module level	Other prerequisit	es	
1 seme	ster	graduate			
Conten	ıte.				

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

Intended learning outcomes

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

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

S + V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

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Additional information

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Workload

--

Teaching cycle

--

$\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

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Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)



Module	title	-	Abbreviation		
		cular-, Cell- and Develop	ints (Practical Cour-	07-MS3ZE-102-m01	
se and	Semina	ar 1)			
Module	Module coordinator			Module offered by	
holder	of the (Chair of Plant Physiology	and Biophysics	Faculty of Biology	
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)	
15	(not) s	successfully completed			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	graduate		pletion of the respec	regular attendance of lab course ctive exercises as specified at the
Conten	ts				
					h project on molecular plant and of a principal investigator.
Intende	ed learr	ning outcomes			
		able to work on a scientif	ic question, to desigr	n an experimental se	tup as well as to interpret, docu-
Course	S (type, n	number of weekly contact hours, l	anguage — if other than Ger	rman)	
S + P (n	o infor	mation on SWS (weekly o	contact hours) and co	urse language avail	able)
		sessment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether
following or b) log	ng optio g (appr	ons will be chosen: a) wr ox. 10 to 30 pages) or c)	itten examination (3c oral examination of o	o to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)
Allocat	ion of p	olaces			
Additio	nal info	ormation			
Worklo	ad				
Teachir	ng cycl	e			
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)				
Module appears in					
Master's degree (1 major) Biology (2011)					
	Master's degree (1 major) Biology (2010)				
waster'	s degre	ee (1 major) Biology (201	4)		



Modul	e title				Abbreviation	
Biophy	sics of	Membraneproteins of F	Plants (Practical Cours	se and Seminar 1)	07-MS3BPF1-102-m01	
Modul	e coord	inator		Module offered by	,	
	r. I. Mai ophysic	rten, holder of the Chair	of Plant Physiology	Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. compl. of module(s)			
10	nume	rical grade				
Duratio	on	Module level	Other prerequisites	;		
1 seme	ster	graduate				
Conter	its					
nal cha	ıracteri		ne proteins. The stude		ods which are used for the functio- ed into research projects on cur-	
Intend	ed lear	ning outcomes				
					rith a focus on plant membrane o document the results obtained.	
Course	S (type, r	number of weekly contact hours	, language — if other than Ge	rman)		
S + P (1	no infor	mation on SWS (weekly	contact hours) and co	ourse language avai	lable)	
		sessment (type, scope, langule for bonus)	uage — if other than German,	examination offered — if n	not every semester, information on whether	
followi or b) lo	ng opti g (appı	ons will be chosen: a) work. 10 to 30 pages) or c	ritten examination (30) oral examination of (o to 60 minutes, inc one candidate each	to the course. Usually, one of the luding multiple choice questions) (30 to 60 minutes) or d) oral exsentation (20 to 45 minutes)	
	ion of p	· · · · · · ·		•	· · · · · · · · · · · · · · · · · · ·	
Additio	nal inf	ormation				
Worklo	ad					
Teachi	ng cycl	e				
	<u> </u>					
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Modul	Module appears in					
		ee (1 major) Biology (20	11)			
	_	ee (1 major) Biology (20	•			
Mactor	Master's degree (4 major) Piology (2014)					



Pharmaceutical Biology

(30 ECTS credits)



Module title				Abbreviation	
Metho	dologie	es of Quantitative Biolog	gy (Lecture)		07-MS3-102-m01
Module coordinator				Module offered by	Į.
holder	of the	Chair of Plant Physiology	and Biophysics	Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. co	mpl. of module(s)	
10	nume	rical grade			
Duration Module level		Other prerequisites			
1 semester graduate		graduate			
Conto	Contents				

Contents

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

Intended learning outcomes

The students are qualified to perform and organize their scientific laboratory work independently and document the obtained results. They are able to design a research project and are prepared to work on a scientific question for their thesis.

 $\textbf{Courses} \ (\text{type, number of weekly contact hours, language} - \text{if other than German})$

V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

Maste

ter's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 131 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



Module appears in



Modul	Module title Abbreviation				
Respo	nse tow	ards Biotic and Abiotic	Factors		07-MS3BA-102-m01
Modul	e coord	inator		Module offered by	Į.
holder of the Chair of Pharmaceutical Biology		l Biology	Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. cor	npl. of module(s)	
10	nume	rical grade			
Duratio	on	Module level	Other prerequisites	1	
1 seme	ester	graduate			
Contents					
lerance and sig as a so	e. The legnal tra	ecture and seminar will nsduction. They will als nutrients.	not only discuss these	e plant responses an	to increased stress resistance/to- nd the mechanisms of perception ns and herbivores for using plants
	_	ning outcomes			
		able to understand the pic in the context of the			nment on a molecular level and to
Course	es (type, r	number of weekly contact hour	s, language — if other than Ge	rman)	
S + V (no infor	rmation on SWS (weekl	y contact hours) and co	ourse language avail	lable)
		sessment (type, scope, lang ble for bonus)	uage — if other than German,	examination offered — if n	ot every semester, information on whether
Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)					
Alloca	tion of p	olaces			
Additio	onal inf	ormation			
Worklo	oad				
Teachi	ng cycl	е			
Referre	ed to in	LPO I (examination regulation	ons for teaching-degree progra	ammes)	

Module appears in

Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Modul	e title		Abbreviation		
Pharmaceutical Biology (Practical Course and Seminar 1)					07-MS3PBF1-102-m01
Module coordinator				Module offered by	
holder of the Chair of Pharmaceutical I			ical Biology	Biology Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. co	Only after succ. compl. of module(s)	
10	nume	rical grade			
Duratio	Duration Module level		Other prerequisite	Other prerequisites	
1 semester graduate					
Conter	Contents				

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

Intended learning outcomes

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

 $\textbf{Courses} \ (\text{type, number of weekly contact hours, language} - \text{if other than German})$

P + S (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2011)

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 134 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



Master's degree (1 major) Biology (2014) Master's degree (1 major) FOKUS Pharmacy (2012)



Module appears in

Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)

Module title					Abbreviation	
Pharm	Pharmaceutical Biology (Practical Course and Seminar 2)				07-MS3PBF2-102-m01	
Modul	e coord	inator		Module offered by	I.	
holder of the Chair of Pharmaceutical Biology		Biology	Faculty of Biology			
ECTS	T T T T T T T T T T T T T T T T T T T					
15	(not)	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ester	graduate			regular attendance of lab course respective exercises.	
Conter	nts					
and/or and pro in a se erzburg	r metab ogress minar. g.de/.	olomic approaches will be in the understanding of be More information is avail	e optimised for and a piological problems w	adapted to the special be documented i	ents. Molecular biology methods ific problem. Experimental results n the form of a log and presented /www.pbio.biozentrum.uni-wu-	
Intend	ed lear	ning outcomes				
outcon terpret	ne. The	y are able to independen	tly approach scientifi hering to accepted ru	c topics in pharmac	to modify them according to the eutical biology and to perform, inctice. They are able to apply spe-	
		number of weekly contact hours, I	*	man)		
		mation on SWS (weekly o			able)	
			ge — if other than German,	examination offered — if no	ot every semester, information on whether	
Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)						
Allocat	tion of _I	olaces				
Additio	Additional information					
Worklo	ad					
Teachi	ng cycl	е				
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 136 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



Ecology and Ecophysiology of Plants

(30 ECTS credits)



Module title					Abbreviation		
Metho	dologie	es of Quantitative Biolog	y (Lecture)		07-MS3-102-m01		
Modul	e coord	inator		Module offered by			
holder	of the	Chair of Plant Physiology	and Biophysics	Faculty of Biology			
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)			
10	nume	rical grade					
Duration Module level		Other prerequisites					
1 seme	ester	graduate					
Contor							

Contents

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

Intended learning outcomes

The students are qualified to perform and organize their scientific laboratory work independently and document the obtained results. They are able to design a research project and are prepared to work on a scientific question for their thesis.

 $\textbf{Courses} \ (\text{type, number of weekly contact hours, language} - \text{if other than German})$

V (no information on SWS (weekly contact hours) and course language available)

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ module is creditable for bonus)

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

Additional information

Workload

Teaching cycle

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

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 138 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



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Modul	e title		Abbreviation				
Develo	pment	al Physiology and Ada	07-MS3PA-102-m01				
Modul	e coord	linator		Module offered by			
holder	holder of the Chair of Pharmaceutical Biology			Faculty of Biology			
ECTS	Meth	od of grading	Only after succ. co	mpl. of module(s)			
10	nume	rical grade					
Duratio	on	Module level	Other prerequisites	5			
1 semester graduate							
Conter	Contents						
<u> </u>		. 151	T 1	.1 1 1 1 1			

Section Developmental Physiology: The lecture will discuss the physiological processes occurring during ontogeny as well as the reaction of plants to various environmental parameters. It will focus on introducing students to the molecular components (ABA, auxin, ethylene etc.) of signalling networks and explaining their biosynthesis, regulation and functioning. Current journal articles on the topics will be presented and discussed in the seminar. Section Adaptation: The lecture will deal with the ecological and environmental constraints under which plants grow and develop (biogeography, biodiversity) and with the interactions of plants with abiotic and biotic environmental factors (e. g. plant-insect, plant-fungus interactions). The evolutionary adaptations on the physiological and organismic level will be emphasised in particular (stress and defence reactions, carnivory, plant protection). Based on selected examples from current research, the seminar will address the topics covered in the lecture in more detail. It will be complemented by topic-related guided tours in the Botanical Garden of the University of Würzburg.

Intended learning outcomes

Students are qualified to recognise ecological and physiological relations and are able to interpret and discuss these relations in the context of the current state of knowledge.

