
Modulhandbuch
Biology - Bachelor's Programme
im Wintersemester 2021/2022
erstellt am 21/01/22

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Basismodule

bio215 - Introduction to Biology

Module label	Introduction to Biology			
Module code	bio215			
Credit points	9.0 KP			
Workload	270 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Basismodule • Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Basismodule 			
Responsible persons	<p>Gerlach, Gabriele (Module responsibility)</p> <p>Zotz, Gerhard (Module counselling)</p> <p>Sienknecht, Ulrike (Module counselling)</p> <p>Gerlach, Gabriele (Authorized examiners)</p> <p>Köppl, Christine (Authorized examiners)</p> <p>Zotz, Gerhard (Authorized examiners)</p> <p>Sienknecht, Ulrike (Authorized examiners)</p>			
Prerequisites				
Skills to be acquired in this module	<p>++ biological knowledge</p> <p>+ knowledge of techniques in biology</p> <p>++ biologically relevant knowledge in the natural sciences and mathematics</p> <p>+ cross-disciplinary knowledge and thinking</p>			
Module contents	<p>Lecture conveys knowledge in</p> <ul style="list-style-type: none"> • evolution, ecology and biodiversity (WiSe) • animal physiology and developmental biology (SoSe) 			
Reader's advisory	<p>Campbell et al. "Biologie", Pearson</p> <p>Sadava et al. "Purves, Biologie", Springer</p>			
Links				
Language of instruction	German			
Duration (semesters)	2 Semester			
Module frequency				
Module capacity	300			
Modullevel / module level	BC (Basiscurriculum / Base curriculum)			
Modulart / typ of module	Pflicht / Mandatory			
Lehr-/Lernform / Teaching/Learning method	Vorlesung			
Vorkenntnisse / Previous knowledge				
Examination	Time of examination	Type of examination		
Final exam of module	lecture-free periods after each series	2 written examinations (WiSe and SoSe)		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		6	SoSe und WiSe	84
Seminar (PFLICHT für Erstsemester!)			WiSe	0
Tutorial (optinal)			--	0
Total time of attendance for the module				84 h

bio210 - General Biology

Module label	General Biology			
Module code	bio210			
Credit points	12.0 KP			
Workload	360 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Basismodule • Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Basismodule 			
Responsible persons	<p>Zotz, Gerhard (Module counselling)</p> <p>Gerlach, Gabriele (Authorized examiners)</p>			
Prerequisites				
Skills to be acquired in this module	<p>++ biological knowledge + knowledge of biological working methods ++ biologically relevant knowledge in the natural sciences and mathematics + interdisciplinary knowledge & thinking</p> <p>The students are enabled:</p> <ul style="list-style-type: none"> • to understand and explain the fundamentals of the subjects dealt with in "Purves" or "Campbell" and to give examples, • to find the rôle of biology in other special fields according to their inclinations and abilities, • to reflect upon the rôle of biology in other special fields and in a modern society, • to approach their individual planning of studies according to their inclinations and abilities 			
Module contents	The lecture imparts the basic knowledge of biology and covers the subjects dealt with in the textbooks "Purves" or "Campbell"			
Reader's advisory	Purves, Spektrum Verlag, latest edition Campbell, Pearson Verlag, latest edition			
Links				
Language of instruction	German			
Duration (semesters)	2 Semester			
Module frequency	jährlich			
Module capacity	unlimited			
Modullevel / module level				
Modulart / typ of module	Pflicht / Mandatory			
Lehr-/Lernform / Teaching/Learning method	(pro Semester)			
Vorkenntnisse / Previous knowledge				
Examination	Time of examination	Type of examination		
Final exam of module	Written examination either in the final week of the semester or in the first week of the semester vacation	One written examination in the winter and summer terms (50 % each)		
		PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		8		112
Tutorial			WiSe	0
Seminar (PFLICHT für Erstsemester!)	Pflichtveranstaltung für alle Studierenden im 1. Semester (Bachelor und Master)		SoSe und WiSe	0
Total time of attendance for the module				112 h