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

S + V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)



Module	e title				Abbreviation		
Specific Ecology and Ecophysiology of Plants (Practical Course and Seminar 1) 07-MS3PÖF1-102-m01							
Module	Module coordinator Module offered by						
		Chair of Ecophysiology ar	nd Vogotation Ecolo-	Faculty of Biology			
gy	or the C	Litali di Ecopilysiology al	id vegetation Ecoto-	raculty of Biology			
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)			
10	nume	rical grade					
Duratio	on	Module level	Other prerequisites				
1 seme	ster	graduate					
Conten	ts		,				
plant-f concep form of	ungus i ots and f preser	nteractions, biogeograph complex experiments wil ntations, publications or	ny, characterisation o Il be designed, and th logs. Students will be	f plant surfaces, cut ne results will be doc e involved in ongoing	siology (e. g. plant-insect and icular barrier properties). Working cumented and presented in the gresearch and will consolidate chemistry or molecular biology.		
Intend	ed learı	ning outcomes					
They a	re able				the field of plant ecophysiology. statistically, adhering to the prin-		
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	rman)			
S + P (r	no infor	mation on SWS (weekly o	contact hours) and co	urse language avail	able)		
		essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether		
followi or b) lo	ng opti g (appr	ons will be chosen: a) wr ox. 10 to 30 pages) or c)	itten examination (3c oral examination of o	o to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)		
	ion of p			, ,,	, 13		
Additio	nal inf	ormation					
Worklo	ad						
Teachi	ng cycl	e					
Referre	ed to in	LPO I (examination regulations	s for teaching-degree progra	mmes)			
Module	e appea	rs in					
	_	ee (1 major) Biology (201					
	_	ee (1 major) Biology (2010					
waster	s aegr	ee (1 major) Biology (201	4)				



Module	e title		Abbreviation			
Specifi	ic Ecolo	gy and Ecophysiology of	Plants (Practical Co	urse and Seminar 2)	07-MS3PÖF2-102-m01	
Module	e coord	inator		Module offered by		
holder of the Chair of Ecophysiology ar			nd Vegetation Ecolo-	Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
15	(not)	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 semester graduate		graduate	Admission prerequisite to assessment: regular attendance of lab course and successful completion of the respective exercises as specified at the beginning of the course.			
Conten	its					
				, .,	d ecophysiology (e. g. plant-in-	

Students will work on projects taken from ongoing research in plant ecology and ecophysiology (e. g. plant-in-sect-, plant-fungus interactions; biogeography; characterisation of plant surfaces, cuticular barrier properties). They will do this work to a large extent on their own responsibility. Based on the results obtained, the ecophysiological, analytical, molecular biological and/or microbiological methods applied (e. g. measurement of transpiration, chromatography, mass spectrometry, fluorescence microscopy, PCR, cloning strategies) will be critically assessed and, where necessary, modified. Students will document and discuss the progress of their work and of the project as a whole in the form of a presentation, a publication or a term paper.

Intended learning outcomes

Students are able to scientifically work on a topic in plant ecophysiology. They are able to answer and to discuss questions asked in the field of chemical ecology. They are able to work according to good practice and to document, interpret and to discuss their results. They have developed the ability to apply specific techniques required to answer scientific questions.

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

S + P (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 142 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



Microbial and Chemical Ecology

(30 ECTS credits)



Module title					Abbreviation		
Metho	dologie	es of Quantitative Biolog	y (Lecture)		07-MS3-102-m01		
Modul	e coord	inator		Module offered by			
holder	of the	Chair of Plant Physiology	and Biophysics	Faculty of Biology			
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)			
10	nume	rical grade					
Duration Module level		Other prerequisites					
1 seme	ester	graduate					
Contor							

Contents

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

Intended learning outcomes

The students are qualified to perform and organize their scientific laboratory work independently and document the obtained results. They are able to design a research project and are prepared to work on a scientific question for their thesis.

 $\textbf{Courses} \ (\text{type, number of weekly contact hours, language} - \text{if other than German})$

V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 144 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



Module appears in



Module	e title				Abbreviation
Respo	ise tow	ards Biotic and Abiotic F	actors		07-MS3BA-102-m01
Module	e coord	inator		Module offered by	
holder	of the (Chair of Pharmaceutical I	Biology	Faculty of Biology	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Duratio	_	Module level	Other prerequisites		
1 seme	ster	graduate			
Conten	its		·		
zymes lerance and sig	and the e. The le gnal trai	e levels of a variety of me ecture and seminar will n	tabolites. Some of the ot only discuss these	ese responses lead plant responses an	ene expression, the activity of en- to increased stress resistance/to- d the mechanisms of perception as and herbivores for using plants
Intend	ed learı	ning outcomes			
		able to understand the in pic in the context of the			nment on a molecular level and to
Course	S (type, n	number of weekly contact hours,	language — if other than Ge	rman)	
S + V (1	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)
		sessment (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether
one of question	the foll ons) or	owing options will be ch	osen: a) written exam ne candidate each (30	ination (30 to 60 mi	ent prior to the course. Usually, inutes, including multiple choice c) oral examination in groups of
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	ımmes)	
Module	e appea	nrs in			

Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Module	e title				Abbreviation
Microb	ial and	Chemical Ecology (Prac	tical Course and Sem	inar 1)	07-MS3MCÖF1-102-m01
Module	e coord	inator		Module offered by	
holder	of the	Chair of Pharmaceutical I	Biology	Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Duratio	on	Module level	Other prerequisites	i	
1 seme	ster	graduate			
Conten	its				
come fa chemis presen	amiliar stry as v tation,	with a variety of method well as literature search t publication or term pape	s within the fields of echniques. They will	molecular ecology, r	croorganisms. Students will be- microbial ecology and analytical uss the results of their work in a
Intende	ed lear	ning outcomes			
They ar	re able				the field of chemical ecology. statistically, adhering to the prin-
Course	S (type, i	number of weekly contact hours,	language — if other than Ge	rman)	
S + P (r	no info	mation on SWS (weekly	contact hours) and co	ourse language avail	able)
		sessment (type, scope, langua ble for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether
followi or b) lo	ng opti g (app	ons will be chosen: a) wr rox. 10 to 30 pages) or c)	itten examination (30 oral examination of c	o to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)
Allocat					·-
Additio	nal inf	ormation			
	-				
Worklo	ad				
	-				
Teachi	ng cvcl	e			
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	ımmes)	
			0 220.22 6100.0		
Module	e appea	ars in			
		ee (1 major) Biology (201	1)		
	_	ee (1 major) Biology (201			
11		as (4 maiss) Dislam, (as4	.)		



Modul	le title				Abbreviation
Microl	bial and	Chemical Ecology (Pract	ical Course and Sem	inar 2)	07-MS3MCÖF2-102-m01
Modul	le coord	inator		Module offered by	Į.
holder	r of the (Chair of Pharmaceutical E	Biology	Faculty of Biology	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
15	(not)	successfully completed			
Durati	on	Module level	Other prerequisites		
1 seme	ester	graduate			regular attendance of lab course respective exercises.
Conte	nts		,		
topics	in cont		crobial and chemical		dently acquaint themselves with e involved in the development of
Intend	led lear	ning outcomes			
ment, red to	interpre answer	t and to discuss their res scientific questions.	sults. They have deve	loped the ability to a	ng to good practice and to docu- apply specific techniques requi-
		number of weekly contact hours, l			
		mation on SWS (weekly o			
		sessment (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether
followi or b) lo	ing opti og (appı	ons will be chosen: a) wr ox. 10 to 30 pages) or c)	itten examination (3c oral examination of c	o to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)
	tion of p		,	·	,
Additio	onal inf	ormation			
			,		
Workle	oad				
Teachi	ing cycl	e			
Referr	ed to in	LPO I (examination regulation	s for teaching-degree progra	immes)	
Modul	le appea	ars in			
	_	ee (1 major) Biology (201 ee (1 major) Biology (201			



System Biology

(30 ECTS credits)



Modul	e title				Abbreviation	
Neurol	oiology	, Behavior and Animal Ec	ology (Lecture)		07-MS1-102-m01	
Modul	e coord	inator		Module offered by		
holder	of the	Chair of Neurobiology an	d Genetics	Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. con	ıpl. of module(s)		
10	nume	rical grade				
Duratio	on	Module level	Other prerequisites	isites		
1 seme	ester	graduate				
Conter	nts					
It will p	orovide	students with insights in	to these fields, helpi	ng them select their	Physiology and Animal Ecology. F1 and F2 practical courses and anced modules of this focus.	
Intend	ed lear	ning outcomes				
		to know the advantages of relate and integrate diffe			g complex biological systems.	
Course	S (type, i	number of weekly contact hours,	anguage — if other than Ger	man)		
V (no i	nforma	tion on SWS (weekly con	act hours) and cours	e language availabl	e)	
		sessment (type, scope, langua ole for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
one of question	the foll ons) or	owing options will be ch	osen: a) written exam ne candidate each (30	ination (30 to 60 mi	ent prior to the course. Usually, inutes, including multiple choice or or al examination in groups of	
Allocat	tion of	places				
Additio	onal inf	ormation				
Worklo	Workload					
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		
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Module appears in

Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Module	e title		Abbreviation			
Molecu	ılar and	d Clinical Neurobiol	07-MS1N-102-m01			
Module	e coord	inator		Module offered by		
Prof. D	Prof. Dr. M. Sendtner Faculty			Faculty of Biology	aculty of Biology	
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)		
10	nume	rical grade				
Duratio	Duration Module level Other prereq		Other prerequisites	3		
1 seme	ster	graduate				
Conten	Contents					

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

Intended learning outcomes

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

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

S + V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)



Modul	e title	,			Abbreviation
Anima	l Ecolog	gy and Tropical Biology (I	ecture and Seminar)		07-MS1TÖ-102-m01
Modul	e coord	inator		Module offered by	
holder	of the	Chair of Animal Ecology a	nd Tropical Biology	Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. com	npl. of module(s)	
10	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 seme	ester	graduate			
Conter	nts				
tions a	nd food e. In the	d nets, evolutionary ecolo	gy, chemical ecology	, tropical ecology, a	Inctions, multi-trophic interacgricultural ecology, and global ed above will be presented and
Intend	ed lear	ning outcomes			
of anin solutio	nal eco on of cu	logy. They will be able to rrent environmental risks	interpret scientific pu	ıblications and appl	rrent research issues in the field y the acquired knowledge to the
	_	number of weekly contact hours, l			
		mation on SWS (weekly o			
		sessment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	et every semester, information on whether
one of question	the foll ons) or	owing options will be cho	osen: a) written exam ie candidate each (30	ination (30 to 60 mi	nt prior to the course. Usually, nutes, including multiple choice) oral examination in groups of
Allocat	tion of _I	olaces			
Additio	nal inf	ormation			
Worklo	ad				
			-		
Teachi	ng cycl	e			
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Kelelle			- rectedening degree progra	illilies)	
				es)	
-	e appea	-	o to cooking degree pregna	······································	

Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Module	e title				Abbreviation
Commu	ınicatio	on Biology (Lecture)			07-MS1K-102-m01
Module	coord	inator		Module offered by	
holder logy	of the (Chair of Behavioral Physi	ology and Sociobio-	Faculty of Biology	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)	
10	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	graduate			
Conten	ts				
semina the top	r sessi ic of th	on, students will deepen e lecture.			f animal signalling. In a follow-up ussing current papers related to
Intende	ed lear	ning outcomes			
logical sent ar Course	conditi Id disci S (type, r	ions, in order to gain a muss current scientific pub number of weekly contact hours, l	ore complete picture lications within a bro anguage — if other than Ger	of a topic. In additionader theoretical framman)	
		mation on SWS (weekly o			
		sessment (type, scope, langua _e le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether
following or b) lo aminat	ng opti g (appı ion in g	ons will be chosen: a) wr rox. 10 to 30 pages) or c) groups of up to 3 candida	itten examination (3c oral examination of c	to 60 minutes, incl one candidate each	o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral ex- entation (20 to 45 minutes)
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teaching cycle					
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	mmes)	
Module					
Master	's degr	ee (1 major) Biology (201	1)		

Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Module title					Abbreviation	
Molecular Biology (Lecture)					07-MS2-102-m01	
Modul	e coord	inator		Module offered by		
holder of the Chair of Microbiology, holder of the Bioinformatics, holder of the Chair of Cell Biology velopmental Biology, Prof. Dr. M. Sauer			Cell Biology and De-	Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
10	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 semester		graduate				
Conter	nts					

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

Intended learning outcomes

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

 $\textbf{Courses} \ (\text{type, number of weekly contact hours, language} - \text{if other than German})$

V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

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Additional information

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Workload

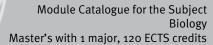
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Teaching cycle

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

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 154 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	





Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)



Modul	e title				Abbreviation
Cell- a	nd Deve	elopmental Biology Ma	ster 1 (Lecture and Ser	minar 1)	07-MS2ZE1-102-m01
Modul	e coord	inator		Module offered	by
holder logy	of the (Chair of Cell Biology and	d Developmental Bio-	Faculty of Biolog	SY .
ECTS	Metho	od of grading	Only after succ. con	er succ. compl. of module(s)	
10	nume	rical grade			
Duratio	on	Module level	Other prerequisites	;	
1 seme	ster	graduate			
Conter	its		`		
cell an lic disc blicatio	d unrav orders a ons in tl	els their biological cau nd cancer. In the semir he field of cell biology a	ses and consequences nar <i>Milestones and Per</i>	s, such as infections spectives of Cell E	escribes pathological states of the in, apoptosis, senescence, metabosiology, classic ground-breaking puview.
		ning outcomes			
		ossess scientific backg biology research.	round knowledge on c	ytopathology and	are able to put this into the broader
Course	S (type, n	number of weekly contact hours	, language — if other than Ge	rman)	
S + V (1	no infor	mation on SWS (weekly	contact hours) and co	ourse language av	vailable)
		sessment (type, scope, lang le for bonus)	uage — if other than German,	examination offered —	if not every semester, information on whether
one of question	the foll ons) or	owing options will be c	hosen: a) written exam one candidate each (30	ination (30 to 60	ment prior to the course. Usually, minutes, including multiple choice or c) oral examination in groups of
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
Teachi	ng cycl	e			
Referre	ed to in	LPO I (examination regulation	ons for teaching-degree progra	ammes)	
Modul	e appea	rs in			
Master	_	ee (1 major) Biology (20	011)		
NA +	سحمام ما	aa (4 maiar) Dialami (aa	1		

Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Module title				Abbreviation	
Cell- and Developmental Biology Master 2 (Lecture and Seminar 2)				07-MS2ZE2-102-m01	
Modul	e coord	linator		Module offered by	
holder of the Chair of Cell Biology and Developmental Biology		Faculty of Biology			
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)	
10	nume	rical grade			
Duration Module level Other		Other prerequisites	;		
1 seme	ester	graduate			
Contor	ntc	•			

&& The module comprises the lecture Signale und Differenzierung (Signals and Differentiation) and the seminar Entwicklungsbiologie-Meilensteine und Perspektiven (Milestones and Perspectives of Developmental Bioloqy). The lecture Signale und Differenzierung (Signals and Differentiation) is not designed to merely impart textbook knowledge to students. It will rather introduce students to particularly interesting and current topics in developmental biology. Topics covered in the lecture (subject to change): - Cooperation: Development and consequences of multicellularity. - Sex: More than just ? +? =. - On the move: Morphogenetic migration. - All-rounders?: Opportunities and limitations of stem cell research. - Growing new hearts?: Animals and their ability to regenerate. - Disasters: What do we actually know about metamorphoses? - Always the same?: Plasticity and epigenetics. - Metaorganisms: We are never alone. - Development in changing environments: Ecology and polyphenism. - Developmental biology of behaviour: Everything is learned. Or isn't it? - Evo-devo: A fad? No, been around for ages. In the seminar Entwicklungsbiologie-Meilensteine und Perspektiven (Developmental Biology - Milestones and Outlook), classical ground-breaking scientific articles in the field of developmental biology will be discussed from an unusual point of view.

Intended learning outcomes

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

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

S + V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

Additional information

Workload

Teaching cycle

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

Module appears in

Master's degree (1 major) Biology (2011)

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 157 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	





Module title Abbreviation						
Microbiology (Lecture and Seminar)					07-MS2M-102-m01	
Modul	e coord	linator		Module offered by		
holder	of the	Chair of Microbiology		Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. con	ıpl. of module(s)		
10	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	its		•			
al path	ogenic				adherence and invasion, bacteri- nd pathogen interference, current	
Intend	ed lear	ning outcomes				
		are able to understand for infectious diseases.	undamental theories o	of molecular microb	iology and infection biology,	
Course	S (type,	number of weekly contact hours,	language — if other than Ger	man)		
V + S (1	no info	rmation on SWS (weekly	contact hours) and co	urse language avail	lable)	
		sessment (type, scope, languable for bonus)	age — if other than German, o	examination offered — if n	ot every semester, information on whether	
one of question	the fol ons) or	lowing options will be ch	osen: a) written exam ne candidate each (30	ination (30 to 60 mi	ent prior to the course. Usually, inutes, including multiple choice c) oral examination in groups of	
Allocat	ion of	places				
Additio	nal inf	ormation				
Workload						
Teaching cycle						
Referre	ed to in	LPO I (examination regulation	ns for teaching-degree progra	mmes)		
	-					

Module appears in



Module title					Abbreviation
Bioinformatics (Lecture and Seminar)					07-MS2BI-102-m01
Module coordinator				Module offered by	
holder	of the	Chair of Bioinformatics		Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)	
10	nume	rical grade			
Durati	Duration Module level		Other prerequisites		
1 semester graduate -					
Contents					

Contents

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

Intended learning outcomes

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

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

S + V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Biochemistry (2012)

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)

Master's degree (1 major) Biology (2014)

Master's degree (1 major) Mathematics (2012)



Module	e title	_			Abbreviation		
Immunology 1 (Lecture and Seminar)					07-MS2IM1-102-m01		
Module	e coord	inator		Module offered by			
Manag biology	_	ector of the Institute of Vi	rology and Immuno-	Faculty of Biology			
ECTS	Metho	od of grading	Only after succ. con	ıpl. of module(s)			
10	nume	rical grade					
Duratio	on	Module level	Other prerequisites				
1 seme	ster	graduate					
Conten	its						
www.v	irologie				ormation is available at http:// ka/immunologie/immunolo-		
Intend	ed lear	ning outcomes					
		gain knowledge about, a Ilular immunology.	nd will be able to pre	sent and discuss ba	sic concepts and methods in mo-		
Course	S (type, r	number of weekly contact hours,	anguage — if other than Ger	man)			
S + V (1	no infor	mation on SWS (weekly	contact hours) and co	urse language avail	lable)		
		sessment (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether		
followi or b) lo	ng opti g (appı	ons will be chosen: a) wr rox. 10 to 30 pages) or c)	itten examination (3c oral examination of c	to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)		
Allocat		· · · · ·		•	· · · · · · · · · · · · · · · · · · ·		
Additio	nal inf	ormation					
Worklo	ad						
Teachi	ng cycl	e					
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Module appears in							
Master	's degr	ee (1 major) Biology (201	1)				
Master	Master's degree (1 major) Biology (2010)						