bio220 - Introductory Zoology-Botany

Module label	Introductory Zoology-Botany
Module code	bio220
Credit points	9.0 KP
Workload	270 h
Applicability of the module	<ul style="list-style-type: none">• Bachelor's Programme Biology (Bachelor) > Basismodule• Dual-Subject Bachelor's Programme Biology (Bachelor) > Basismodule
Responsible persons	<p>Zotz, Gerhard (Module responsibility)</p> <p>Bininda-Emonds, Olaf (Module responsibility)</p> <p>Glatzel, Thomas (Module responsibility)</p> <p>Ahrichs, Wilko (Module counselling)</p> <p>Glatzel, Thomas (Module counselling)</p> <p>Ahrichs, Wilko (Authorized examiners)</p> <p>Bininda-Emonds, Olaf (Authorized examiners)</p> <p>Zotz, Gerhard (Authorized examiners)</p> <p>Will, Maria (Authorized examiners)</p>
Prerequisites	keine
Skills to be acquired in this module	<p>++ biological knowledge + knowledge of biological working methods ++ biologically relevant knowledge in the natural sciences and mathematics + abstract, logical, analytical thinking + independent learning and (research-based) working + teamwork</p> <p>THEORY:</p> <ul style="list-style-type: none">* To understand the fundamentals of reconstructing phylogenetic relationships* To know the phylogenetic system and ground pattern of high-ranking ancestral animal species* To know the cell structures, organization, and reproduction of plants and animals* To know the morphology and anatomy of individual species <p>PRACTICE:</p> <ul style="list-style-type: none">* To improve and verify the theoretical knowledge acquired from lectures and textbooks by studying the original* To train visual and tactile perception by studying various species* To learn that representations in textbooks are abstractions of a much more complex reality* To be able to criticize representations in textbooks and models* To acquire the knowledge of the function in living animals and plants by studying preserved specimens* Learning how to follow preparation instructions* Learning that the organization of individual species may be highly variable* Preparing records or drawings from the information obtained by original specimens studied
Module contents	<p>GENERAL: Light microscopic methods are applied to study structures in plants and animals. Records in the form of descriptions and drawings.</p> <p>BOTANY: Morphological structure and reproduction of various plant organization types with a focus on the structure of plant tissue. Representation of the relationships between structure and function with regard to absorption processes, transport processes, transpiration, and photosynthesis.</p> <p>ZOOLOGY: Morphological structure of animal tissues. Biology of selected partial taxa and metazoans. Principles of phylogenetic systematics and the phylogenetic position in the animal system of the taxa dealt with.</p>
Reader's advisory	<p>GENERAL:: Campbell: Biologie (Spektrum Verlag) or Purves: Biologie (Spektrum Verlag), latest edition</p> <p>ZOOLOGY: V. Storch: Kükenthal Zoologisches Praktikum, one of the latest editions; Optional: Ax, P. (1999-2001): Das System der Metazoa (I,II, III), Fischer Verlag. Westheide/Rieger (1996): Spezielle Zoologie " First part: Einzeller und Wirbellose Tiere, Gustav Fischer Verlag,</p>

Stuttgart; Westheide, Wilfried; Rieger, Reinhard Spezielle Zoologie. Second part: Wirbel- oder Schädeltiere 2003, 714 S., 650 s/w Abb. Gebunden ISBN 3-8274-0900-4.

BOTANY: Script; Kück, Wolff Botanisches Grundpraktikum, 2nd edition, Springer, 2008, UTB; Grundlagen der Botanik, UTB; Lüttge, Kluge, Bauer, Botanik, WILEY-VCH, 2010

Links

Language of instruction	German
Duration (semesters)	1 Semester
Module frequency	jährlich
Module capacity	unlimited
Modullevel / module level	BC (Basiscurriculum / Base curriculum)
Modulart / typ of module	Pflicht / Mandatory

Lehr-/Lernform / Teaching/Learning method

Vorkenntnisse / Previous knowledge

Examination	Time of examination	Type of examination
Final exam of module	Written examination in the final week of the current part	1 written examination (50%) following the part Zoology 1 written examination (50%) following the part Botany; voluntary bonus (10%) in the second part (botany) PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.

Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		2		28
Exercises		4		56
Tutorial			WiSe	0
Total time of attendance for the module				84 h

bio233 - Basics in Microbiology and Genetics

Module label	Basics in Microbiology and Genetics			
Module code	bio233			
Credit points	6.0 KP			
Workload	180 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Basismodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Basismodule 			
Responsible persons	<p>Rabus, Ralf Andreas (Module responsibility)</p> <p>Claußen, Maike (Module counselling)</p> <p>Rabus, Ralf Andreas (Authorized examiners)</p> <p>Claußen, Maike (Authorized examiners)</p>			
Prerequisites				
Skills to be acquired in this module	<p>++ biological knowledge</p> <p>+ knowledge of biological working methods</p> <p>+ biologically relevant knowledge in the natural sciences and mathematics</p> <p>+ deepened expertise in biological specialist field</p> <p>+ independent learning and (research-based) working</p>			
Module contents	<p>Grundlagen der Mikrobiologie und Genetik:</p> <p>Mikrobiologie: Moleküle des Lebens; Energie und Enzyme,; Zentralstoffwechsel; Atmung; Photosynthese; anaerober Stoffwechsel; Chemolithotrophie; prokaryotische Zellstruktur; mikrobielle Diversität; Bedeutung von Mikroorganismen für Mensch, Pflanze und Tier, Biotechnologie und Erdsystem.</p> <p>Genetik: Mitose und Zellzyklus, Meiose und Rekombination, Mendelsche Vererbungslehre, chromosomale und molekulare Grundlagen der Vererbung; Replikation, Transkription, Translation, Mutation und DNA-Reparatur, Organisation des genetischen Materials und Genregulation</p>			
Reader's advisory	<p>Purves Biologie (Spektrum Verlag), neuste Ausgabe</p> <p>Campbell et al., Biologie (Pearson Verlag), neuste Ausgabe</p> <p>Fuchs, Allgemeine Mikrobiologie (Thieme Verlag), neueste Auflage</p>			
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency				
Module capacity	unlimited			
Modullevel / module level	BC (Basiscurriculum / Base curriculum)			
Modulart / typ of module	Pflicht / Mandatory			
Lehr-/Lernform / Teaching/Learning method	lecture			
Vorkenntnisse / Previous knowledge				
Examination	Time of examination	Type of examination		
Final exam of module	Klausuren direkt nach jeweiligem Veranstaltungsteil	2 Prüfungsleistungen:		
		<ul style="list-style-type: none"> • 1 Klausur (50 %) nach dem Teil Mikrobiologie • 1 Klausur (50 %) nach dem Teil Genetik 		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		4	SoSe oder WiSe	56
Tutorial (optional)			SoSe und WiSe	0
Total time of attendance for the module				56 h