Module title					Abbreviation		
Immun	ology	2 (Lecture and Seminar)			07-MS2IM2-102-m01		
Modul	e coord	linator		Module offered by	<u> </u>		
Manag biology	_	ector of the Institute of V	irology and Immuno-	Faculty of Biology			
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)			
10	nume	rical grade					
Duratio	on	Module level	Other prerequisites	i			
1 seme	ester	graduate					
Conter	nts						
the im	mune s	nity and immunomodula ystem, infection immun ning outcomes		the immune system,	immunogenetics, evolution of		
		able to understand curre	ent topics in immunolo	ngy and to discuss th	nese in detail.		
		number of weekly contact hours,					
		rmation on SWS (weekly			ahle)		
Metho	d of as	· · · · · · · · · · · · · · · · · · ·			ot every semester, information on whether		
followi or b) lo	ng opti og (app	ons will be chosen: a) w rox. 10 to 30 pages) or c	ritten examination (30) oral examination of c	o to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral ex- entation (20 to 45 minutes)		
Allocat	tion of	places					
Additio	nal inf	ormation					
Worklo	oad						
Teachi	ng cycl	e					
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)						
Modul	e appe	ars in					
Master	r's degr	ee (1 major) Biology (20	11)				
	_	ee (1 major) Biology (20	•				
Master	Master's degree (1 major) Biology (2014)						



Module title					Abbreviation
Virolog	y 1 (Le	cture and Seminar)			07-MS2V1-102-m01
Module	Module coordinator			Module offered by	,
Manag biology	_	ector of the Institute of V	irology and Immuno-	Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
10	nume	erical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	graduate			
Conten	ts	,			
This co	urse o	ffers an introduction to v	irology and current re	search in the field of	virology.
Intende	ed lear	ning outcomes			
Studen	ts will	have gained the ability to	o understand current	issues in virology an	d to discuss these in depth.
Course	S (type,	number of weekly contact hours,	language — if other than Ge	man)	
S + V (r	no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)
		sessment (type, scope, languable for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether
one of question	the fol ons) or	lowing options will be ch	osen: a) written exam ne candidate each (30	ination (30 to 60 mi	nt prior to the course. Usually, nutes, including multiple choice) oral examination in groups of
Allocat	ion of	places			
Additio	nal inf	formation			
Worklo	ad				
Teachi	ng cyc	le			
Referre	d to in	LPO I (examination regulation	ns for teaching-degree progra	immes)	
	-				
Module	appe	ars in			
Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)					



Module	e title	_		Abbreviation				
Virology 2 (Lecture and Seminar)					07-MS2V2-102-m01			
Module	coord	inator		Module offered by	l .			
Manag	_	ector of the Institute of Vi	rology and Immuno-	Faculty of Biology				
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)				
10	nume	rical grade						
Duratio	n	Module level	Other prerequisites					
1 seme	ster	graduate						
Conten	ts							
This co	urse of	fers an introduction to vi	rology and current re	search in the field of	f virology.			
Intende	ed lear	ning outcomes						
Studen	ts will	have gained the ability to	understand current	issues in virology an	nd to discuss these in depth.			
Course	S (type, i	number of weekly contact hours, I	anguage — if other than Ger	rman)				
S + V (r	no info	rmation on SWS (weekly	contact hours) and co	ourse language avail	able)			
module is	creditab	ele for bonus)			ot every semester, information on whether			
one of	the foll ons) or	owing options will be cho	osen: a) written exam ne candidate each (30	ination (30 to 60 mi	ent prior to the course. Usually, nutes, including multiple choice) oral examination in groups of			
Allocat								
		Jucco						
Additio	nal inf	ormation						
		<u> </u>						
Worklo	ad							
Teachi	ng cycl	e						
	<u> </u>							
Referre	d to in	LPO I (examination regulation	s for teaching-degree progra	mmes)				
Module	Module appears in							
	Master's degree (1 major) Biology (2011)							
Master	's degr	ee (1 major) Biology (201	0)					
Master	Master's degree (1 major) Biology (2014)							



Module title A					Abbreviation		
Human	Human Genetics (Lecture and Seminar)				07-MS2HG-102-m01		
Module	Module coordinator			Module offered by			
Manag	ing Dire	ector of the Institute of H	uman Genetics	Faculty of Biology			
ECTS	Metho	od of grading	Only after succ. con	ıpl. of module(s)			
10	nume	rical grade					
Duratio	on	Module level	Other prerequisites				
2 seme	ester	graduate					
Conten	its						
This mo	odule v	vill discuss current topics	s in human genetics.				
Intend	ed lear	ning outcomes					
Studen depth.		have gained the ability to	understand current	issues in human ger	netics and to discuss these in		
Course	S (type, r	number of weekly contact hours,	language — if other than Ge	rman)			
S + V (r	no infor	mation on SWS (weekly	contact hours) and co	urse language avail	able)		
		sessment (type, scope, langua le for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether		
one of questic	the foll ons) or	owing options will be ch	osen: a) written exam ne candidate each (30	ination (30 to 60 mi	nt prior to the course. Usually, nutes, including multiple choice) oral examination in groups of		
Allocat	ion of p	olaces	-				
Additio	nal inf	ormation					
	_						
Worklo	ad						
Teachi	ng cycl	e					
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Module appears in							
	Master's degree (1 major) Biology (2011)						
	Master's degree (1 major) Biology (2010)						
Master	Master's degree (1 major) Biology (2014)						



Module title					Abbreviation
Methodologies of Quantitative Biology (Lecture)					07-MS3-102-m01
Module coordinator				Module offered by	Į.
holder	of the	Chair of Plant Physiology	and Biophysics	Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. co	mpl. of module(s)	
10	nume	rical grade			
Durati	Duration Module level		Other prerequisites		
1 semester graduate					
Conto	Contonts				

Contents

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

Intended learning outcomes

The students are qualified to perform and organize their scientific laboratory work independently and document the obtained results. They are able to design a research project and are prepared to work on a scientific question for their thesis.

 $\textbf{Courses} \ (\text{type, number of weekly contact hours, language} - \text{if other than German})$

V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 166 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	



Module appears in



Module	e title		Abbreviation				
Develo	pmenta	al Physiology and A	07-MS3PA-102-m01				
Module coordinator Module offered by					1		
holder	holder of the Chair of Pharmaceutical Biology			Faculty of Biology			
ECTS	Metho	od of grading	Only after succ. co	Only after succ. compl. of module(s)			
10	nume	rical grade					
Duratio	on	Module level	Other prerequisite	Other prerequisites			
1 semester graduate							
Conten	Contents						

Section Developmental Physiology: The lecture will discuss the physiological processes occurring during ontogeny as well as the reaction of plants to various environmental parameters. It will focus on introducing students to the molecular components (ABA, auxin, ethylene etc.) of signalling networks and explaining their biosynthesis, regulation and functioning. Current journal articles on the topics will be presented and discussed in the seminar. Section Adaptation: The lecture will deal with the ecological and environmental constraints under which plants grow and develop (biogeography, biodiversity) and with the interactions of plants with abiotic and biotic environmental factors (e. g. plant-insect, plant-fungus interactions). The evolutionary adaptations on the physiological and organismic level will be emphasised in particular (stress and defence reactions, carnivory, plant protection). Based on selected examples from current research, the seminar will address the topics covered in the lecture in more detail. It will be complemented by topic-related guided tours in the Botanical Garden of the University of Würzburg.

Intended learning outcomes

Students are qualified to recognise ecological and physiological relations and are able to interpret and discuss these relations in the context of the current state of knowledge.

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

S + V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

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Additional information

--

Workload

--

Teaching cycle

--

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

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Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)



Module title					Abbreviation	
Biophysics and Biochemistry					07-MS3BB-102-m01	
Module coordinator				Module offered by		
holder of the Chair of Plant Physiology and Biophysics			and Biophysics	Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. con	compl. of module(s)		
10	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 semester graduate						
Contents						
The module imparts theoretical and methodological knowledge of plant membrane transport, structural biology						

opportunity to experience the practical aspects of biophysical and biochemical research. **Intended learning outcomes**

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

and biochemistry which is illustrated with specific examples from current research. Depending on the number of participants and their interests, practical demonstrations of methods that are currently used give students an

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

S + V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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$\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

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Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)



Module title					Abbreviation	
Response towards Biotic and Abiotic Factors					07-MS3BA-102-m01	
Module coordinator Modu			Module offered by			
holder	of the (Chair of Pharmaceutical I	Biology	Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
10	nume	rical grade				
Duratio	_	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	its		·			
zymes lerance and sig	and the e. The le gnal trai	e levels of a variety of me ecture and seminar will n	tabolites. Some of the ot only discuss these	ese responses lead plant responses an	ene expression, the activity of en- to increased stress resistance/to- d the mechanisms of perception as and herbivores for using plants	
Intend	ed learı	ning outcomes				
		able to understand the in pic in the context of the			nment on a molecular level and to	
Course	S (type, n	number of weekly contact hours,	language — if other than Ge	rman)		
S + V (1	no infor	mation on SWS (weekly	contact hours) and co	ourse language avail	able)	
		sessment (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	ot every semester, information on whether	
one of question	the foll ons) or	owing options will be ch	osen: a) written exam ne candidate each (30	ination (30 to 60 mi	ent prior to the course. Usually, inutes, including multiple choice c) oral examination in groups of	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	Workload					
Teaching cycle						
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	ımmes)		
Module	Module appears in					

Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Module title					Abbreviation
System Biology (Lecture and Seminar)					07-MS3S-102-m01
Modul	e coord	inator		Module offered by	
holder	of the	Chair of Bioinformatics		Faculty of Biology	
ECTS	Meth	thod of grading Only after succ. compl. of module(
10	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 semester graduate					
Contents					
Advances and current results of computational systems biology are explained and discussed, this includes results from functional genomics, dynamics of the transcriptome, of metabolism and metabolic networks as well					

Intended learning outcomes

as regulatory networks.