bio236 - Basics in Biochemistry and Cell Biology

Module label	Basics in Biochemistry and Cell Biology	
Module code	bio236	
Credit points	6.0 KP	
Workload	180 h	
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Basismodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Basismodule 	
Responsible persons	<p>Koch, Karl-Wilhelm (Module responsibility)</p> <p>Winklhofer, Michael (Module counselling)</p> <p>Koch, Karl-Wilhelm (Authorized examiners)</p> <p>Winklhofer, Michael (Authorized examiners)</p>	
Prerequisites	Zulassung BSc Biologie	
Skills to be acquired in this module	<p>++ biological knowledge</p> <p>+ knowledge of biological working methods</p> <p>++ biologically relevant knowledge in the natural sciences and mathematics</p> <p>+ abstract, logical, analytical thinking</p>	
Module contents	Introduction to structure and function of main biochemical building blocks; amino acids, carbohydrates, proteins, nucleic acids, introduction to metabolism; biological membranes and transmembrane transport; structure and function of cell organelles; protein synthesis and postranslational modification, intracellular transport and trafficking, signalling agents and cellular communication, cell division, controlled cell death	
Reader's advisory	<p>Biochemie, Müller-Esterl</p> <p>Stryer Biochemie, Berg, Tymoczko, Stryer</p> <p>Lehninger Prinzipien der Biochemie, David L. Nelson und Michael M. Cox</p> <p>Principles of Biochemistry, Horton et al.</p> <p>Zellbiologie, Helmut Plattner und Joachim Hentschel</p> <p>Molekulare Zellbiologie, Gerald Karp</p> <p>Molekularbiologie der Zelle, Bruce Alberts</p>	
Links		
Language of instruction	German	
Duration (semesters)	1 Semester	
Module frequency		
Module capacity	unlimited	
Modullevel / module level	BC (Basiscurriculum / Base curriculum)	
Modulart / typ of module	Pflicht / Mandatory	
Lehr-/Lernform / Teaching/Learning method	lecture	
Vorkenntnisse / Previous knowledge		
Examination	Time of examination	Type of examination
Final exam of module	during the semester	written exam
Course type	Lecture	
SWS	4	
Frequency	WiSe	
Workload attendance	56 h	

bio230 - Microbiology and Cell Biology

Module label	Microbiology and Cell Biology			
Module code	bio230			
Credit points	9.0 KP			
Workload	270 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Basismodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Basismodule 			
Responsible persons	<p>Rabus, Ralf Andreas (Authorized examiners)</p> <p>Nothwang, Hans Gerd (Authorized examiners)</p> <p>Claußen, Maike (Module counselling)</p>			
Prerequisites				
Skills to be acquired in this module	<p>++ biological knowledge ++ knowledge of biological working methods + biologically relevant knowledge in the natural sciences and mathematics + abstract, logical, analytical thinking + deepened expertise in biological specialist field + teamwork</p> <p>Theory: Basic knowledge in Biochemistry, Microbiology, Cell Biology and Genetics Practice: Basic methodological skills acquired by performing experiments</p>			
Module contents	<p>Fundamentals of Microbiology and Cell Biology: Molecules of life; energy and enzymes; central metabolism; breathing; photosynthesis; anaerobic metabolism; chemolithotrophy; procaryotic and eucaryotic cell structures; microbial diversity; importance of microorganisms for human beings, plants, animals, biotechnology and earth system cell group; signal transmission and communication between cells; meiosis; mitosis; mendelian inheritance; chromosomal and molecular basis of inheritance; replication; transcription; translation; genomic organization; mutation and repair.</p>			
Reader's advisory	<p>Purves et al., Biologie (Spektrum Verlag), latest edition Campbell, Pearson Verlag, latest edition Fuchs, Allgemeine Mikrobiologie (Thieme Verlag), latest edition Lodisch et al., Molekulare Zellbiologie (Spektrum Verlag), latest edition</p>			
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	jährlich			
Module capacity	unlimited			
Modullevel / module level	BC (Basiscurriculum / Base curriculum)			
Modulart / typ of module	Pflicht / Mandatory			
Lehr-/Lernform / Teaching/Learning method				
Vorkenntnisse / Previous knowledge				
Examination	Time of examination	Type of examination		
Final exam of module	Written examination in the final week of the current part	<p>1 written examination (50%) following the part Microbiology 1 written examination (50%) following the part Cell Biology</p> <p>Records are collected following every course day.</p> <p>PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply</p>		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		4		56
Exercises		2		28
Total time of attendance for the module				84 h