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

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

S + V (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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$\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

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Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)

Master's degree (1 major) Biology (2014)

Master's degree (1 major) Mathematics (2012)



Module	e title		Abbreviation			
System	n Biolog	gy (Practical Course and	07-MS3SYF1-102-m01			
Module	e coord	inator		Module offered by		
holder	holder of the Chair of Bioinformatics			Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
10	nume	rical grade				
Duration Module level Other prerequis			Other prerequisites			
1 semester graduate						
Conten	Contents					

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

Intended learning outcomes

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

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

P + S (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

Allocation of places

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Additional information

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Workload

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Teaching cycle

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

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Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)

Master's degree (1 major) Biology (2014)

Master's degree (1 major) Mathematics (2012)



Module title					Abbreviation	
System Biology (Practical Course and Seminar 2)					07-MS3SYF2-102-m01	
Module coordinator				Module offered by	l.	
holder of the Chair of Bioinformatics				Faculty of Biology		
ECTS	Method of grading Only after succ		Only after succ. con	ompl. of module(s)		
15	(not)	successfully completed				
Duratio	n	Module level	Other prerequisites			
1 semester graduate		graduate	Admission prerequisite to assessment: regular attendance of lab cours and successful completion of the respective exercises as specified at the beginning of the course.			

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

Intended learning outcomes

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

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

P + S (no information on SWS (weekly contact hours) and course language available)

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

Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

Allocation of places

Additional information

Workload

Teaching cycle

$\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

Module appears in

Master's degree (1 major) Biology (2011)

Master's degree (1 major) Biology (2010)

Master's degree (1 major) Biology (2014)

Master's degree (1 major) Mathematics (2012)



Non-focus Lab Course

(ECTS credits)



Modul	e title		Abbreviation			
Labora	tory pr	actical course 1		07-MSL1-102-m01		
Modul	Module coordinator Mo				l .	
Coordi	nator B	ioCareers		Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	pl. of module(s)		
5	(not)	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate	Please consult with	course advisory serv	vice in advance.	
Conten	ıts					
Practic	al cour	se, summer school or wo	rkshop on specific to	pics in biology (dura	ition: 2-3 weeks).	
Intend	ed learı	ning outcomes				
		specific methods and lab		ected fields of biolo	gy. Ability to apply these me-	
Course	S (type, r	umber of weekly contact hours, l	anguage — if other than Ger	man)		
P (no i	nformat	ion on SWS (weekly cont	act hours) and cours	e language available	2)	
Studer followi or b) lo	s creditab nts will l ng option ng (appr	le for bonus) De informed about the lei Dons will be chosen: a) wr TOX. 10 to 30 pages) or c)	ngth and scope of the itten examination (3c oral examination of c	e assessment prior to to 60 minutes, incl one candidate each (to the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)	
	tion of p	· · · · · · · · · · · · · · · · · · ·				
	•					
Additio	onal inf	ormation				
	-					
Worklo	ad					
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
	Master's degree (1 major) Biology (2011)					
	_	ee (1 major) Biology (2010				
Master	Master's degree (1 major) Biology (2014)					



Module	Module title Abbreviation					
Labora	tory pra	actical course 2		07-MSL2-102-m01		
Module	coord	inator		Module offered by		
Coordin	nator B	ioCareers		Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	pl. of module(s)		
10	(not) s	successfully completed				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate	Please consult with	course advisory serv	vice in advance.	
Conten	ts					
Practica	al cour	se, summer school or wo	rkshop on specific to	pics in biology (dura	ition: 4-6 weeks).	
Intende	ed learı	ning outcomes				
	•	specific methods and lab	•	ected fields of biolo	gy. Ability to apply these me-	
Course	S (type, n	number of weekly contact hours, l	anguage — if other than Ger	man)		
P (no in	format	ion on SWS (weekly cont	act hours) and cours	e language available	2)	
module is Studen followin	creditab ts will l ng opti	le for bonus) be informed about the le ons will be chosen: a) wr	ngth and scope of the itten examination (30	e assessment prior to to 60 minutes, incl	o the course. Usually, one of the uding multiple choice questions)	
					30 to 60 minutes) or d) oral exentation (20 to 45 minutes)	
Allocat		· · · ·			13 2000	
Additio	nal inf	ormation				
Worklo	ad					
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
						
Module	Module appears in					
		ee (1 major) Biology (201				
	Master's degree (1 major) Biology (2010)					
Master	Master's degree (1 major) Biology (2014)					



Modul	e title		Abbreviation			
Labora	tory pr	actical course 3		07-MSL3-102-m01		
Modul	Module coordinator M				l .	
Coordi	nator B	ioCareers		Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
15	(not)	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ester	graduate	Please consult with	course advisory serv	vice in advance.	
Conter	nts					
Practic	al cour	se, summer school or wo	rkshop on specific to	pics in biology (dura	tion: 6-9 weeks).	
Intend	ed learı	ning outcomes				
		specific methods and lab		ected fields of biolo	gy. Ability to apply these me-	
Course	es (type, r	umber of weekly contact hours, l	anguage — if other than Ger	rman)		
P (no i	nformat	ion on SWS (weekly cont	act hours) and cours	e language available	2)	
Studer followi or b) lo	s creditab nts will ing opti og (appr	le for bonus) De informed about the lei Dons will be chosen: a) wr TOX. 10 to 30 pages) or c)	ngth and scope of the itten examination (3c oral examination of c	e assessment prior to to 60 minutes, incli one candidate each (to the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)	
	tion of p	· · · · · · · · · · · · · · · · · · ·	100 (upprox. 30 to 00	minutes) or e) press	entation (20 to 45 initiates)	
Additio	onal inf	ormation				
Worklo	oad					
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
Master	Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010)					
Master	Master's degree (1 major) Biology (2014)					



Module title					Abbreviation	
Practic	al Cour	se as exchange student		07-MSA1-102-m01		
Module	Module coordinator			Module offered by		
Coordin	nator B	ioCareers		Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	(not)	successfully completed				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate	Please consult with	course advisory serv	vice in advance.	
Conten	ts					
Practica	al cour	se during stay abroad on	a selected topic in bi	ology (duration: 2-3	weeks).	
Intende	ed learı	ning outcomes				
	•	selected methods and la hniques later on in a rese	•	lected fields of biolo	ogy. Ability to apply these me-	
Course	S (type, n	umber of weekly contact hours, l	anguage — if other than Ger	rman)		
P (no in	format	ion on SWS (weekly cont	act hours) and cours	e language available	e)	
module is Studen followin	creditab ts will l ng opti	le for bonus) be informed about the le ons will be chosen: a) wr	ngth and scope of the itten examination (3c	e assessment prior to to 60 minutes, incli	o the course. Usually, one of the uding multiple choice questions)	
					30 to 60 minutes) or d) oral exentation (20 to 45 minutes)	
Allocat		· · · · · · · · · · · · · · · · · · ·		· · · · ·		
Additio	nal inf	ormation				
Worklo	ad					
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
-						
Module	Module appears in					
Master	Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)					



Module title					Abbreviation	
Practic	al Cour	se as exchange student	2		07-MSA2-102-m01	
Module	Module coordinator Mo				l.	
Coordi	nator B	ioCareers		Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	ipl. of module(s)		
10	(not)	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate	Please consult with	course advisory serv	vice in advance.	
Conten	ıts	, =				
		ment on a biological top to present their data.	ic. Students spend 4-	6 weeks working on	a well-defined scientific project	
Intend	ed learı	ning outcomes				
		selected methods and la hniques later on in a rese		lected fields of biol	ogy. Ability to apply these me-	
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)		
P (no ir	nformat	tion on SWS (weekly cont	act hours) and cours	e language available	<u>e</u>)	
		sessment (type, scope, langua	ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
followi or b) lo	ng opti og (appi	ons will be chosen: a) wr rox. 10 to 30 pages) or c)	itten examination (3c oral examination of c	to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)	
Allocat	tion of p	olaces				
Additio	onal inf	ormation				
Worklo	ad					
						
Teaching cycle						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module	Module appears in					
Master	's degr	ee (1 major) Biology (201	1)			
Master	Master's degree (1 major) Biology (2010)					



Module title					Abbreviation	
Practic	al Cour	se as exchange student		07-MSA3-102-m01		
Module	Module coordinator Mod				L	
Coordi	nator B	ioCareers		Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
15	(not)	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	graduate	Please consult with	course advisory serv	vice in advance.	
Conten	its					
	•	ment on a biological top how to present their data	•	9 weeks working on	a well-defined scientific lab pro-	
Intend	ed learı	ning outcomes				
		selected methods and la hniques later on in a rese		lected fields of biolo	ogy. Ability to apply these me-	
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	rman)		
P (no ir	nformat	ion on SWS (weekly cont	act hours) and cours	e language available	<u>e)</u>	
		sessment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
followi or b) lo	ng opti g (appı	ons will be chosen: a) wr ox. 10 to 30 pages) or c)	itten examination (3c oral examination of c	o to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)	
Allocat	ion of p	olaces				
Additio	nal inf	ormation	•			
Worklo	ad					
Teaching cycle						
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module	Module appears in					
Master	's degr	ee (1 major) Biology (201	1)			
Master	Master's degree (1 major) Biology (2010)					



Compulsory Electives 2

(15 ECTS credits)



Module title					Abbreviation
Presentation of Scientific Data					07-MPWD-102-m01
Modul	e coord	inator		Module offered by	
Coordinator BioCareers				Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
5	(not)	successfully completed			
Duration Module level			Other prerequisites	i	
1 semester graduate					
Contents					

Principles for the preparation of scientific manuscripts, citations and the presentation of scientific data. Students will write a scientific mini review and present this in a talk (15 minutes). Content, structure, coherence and the logical chain of arguments will be discussed. Students will write and publish (where possible) a scientific paper or review on a selected topic in a scientific journal. The students' work will be based on original papers as well as on reviews and will follow the instructions of a scientific journal of the students' choice. These instructions can be found on the website of the respective journal under "Instructions to Authors" or similar. Both length of chapters and structure of the article should be based on the style of the journal selected. Attendance of no less than 20 scientific talks (e.g., defences of doctoral theses, presentations of research projects, retreats) including presentations by guest speakers. Students are to obtain proof of attendance from the organisers or spea-

Intended learning outcomes

The students are familiar with the details of publishing scientific data in written and oral form. They have become familiar with the methodology of scientific publishing in oral or written fashion. In addition, they have enhanced their English reading, speaking and writing skills.

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

This module comprises 2 module components. Information on courses will be listed separately for each module component.

- o7-MPWD-1-102: S (no information on SWS (weekly contact hours) and course language available)
- o7-MPWD-2-102: S (no information on SWS (weekly contact hours) and course language available)

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

Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

Assessment in module component 07-MPWD-1-102: Publication and Presentation

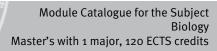
- 4 ECTS, Method of grading: (not) successfully completed
- Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

Assessment in module component o7-MPWD-2-102: Scientific Talks

- 1 ECTS, Method of grading: (not) successfully completed
- Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

Allocation of places

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 182 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	





Additional information

Workload
Teaching cycle
Referred to in LPO I (examination regulations for teaching-degree programmes)
Module appears in
Master's degree (1 major) Biology (2010)



Module title					Abbreviation	
Good Practice, Biosafety and Nature Conservation					07-MGLN-102-m01	
Module coordinator Module offere					l .	
Coordi	Coordinator BioCareers			Faculty of Biology		
ECTS	Meth	Method of grading Only after succ. co		npl. of module(s)		
5	nume	rical grade				
Duration Module level		Other prerequisites	Other prerequisites			
1 semester graduate						
Contor	Contonts					

Political instruments to conserve biodiversity (convention on biodiversity (CBD), German strategy on biodiversity) as well as corporate social responsibility in the private economy, sponsoring and marketing are discussed. These topics are critically analysed with regard to sustainability, credibility and effectiveness. In addition, the students become familiar with strategies to prevent biodiversity loss and actively contribute to these activities. Good practice in the biosciences, quality assurance approaches and quality culture. Structure, idea and fundamental principles of quality management approaches, DIN EN ISO 9001, regulatory documents and framework in the biosciences including biotechnology, biosafety, biosecurity, risk assessment.

Intended learning outcomes

The students know relevant international conventions and German regulations on the conservation of biodiversity. They have become familiar with the regulatory and political framework for the conservation of biodiversity. They are aware of corporate responsibilities in this regard and know how to support cooperative approaches among companies and organisations on environmental protection. The students are familiar with the fundamental principles of "good practice" in research and development, and have understood the fundamental principles of quality management circles. They have developed a distinct sensitivity towards biosafety and biosecurity issues and know how to properly handle biological agents and organisms, including GMOs. In addition, they have developed a sensitivity towards the complex interdependencies in nature and are able to critically discuss socio-ethical issues in the bioscience area. Students possess the knowledge and skills required of a biosafety officer and are qualified for working in CSR or environmental management at major enterprises or mediating between environmental organisations, governments and the private sector.

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

This module comprises 2 module components. Information on courses will be listed separately for each module component.

- o7-MGLN-1-102: S (no information on SWS (weekly contact hours) and course language available)
- o7-MGLN-2-102: V + S (no information on SWS (weekly contact hours) and course language available)

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

Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

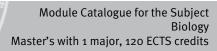
Assessment in module component o7-MGLN-1-102: Biosafety and Bioethics

- 2 ECTS, Method of grading: (not) successfully completed
- Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

Assessment in module component o7-MGLN-2-102: Quality Management , Good Practice, Biosafety Quality Management , Good Practice, Biosafety

- 3 ECTS, Method of grading: numerical grade
- written examination (30 to 60 minutes, including multiple choice questions)

Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 184 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	





Allocation of places
Additional information
Workload
-
Teaching cycle
Referred to in LPO I (examination regulations for teaching-degree programmes)
Module appears in
Master's degree (1 major) Biology (2010)



Module title					Abbreviation
Epistemology, Biopsychology					07-MEWB-102-m01
Modul	e coord	inator		Module offered by	l.
Coordinator BioCareers				Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	
5	(not)	successfully completed			
Duration Module level		Other prerequisites			
1 semester graduate					
Combants					

Philosophical foundations and scientific principles, history and theory of mind, human memory, intentional decision making and biochemical principles of cognitive and emotional processes. Fundamental terms and principles in biology are discussed.

Intended learning outcomes

The students are familiar with the hallmarks of the history of natural sciences. They have developed an increased awareness of how to use fundamental terms and definitions as well as of risks and concerns arising with knowledge and technical developments in the biosciences.

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

This module comprises 3 module components. Information on courses will be listed separately for each module component.

- o7-MEWB-1-102: V (no information on SWS (weekly contact hours) and course language available)
- o7-MEWB-2-102: S (no information on SWS (weekly contact hours) and course language available)
- o7-MEWB-3-102: S (no information on SWS (weekly contact hours) and course language available)

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

Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

Assessment in module component o7-MEWB-1-102: Lecture Epistemology, Biopsychology

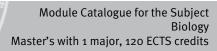
- 1 ECTS, Method of grading: (not) successfully completed
- Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

Assessment in module component o7-MEWB-2-102: Brain and Psyche

- 2 ECTS, Method of grading: (not) successfully completed
- Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

Assessment in module component o7-MEWB-3-102: Epistemology and History

- 2 ECTS, Method of grading: (not) successfully completed
- Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)





Allocation of places
Additional information
Workload
Teaching cycle
Referred to in LPO I (examination regulations for teaching-degree programmes)
Module appears in
Master's degree (1 major) Biology (2010)



Module title					Abbreviation	
Entrep	reneuri	al Spirit in Biosciences			07-MUDB-102-m01	
Modul	e coord	inator		Module offered by		
Coordi	nator B	ioCareers		Faculty of Biology		
ECTS	Metho	Method of grading Only after		npl. of module(s)		
5	(not)	successfully completed				
Duration Module level			Other prerequisites			
1 semester graduate						
Cantan	Contonts					

Companies are presented to students opt. together with cooperative workshops. These workshops may also deal with the process of founding start-up companies in the biotech or biomedical sectors. Topics on intellectual property protection are discussed.

Intended learning outcomes

Students gained an insight into the business plans and market of companies. They gained an insight into industrial research and development.

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

This module has 2 components; information on courses listed separately for each component.

- o7-MUDB-1-102: S (no information on language and number of weekly contact hours available)
- o7-MUDB-2-102: S (no information on language and number of weekly contact hours available)

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

This module has the following 2 assessment components. Unless stated otherwise, students must pass all of these assessment components to pass the module as a whole..

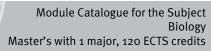
Assessment component to module component 07-MUDB-1-102: Unternehmerisches Denken Biowissenschaften

- 5 ECTS credits, method of grading: numerical grade
- Students will be informed about the method, length and scope of the assessment prior to the course. Usually, the following option will be chosen: a) written examination (30-60 minutes, auch Multiple Choice) or b) log (approx. 10-30 pages) or c) oral examination of on candidate each (30-60 minutes) or d) oral examination in groups up to three candidates (approx. 30-60 minutes) or e) presentation (20-45 minutes).

Assessment component to module component o7-MUDB-2-102: Interdisziplinäre Projektarbeit

- 5 ECTS credits, method of grading: numerical grade
- Students will be informed about the method, length and scope of the assessment prior to the course. Usually, the following option will be chosen: a) written examination (30-120 minutes) or b) log (ca.10-30 pages) or c) oral examination of on candidate each (20-30-60 minutes) or d) oral examination in groups up to three candidates (approx. 30-60 minutes) or e) presentation (20-45 minutes).

Allocation of places
Additional information
Workload
Teaching cycle
Referred to in LPO I (examination regulations for teaching-degree programmes)
Module appears in





Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Module title					Abbreviation	
Specif	ic Curri	cular Activities in Biologi	cal Sciences 1		07-MVMINT1-102-m01	
Modul	Module coordinator			Module offered by		
Coordi	nator B	ioCareers		Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	ıpl. of module(s)		
2	(not)	successfully completed				
Duratio	on	Module level	Other prerequisites			
1 seme	ester	graduate	Please consult with	course advisory serv	vice.	
Conter	nts					
	r specil ass req		weekly contact hour) in biological or nat	ural sciences; assessment ungra-	
Intend	ed lear	ning outcomes				
Specif	ic skills	and knowledge on an in	terdisciplinary subjec	t in the biological o	natural sciences.	
Course	es (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)		
V (no i	nformat	tion on SWS (weekly cont	act hours) and cours	e language available	e)	
		sessment (type, scope, langua ble for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
regula	rattend	lance as certified by the l	ecturer			
Allocat	tion of p	olaces				
Additio	onal inf	ormation				
Worklo	oad					
Teachi	ng cycl	e				
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
Master	Master's degree (1 major) Biology (2011)					
	Master's degree (1 major) Biology (2010)					
Master	Master's degree (1 major) Biology (2014)					