Aufbaumodule

bio255 - Basics in Biochemistry and Cell Biology

Module label	Basics in Biochemistry and Cell Biology			
Module code	bio255			
Credit points	9.0 KP			
Workload	270 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Aufbaumodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Aufbaumodule 			
Responsible persons	<p>Nolte, Arne (Module responsibility)</p> <p>Nolte, Arne (Authorized examiners)</p>			
Prerequisites				
Skills to be acquired in this module	<p>++ biological knowledge ++ knowledge of biological working methods ++ biologically relevant knowledge in the natural sciences and mathematics + statistics & scientific programming ++ interdisciplinary knowledge & thinking ++ abstract, logical, analytical thinking ++ deepened expertise in biological specialist field</p> <p>The field of molecular ecology examines relationships among genotypes, phenotypes and the environment to explain evolution and diversity of organisms. The lecture will introduce basics in genomics, molecular evolution and population genetics to explore properties of the genome and the organism from an evolutionary perspective. Central aspects are the adaptation of species to their environment and ecological change, speciation, the genetic basis of phenotypic change. Methods and data used in genomics and molecular ecology will be introduced during the lecture and exercises.</p>			
Module contents	<p>Lecture: the lecture conveys knowledge about the fields of genomics, evolution and organismic biology. Moreover laboratory methods as well as basics and background information on the analysis of genetic and genomic datasets are given.</p> <p>Excercise: Modern data sets and up to date methods in genomics and population genetics are introduced. The practical emphasizes computer based data analyses.</p>			
Reader's advisory				
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency				
Module capacity	30			
Modullevel / module level	AC (Aufbaucurriculum / Composition)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method	Vorlesung, Übung			
Vorkenntnisse / Previous knowledge				
Examination	Time of examination		Type of examination	
Final exam of module	exam			
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		1.5	WiSe	21
Exercises		4.5	WiSe	63
Total time of attendance for the module				84 h

bio256 - Form and Identification - Flora and Fauna

Module label	Form and Identification - Flora and Fauna
Module code	bio256
Credit points	12.0 KP
Workload	360 h
Applicability of the module	<ul style="list-style-type: none"> Bachelor's Programme Biology (Bachelor) > Aufbaumodule
Responsible persons	<p>Albach, Dirk Carl (Module responsibility)</p> <p>Glatzel, Thomas (Module responsibility)</p> <p>Will, Maria (Module counselling)</p> <p>Niedringhaus, Rolf (Module counselling)</p> <p>von Hagen, Klaus Bernhard (Module counselling)</p> <p>Donat, Frank Henrik (Module counselling)</p> <p>Albach, Dirk Carl (Authorized examiners)</p> <p>Glatzel, Thomas (Authorized examiners)</p> <p>Will, Maria (Authorized examiners)</p> <p>Niedringhaus, Rolf (Authorized examiners)</p> <p>von Hagen, Klaus Bernhard (Authorized examiners)</p> <p>Donat, Frank Henrik (Authorized examiners)</p>
Prerequisites	
Skills to be acquired in this module	<p>+ biological knowledge</p> <p>+ knowledge of biological working methods</p> <p>+ independent learning and (research-based) working</p> <p>+ knowledge of safety and environmental issues</p> <p>The module conveys the basic knowledge in animal and plant identification and their diversity. This is essential for all parts of biology concerned with plants and animals. Especially, education for the field of conservation and schools rely on these expertises. Therefore, topics and methods relevant for these professions are emphasized. Students shall get a basic knowledge of species and learn methods to identify them. This is connected with a systemic knowledge of habitats in Northwestern Germany. Basic evaluation competence in the field of biodiversity, species diversity and conservation is conveyed to sensitize students for a respectful treatment of organisms.</p>
Module contents	<p>L: Introduction to the diversity of native flora and fauna, presentation of important plant and animal groups, introduction to systematics and major traits, ecological perspectives of species diversity</p> <p>EXE: Working with identification keys for plants and animals and their classification</p> <p>EXC: Excursion to characteristic habitats of Northwestern Germany, practicing work with field guides and identification of important traits</p>
Reader's advisory	<p>Botany:</p> <p>Rothmaler - Exkursionsflora von Deutschland, Band 2 - Grundband, Spektrum Akademischer Verlag</p> <p>Zoology:</p> <p>M. Schaefer: Brohmer - Fauna von Deutschland, ab 20. Auflage</p> <p>B. Klausnitzer: Stresemann - Exkursionsfauna von Deutschland. Band 1: Wirbellose (ohne In-sekten)</p>
Links	
Language of instruction	German
Duration (semesters)	2 Semester
Module frequency	
Module capacity	unlimited
Modullevel / module level	AC (Aufbaucurriculum / Composition)
Modulart / typ of module	Pflicht / Mandatory
Lehr-/Lernform / Teaching/Learning method	Vorlesung, Übung, Exkursion
Vorkenntnisse / Previous knowledge	