Modul	Module title Abbreviation					
Specific Curricular Activities in Biological Sciences 2					07-MVMINT2-102-m01	
Modul	e coord	inator		Module offered by		
Coordi	nator B	ioCareers		Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
3	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ester	graduate	Please consult with	course advisory serv	vice.	
Conter	nts					
		ic lecture, seminar, work es with a graded assessr		ical course (1 weekly	y contact hour) in biological or	
Intend	ed lear	ning outcomes				
Specif	ic skills	and knowledge on an in	terdisciplinary subjec	t in the biological or	r natural sciences.	
Course	es (type, r	number of weekly contact hours, l	anguage — if other than Ger	rman)		
V (no i	nformat	ion on SWS (weekly cont	act hours) and cours	e language available	e)	
		sessment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
followi or b) lo	ing opti og (appi	ons will be chosen: a) wr ox. 10 to 30 pages) or c)	itten examination (3c oral examination of c	o to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)	
	tion of p	· · · · · ·		, ,,	, 13 ,	
Additio	onal inf	ormation				
Worklo	oad					
Teachi	ng cycl	е				
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
Master's degree (1 major) Biology (2011)						
	Master's degree (1 major) Biology (2010)					
Master	Master's degree (1 major) Biology (2014)					



Modul	e title	_	Abbreviation				
Specif	ic Curri	cular Activities in Biologi		07-MVMINT3-102-m01			
Modul	e coord	linator		Module offered by			
Coordi	nator B	lioCareers		Faculty of Biology			
ECTS	Meth	od of grading	Only after succ. com	npl. of module(s)			
4	(not)	successfully completed					
Durati	on	Module level	Other prerequisites				
1 seme	ester	graduate	Please consult with	course advisory serv	vice.		
Conte	nts						
		fic lecture, seminar, work ces; assessment ungrade		ical course (2 weekl	y contact hours) in biological or		
Intend	ed lear	ning outcomes					
Specif	ic skills	and knowledge on an in	terdisciplinary subjec	t in the biological or	natural sciences.		
Course	es (type,	number of weekly contact hours, I	anguage — if other than Ger	man)			
V (no i	nforma	tion on SWS (weekly cont	act hours) and cours	e language available	2)		
		sessment (type, scope, langua ble for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether		
regula	r attend	lance as certified by the l	ecturer				
Alloca	tion of	places					
Addition	onal inf	ormation	•				
Workle	oad						
Teachi	ng cycl	e					
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Module appears in							
	Master's degree (1 major) Biology (2011)						
	_	ree (1 major) Biology (201					
Maste	Master's degree (1 major) Biology (2014)						



Module	e title	Abbreviation					
Specifi	c Curri	cular Activities in Biolog		07-MVMINT4-102-m01			
Module	Module coordinator			Module offered by	L		
Coordi	nator B	ioCareers		Faculty of Biology			
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
5	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	graduate	Please consult with	course advisory sen	vice.		
Conten	ts		•				
		ic lecture, seminar, work		tical course (2 weekl	y contact hours) in biological or		
Intende	ed lear	ning outcomes					
Specifi	c skills	and knowledge on an in	terdisciplinary subjec	ct in the biological o	r natural sciences.		
Course	S (type, r	number of weekly contact hours,	language — if other than Gei	rman)			
V (no ir	nformat	tion on SWS (weekly con	tact hours) and cours	e language available	2)		
Studen following or b) lo	creditab its will ng opti g (appr	be informed about the le ons will be chosen: a) wi ox. 10 to 30 pages) or c)	ngth and scope of the itten examination (3co) oral examination of co	e assessment prior to to 60 minutes, incl one candidate each (o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)		
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
<u></u>							
Teaching cycle							
							
Referred to in LPO I (examination regulations for teaching-degree programmes)							
							
Module appears in							
	_	ee (1 major) Biology (201					
	_	ee (1 major) Biology (201	· ·				
waster	Master's degree (1 major) Biology (2014)						



Module title					Abbreviation	
Extracurricular Activities Outside of Natural Sciences 1					07-MV1-102-m01	
Module	e coord	inator		Module offered by		
Coordi	nator B	ioCareers		Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
2	(not) s	successfully completed	-			
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate	Please consult with	course advisory serv	vice.	
Conten	ts					
science dule co econor	es. Asse ordina nics, ar	essment ungraded, pass tors. Possible subjects and law.	required (2 ECTS cred	dits); decision on cre	ner than biology or the natural edit transfer to be made by moges, social studies, psychology,	
		ning outcomes				
		and knowledge on a spe			or the natural sciences.	
		umber of weekly contact hours, l			`	
		ion on SWS (weekly cont				
		eessment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
regular	attend	ance as certified by the l	ecturer			
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
	_	ee (1 major) Biology (201: ee (1 major) Biology (201:				
	_	ee (1 major) Biology (2010 ee (1 major) Biology (2010				
Master 3 degree (1 major) Biology (2014)						



Modul	le title			Abbreviation			
Extrac	urricula	r Activities Outside of N	atural Sciences 2		07-MV2-102-m01		
Module coordinator				Module offered by			
Coord	inator B	ioCareers		Faculty of Biology			
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)			
3	nume	rical grade					
Durati	on	Module level	Other prerequisites				
1 sem	ester	graduate	Please consult with	course advisory ser	vice.		
Conte	nts		•				
scienc dule c econo	ces. Ass oordina mics, a	essment ungraded, pass tors. Possible subjects a nd law.	required (3 ECTS cree	dits); decision on cre	ner than biology or the natural edit transfer to be made by moges, social studies, psychology,		
Intend	led lear	ning outcomes					
Specif	ic skills	and knowledge on a spe	ecific subject in an ar	ea other than biolog	y or the natural sciences.		
		number of weekly contact hours,					
V (no i	informa	tion on SWS (weekly con	tact hours) and cours	e language availabl	e)		
		sessment (type, scope, langua ble for bonus)	age — if other than German,	examination offered — if no	ot every semester, information on whether		
follow or b) l	ing opti og (app	ons will be chosen: a) wirox. 10 to 30 pages) or c)	ritten examination (30 oral examination of o	to 60 minutes, incl one candidate each	to the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral exentation (20 to 45 minutes)		
Alloca	tion of	places		-			
Additi	onal inf	ormation					
Workl	oad						
Teaching cycle							
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Module appears in							
Maste	r's degr	ee (1 major) Biology (201	1)				
Maste	r's degr	ee (1 major) Biology (201	.o)				
11	Markada da mara (maria) Dialam (anna)						

Master's degree (1 major) Biology (2014)



Module title					Abbreviation		
Extrac	urricula	r Activities Outside of Na	07-MV3-102-m01				
Modul	Module coordinator Module o						
Coordi	nator B	ioCareers		Faculty of Biology			
ECTS	Metho	od of grading	Only after succ. con	pl. of module(s)			
4	(not)	successfully completed					
Duratio	on	Module level	Other prerequisites				
1 seme	ester	graduate	Please consult with	course advisory serv	vice.		
Conter	nts						
or othe science dule co	er institi es. Asse	utions, in which students essment ungraded, pass tors. Possible subjects aı	will acquire addition required (4 ECTS cred	al skills in areas oth dits); decision on cre	y contact hours), offered by JMU ner than biology or the natural edit transfer to be made by mo- ges, social studies, psychology,		
Intend	ed lear	ning outcomes					
Specifi	ic skills	and knowledge on a spe	cific subject in an are	ea other than biology	y or the natural sciences.		
Course	es (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)			
V (no i	nformat	ion on SWS (weekly cont	act hours) and cours	e language available	e)		
		sessment (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether		
regula	r attend	ance as certified by the l	ecturer				
Allocat	tion of p	olaces					
Additio	onal inf	ormation					
Worklo	oad						
Teaching cycle							
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Module appears in							
	_	ee (1 major) Biology (201:					
	_	ee (1 major) Biology (2010					
Master	Master's degree (1 major) Biology (2014)						



Modul	e title		Abbreviation			
Extrac	urricula	ar Activities Outside of Na		07-MV4-102-m01		
Modul	e coord	linator		Module offered by	-	
Coordi	nator B	ioCareers		Faculty of Biology		
ECTS	Meth	od of grading	Only after succ. con	ıpl. of module(s)		
5	nume	rical grade				
Duration	on	Module level	Other prerequisites			
1 seme	ester	graduate	Please consult with	course advisory ser	vice.	
Conter	nts					
scienc dule co econor	es. Ass oordina mics, a	essment ungraded, pass itors. Possible subjects a nd law.	required (5 ECTS cred	lits); decision on cre	ner than biology or the natural edit transfer to be made by moges, social studies, psychology,	
Intend	ed lear	ning outcomes				
Specif	ic skills	and knowledge on a spe	cific subject in an are	ea other than biolog	y or the natural sciences.	
Course	es (type, i	number of weekly contact hours, I	anguage — if other than Ger	man)		
V (no i	nforma	tion on SWS (weekly cont	act hours) and cours	e language availabl	e)	
		sessment (type, scope, langua ble for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
followi or b) lo	ng opti og (app	ons will be chosen: a) wr rox. 10 to 30 pages) or c)	itten examination (3c oral examination of c	to 60 minutes, incl ne candidate each	o the course. Usually, one of the uding multiple choice questions) (30 to 60 minutes) or d) oral ex- entation (20 to 45 minutes)	
Alloca	tion of	places				
Additio	onal inf	ormation				
Workload						
Teaching cycle						
Referre	ed to in	LPO I (examination regulation	s for teaching-degree progra	mmes)		
Modul	e appea	ars in				

Master's degree (1 major) Biology (2011) Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)



Module title					Abbreviation
Entrepreneurial Management in Biosciences					07-MEMB-102-m01
Module coordinator				Module offered by	l .
Coordi	nator B	ioCareers		Faculty of Biology	
ECTS	Meth	od of grading	Only after succ. con	ıpl. of module(s)	
10	(not)	successfully completed			
Duration Module level		Other prerequisites			
1 semester graduate					
Contents					

Overview of the bioscience sector with a particular focus on research and development, fundamental methods and technologies, recent developments and trends in established as well as up-and-coming high-tech industries, legal framework, financing and business models, best practice examples of start-ups as well as established companies, criteria of project-based work, characteristics and elements of project work, case studies, project work in interdisciplinary teams of students where possible, selected guest lectures giving the course practical relevance.