Examination	Time of examination	Type of examination
Final exam of module	exams at the end of the semester	1 written exam (botany) 50%, 1 written exam (zoology) 50%, excursion protocols (ungraded), additional requirements regarding presence and ungraded activities as specified by docents responsible for the module

Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		2	SoSe oder WiSe	28
Exercises		5	SoSe oder WiSe	70
Study trip		1	SoSe oder WiSe	14
Total time of attendance for the module				112 h

bio265 - General Microbiology

Module label	General Microbiology			
Module code	bio265			
Credit points	9.0 KP			
Workload	270 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Aufbaumodule • Bachelor's Programme Environmental Science (Bachelor) > Wahlpflichtmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Aufbaumodule 			
Responsible persons	<p>Rabus, Ralf Andreas (Module responsibility)</p> <p>Rhiel, Erhard (Module counselling)</p> <p>Wöhlbrand, Lars (Module counselling)</p> <p>Rabus, Ralf Andreas (Authorized examiners)</p> <p>Rhiel, Erhard (Authorized examiners)</p> <p>Wöhlbrand, Lars (Authorized examiners)</p>			
Prerequisites				
Skills to be acquired in this module	Basic knowledge of microbiology; ability to assess and apply fundamental microbiological techniques.			
Module contents	Imparting basic microbiological skills and working methods: Chemistry and structure of the cell, fundamentals of metabolism, taxonomy and phylogeny of microorganisms, diversity of microorganisms, insight into Applied Microbiology, propagation of microorganisms.			
Reader's advisory	Allgemeine Mikrobiologie, Schlegel 1992; Brock-Biology of Microorganisms, eds.: Madigan et al., 2003; Grundlagen der Mikrobiologie, Cypionka, 2003			
Links	http://www-icbm.de/~gmb/11429.html			
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	jährlich			
Module capacity	unlimited			
Modullevel / module level	---			
Modulart / typ of module	je nach Studiengang Pflicht oder Wahlpflicht			
Lehr-/Lernform / Teaching/Learning method				
Vorkenntnisse / Previous knowledge				
Examination	Time of examination	Type of examination		
Final exam of module		1 written examination		
		PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		2	WiSe	28
Seminar		1	WiSe	14
Practical training		4	WiSe	56
Total time of attendance for the module				98 h