Intended learning outcomes

Students have acquired an insight into industries and developments in the natural sciences. They are familiar with the characteristics of industries and established businesses as well as with specific characteristics of start-up companies and up-and-coming technologies. Students are also familiar with the criteria of project-based work and have gained experience working in interdisciplinary teams. They are better qualified to evaluate what approaches or methods from individual disciplines are most suitable for solving a particular problem. The experience of interdisciplinary project work students have acquired will help them enhance their entrepreneurial skills.

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

This module comprises 2 module components. Information on courses will be listed separately for each module component.

- o7-MEMB-1-102: S (no information on SWS (weekly contact hours) and course language available)
- o7-MEMB-2-102: S (no information on SWS (weekly contact hours) and course language available)

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

Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

Assessment in module component o7-MEMB-1-102: Basics in the Management of Natural Sciences

- 5 ECTS, Method of grading: (not) successfully completed
- Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

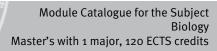
Assessment in module component o7-MEMB-2-102: Interdisciplinary Project

- 5 ECTS, Method of grading: (not) successfully completed
- Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

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Master's with 1 major Biology (2010)	JMU Würzburg • generated 26-Aug-2024 • exam.	page 198 / 206
	reg. data record Master (120 ECTS) Biologie - 2010	





Additional information
Workload
Teaching cycle
-
Referred to in LPO I (examination regulations for teaching-degree programmes)
Module appears in
Master's degree (1 major) Biology (2010)



Module title Abbreviation							
Scienti	ific Tea	ching 1			07-DR1-102-m01		
Module	e coord	inator		Module offered by			
degree	progra	mme coordinator Biologi	e (Biology)	Faculty of Biology			
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
2	(not)	successfully completed					
Duratio	on	Module level	Other prerequisites				
1 seme	ster	graduate	Please consult with	course advisory serv	vice.		
Conten	its						
ganisir	ng cour		contents and organi		udents or pupils. Students or- ree programme coordinator. The		
Intend	ed lear	ning outcomes					
Ability	to inde	pendently organise, plan	and deliver courses.				
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	rman)			
V (no ii	nformat	tion on SWS (weekly cont	act hours) and cours	e language available	<u>e)</u>		
		sessment (type, scope, langua ble for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether		
succes	sful co	mpletion as certified by t	he lecturer				
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
Teaching cycle							
r 							
Referred to in LPO I (examination regulations for teaching-degree programmes)							
<u></u>							
Module appears in							
	_	ee (1 major) Biology (201	· ·				
	_	ee (1 major) Biology (201					
Mastel	Master's degree (1 major) Biology (2014)						



Module	e title	,	Abbreviation				
Scienti	Scientific Teaching 2				07-DR2-102-m01		
Module	e coord	inator		Module offered by			
degree	progra	mme coordinator Biologi	e (Biology)	Faculty of Biology			
ECTS	Metho	od of grading	Only after succ. con	ipl. of module(s)			
3	(not)	successfully completed					
Duratio	on	Module level	Other prerequisites				
1 seme	ster	graduate	Please consult with	course advisory serv	vice.		
Conten	its						
Studen	ıts orga		e advice on contents		Bachelor's students or pupils. om the degree programme coor-		
Intend	ed lear	ning outcomes					
Ability	to inde	pendently organise, plan	and deliver courses.				
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	rman)			
V (no ir	nformat	tion on SWS (weekly cont	act hours) and cours	e language available	e)		
		sessment (type, scope, langua ble for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether		
succes	sful co	mpletion as certified by t	he lecturer				
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
Teaching cycle							
							
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Module appears in							
	Master's degree (1 major) Biology (2011)						
	_	ee (1 major) Biology (201					
waster	Master's degree (1 major) Biology (2014)						



Module title					Abbreviation	
Scientific Teaching 3					07-DR3-102-m01	
Module	Module coordinator			Module offered by		
degree programme coordinator Biologie (Biol			e (Biology)	Faculty of Biology		
ECTS	CTS Method of grading Only after succ. compl. o			ipl. of module(s)	l. of module(s)	
4	(not)	successfully completed				
Duration Module level Other prerequisites						
1 seme	1 semester graduate Please consult v			th course advisory service.		
Conten	its					
ganisir	ng cour		contents and organi		udents or pupils. Students or- ree programme coordinator. The	
Intend	ed lear	ning outcomes				
Ability	to inde	pendently organise, plan	and deliver courses.			
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	rman)		
V (no ii	nforma	tion on SWS (weekly cont	act hours) and cours	e language available	e)	
		sessment (type, scope, langua ble for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
succes	successful completion as certified by the lecturer					
Allocat	ion of	olaces				
Additional information						
Workload						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
-						
Module appears in						
Master's degree (1 major) Biology (2011)						
	Master's degree (1 major) Biology (2010)					
master	Master's degree (1 major) Biology (2014)					



Module	Module title Abbreviation					
Scientific Teaching 4					07-DR4-102-m01	
Module coordinator				Module offered by		
degree programme coordinator Biologie (Bi			e (Biology)	Faculty of Biology		
ECTS	ECTS Method of grading Only after succ. co			pl. of module(s)		
5	(not)	successfully completed				
Duration Module level Other prerequisites						
1 seme	ster	graduate	Please consult with	course advisory serv	rice.	
Conten	its					
ganisir	ng cours		contents and organi		udents or pupils. Students or- ee programme coordinator. The	
Intend	ed learı	ning outcomes				
Ability	to inde	pendently organise, plan	and deliver courses.			
Course	S (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)		
V (no ii	nformat	tion on SWS (weekly cont	act hours) and cours	e language available	2)	
		sessment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether	
succes	sful co	mpletion as certified by t	he lecturer			
Allocat	ion of p	olaces				
Additional information						
Worklo	ad					
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
	Master's degree (1 major) Biology (2011)					
	Master's degree (1 major) Biology (2010)					
Master's degree (1 major) Biology (2014)						



Modul	Module title Abbreviation					
Supervising Tutorial Master 1					07-FT1-102-m01	
Module coordinator				Module offered by		
degree programme coordinator Biologie			e (Biology)	Faculty of Biology		
ECTS	T T T T T T T T T T T T T T T T T T T					
3	(not)	successfully completed		, ,,		
Duratio	on	Module level	Other prerequisites			
		Please consult with course advisory service.				
Conter	ıts					
		tors, students will mentoes, in particular exercises.		ng courses in particu	ılar and will help organise and	
Intend	ed lear	ning outcomes				
ence supervising a group and helping students with personal matters. The tutors have thus enhanced their own interpersonal skills and know how to share their expertise in exploring complex topics. In addition, the tutors have learned to plan and organise key elements of their own university education and the university education of the students they mentor.						
Course	es (type, r	number of weekly contact hours, l	anguage — if other than Ger	rman)		
T (no ir	nformat	ion on SWS (weekly cont	act hours) and cours	e language available	2)	
	Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)					
succes	sful co	mpletion as certified by t	he lecturer			
Allocat	tion of p	places				
Additio	onal inf	ormation	,			
Workload						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
Master's degree (1 major) Biology (2011)						
	Master's degree (1 major) Biology (2010)					
Master's degree (1 major) Biology (2014)						



Module	Module title Abbreviation					
Supervising Tutorial Master 2					07-FT2-102-m01	
Module coordinator				Module offered by		
degree programme coordinator Biologi			e (Biology)	<u> </u>		
ECTS	Metho	od of grading	Only after succ. con			
4	(not)	successfully completed				
Duratio	ration Module level Other prerequisites					
1 semester graduate Ple			Please consult with	Please consult with course advisory service.		
Conten	ts					
		tors, students will mento s, in particular exercises.		ng courses in particu	ılar and will help organise and	
Intende	ed lear	ning outcomes				
ence supervising a group and helping students with personal matters. The tutors have thus enhanced their own interpersonal skills and know how to share their expertise in exploring complex topics. In addition, the tutors have learned to plan and organise key elements of their own university education and the university education of the students they mentor.						
		number of weekly contact hours, lion on SWS (weekly cont)	
,			·		•	
		le for bonus)	ge — if other than German, o	examination offered — if no	ot every semester, information on whether	
succes	sful co	mpletion as certified by t	ne lecturer			
Allocat						
Additional information						
Workload						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
Master's degree (1 major) Biology (2011)						
	Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)					
Master's degree (1 Major) Biology (2014)						



Module title Abbreviation						
Supervising Tutorial Master 3 07-FT3-102-m01					07-FT3-102-m01	
Module coordinator				Module offered by	Į.	
degree programme coordinator Biologie (Biology)			e (Biology)	Faculty of Biology		
ECTS						
5	(not) s	successfully completed		•		
Duratio	on	Module level	Other prerequisites	her prerequisites		
1 semester graduate Please consult with course advisory service.			vice.			
Conten	its					
Tutors	will sup	port other students on th	neir way towards aca	demic success.		
Intend	ed learı	ning outcomes				
ence supervising a group and helping students with personal matters. The tutors have thus enhanced their own interpersonal skills and know how to share their expertise in exploring complex topics. In addition, the tutors have learned to plan and organise key elements of their own university education and the university education of the students they mentor.						
Course	S (type, n	number of weekly contact hours, l	anguage — if other than Ger	rman)		
T (no ir	format	ion on SWS (weekly cont	act hours) and cours	e language available	2)	
Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)						
succes	sful cor	mpletion as certified by t	he lecturer			
Allocat	ion of p	olaces				
Additional information						
Workload						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
						
Module appears in						
Master's degree (1 major) Biology (2011)						
Master's degree (1 major) Biology (2010) Master's degree (1 major) Biology (2014)						
master's degree (1 major) Biology (2014)						