bio275 - Basics in Physiology

Module label	Basics in Physiology			
Module code	bio275			
Credit points	9.0 KP			
Workload	270 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Aufbaumodule • Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Aufbaumodule 			
Responsible persons	<p>Heyers, Dominik (Module responsibility)</p> <p>Köppl, Christine (Module counselling)</p> <p>Dedek, Karin (Module counselling)</p> <p>Heyers, Dominik (Authorized examiners)</p> <p>Köppl, Christine (Authorized examiners)</p> <p>Dedek, Karin (Authorized examiners)</p>			
Prerequisites				
Skills to be acquired in this module	<p>++ biological knowledge ++ knowledge of biological working methods + biologically relevant knowledge in the natural sciences and mathematics + statistics & scientific programming ++ abstract, logical, analytical thinking + deepened expertise in biological specialist field ++ independent learning and (research-based) working + teamwork</p> <p>Basic knowledge on physiological processes and their underlying mechanisms with a focus on human physiology. Designing, performing, documenting and analysing physiological experiments; troubleshooting, basic statistics, "experimental thinking".</p>			
Module contents	<p>The lecture covers topics such as cell physiology, sensory physiology, neurophysiology, functions of the vegetative system, blood physiology/immune response, blood cycle, respiration and digestion. Emphasis will be on human physiology. In the following lab exercises, students get the opportunity to perform physiological experiments linking to topics from the lecture. By performing experiments on themselves and computer simulations students will gain insight into the underlying physiological principles.</p>			
Reader's advisory	<p>Klinke, Pape, Kurtz, Silbernagl: Physiologie, Aufl. 4, 2014 Schmidt, Lang, Heckmann: Physiologie des Menschen mit Pathophysiologie, Aufl. 31, 2011 Wehner, Gehring: Zoologie, Aufl. 25, 2013</p>			
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	jährlich			
Module capacity	144			
Modullevel / module level	AC (Aufbaucurriculum / Composition)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method	Vorlesung, Übung			
Vorkenntnisse / Previous knowledge				
Examination	Time of examination	Type of examination		
Final exam of module	within a few weeks after the winter term lecture period	written exam (100%)		
		<p>Written protocols and active participation in the lab exercises. A cumulative bonus can be obtained with good lab protocols. The decision whether a given protocol deserves the bonus lies with the respective supervisor of each experiment. An exam mark of 1.0 is achievable without a bonus. A bonus cannot be applied to pass a failed exam.</p>		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance

Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		4	WiSe	56
Exercises	A C H T U N G Die endgültige Einteilung für die Teilkurse wird über Stud.IP vorgenommen. Bitte achten Sie zu BEGINN des WiSe auf entsprechende Mitteilungen über Stud.IP.	2	WiSe	28
Total time of attendance for the module				84 h

bio285 - Plant Physiology, Molecular Biology and Biotechnology

Module label	Plant Physiology, Molecular Biology and Biotechnology			
Module code	bio285			
Credit points	9.0 KP			
Workload	270 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Aufbaumodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Aufbaumodule 			
Responsible persons	<p>Laubinger, Sascha (Module responsibility)</p> <p>Laubinger, Sascha (Authorized examiners)</p>			
Prerequisites				
Skills to be acquired in this module	<p>++ biological knowledge</p> <p>++ knowledge of biological working methods</p> <p>+ biologically relevant knowledge in the natural sciences and mathematics</p> <p>+ statistics & scientific programming</p> <p>+ abstract, logical, analytical thinking</p> <p>+ independent learning and (research-based) working</p> <p>+ teamwork</p> <p>+ (scientific) communication skills</p>			
Module contents	<p>V: Theoretische Kenntnisse über den Stoffwechsel und die (molekulare) Steuerung der Entwicklung pflanzlicher Organismen, Einführung in die Gentechnik.</p> <p>S: Vorstellung der Experimente, Darstellung der theoretischen Grundlagen der Experimente, Vorstellung aktueller Fachliteratur.</p> <p>Ü: Physiologie von Licht- und Dunkelreaktionen, Photosyntheseleistung und Standortfaktoren. Einfluss von Mineralstoffen auf das Pflanzenwachstum, Funktion des Lichtes als Entwicklungsfaktor, Funktion von Pflanzenhormonen als Entwicklungsfaktoren. Versuche zur molekularen Stressphysiologie. Analyse und Nachweis von gentechnisch veränderten Pflanzen in Lebensmitteln.</p>			
Reader's advisory	<p>Campbell/Reece: Biologie (Pearson); Schopfer/Brennicke: Pflanzenphysiologie (Springer Spektrum); Buchanan/Gruissem/Jones: Biochemistry and molecular biology of plants (American Society of Plant Physiologists); Heldt/Piechulla: Pflanzenbiochemie (Springer Spektrum).</p>			
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	jährlich			
Module capacity	32			
Modullevel / module level	AC (Aufbaucurriculum / Composition)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method	Vorlesung, Seminar, Übung			
Vorkenntnisse / Previous knowledge				
Examination	Time of examination	Type of examination		
Final exam of module	spätestens in der letzten Woche der Vorlesungszeit		exam	
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		2	SuSe	28
Seminar		1	SuSe	14
Practical training		4	SuSe	56
Total time of attendance for the module				98 h

bio295 - Genetics

Module label	Genetics			
Module code	bio295			
Credit points	9.0 KP			
Workload	270 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Aufbaumodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Aufbaumodule • Master of Education Programme (Special Needs Education) Biology (Master of Education) > Frühere Module 			
Responsible persons	<p>Claußen, Maike (Module responsibility)</p> <p>Hartmann, Anna-Maria (Module counselling)</p> <p>Nothwang, Hans Gerd (Module counselling)</p> <p>Ebbers, Lena (Module counselling)</p> <p>Claußen, Maike (Authorized examiners)</p> <p>Nothwang, Hans Gerd (Authorized examiners)</p> <p>Hartmann, Anna-Maria (Authorized examiners)</p> <p>Ebbers, Lena (Authorized examiners)</p>			
Prerequisites				
Skills to be acquired in this module	<p>++ biological knowledge</p> <p>++ knowledge of biological working methods</p> <p>+ biologically relevant knowledge in the natural sciences and mathematics</p> <p>+ abstract, logical, analytical thinking</p> <p>++ deepened expertise in biological specialist field</p> <p>++ independent learning and (research-based) working</p> <p>++ data presentation and evidence-based discussion (written and spoken)</p> <p>+ teamwork</p> <p>++ (scientific) communication skills</p> <p>+ project and time management</p> <p>+ knowledge of safety and environmental issues</p> <p>Fundamentals of genetics, performing experiments, quantitative analyses.</p>			
Module contents	general and molecular genetics; mechanisms of mutation, recombination, DNA repair, regulation of transcription; quantitative experiments, prokaryotes and eukaryotes, human genome project, personalized medicine, genetic engineering, safety regulations, sterile working			
Reader's advisory	Campbell/Reece Biologie (latest edition, Pearson Verlag), Strachan & Read Molekulare Humangenetik (latest edition, Spektrum Verlag); Purves Biologie (latest edition, Spektrum Verlag).			
Links	http://			
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	jährlich			
Module capacity	72			
Modullevel / module level	AC (Aufbaucurriculum / Composition)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method	Vorlesung, Seminar, Übung			
Vorkenntnisse / Previous knowledge	biochemisches und genetisches Grundlagenwissen			
Examination	Time of examination		Type of examination	
Final exam of module			Written examination (100%), ungraded presentation, protocol	
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		1.5	WiSe	21
Exercises		3	WiSe	42

Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Seminar		1.5	WiSe	21
Total time of attendance for the module				84 h

bio240 - Flora and Fauna

Module label	Flora and Fauna			
Module code	bio240			
Credit points	10.0 KP			
Workload	300 h			
Applicability of the module	<ul style="list-style-type: none"> Bachelor's Programme Biology (Bachelor) > Aufbaumodule 			
Responsible persons	<p>Albach, Dirk Carl (Authorized examiners)</p> <p>Glatzel, Thomas (Authorized examiners)</p> <p>von Hagen, Klaus Bernhard (Module counselling)</p> <p>Will, Maria (Module counselling)</p>			
Prerequisites				
Skills to be acquired in this module	<p>+ biological knowledge</p> <p>+ knowledge of biological working methods</p> <p>+ independent learning and (research-based) working</p> <p>+ knowledge of safety and environmental issues</p> <p>To determine species-rich taxa and to verify the results independently using relevant literature</p>			
Module contents	<p>L: Introduction to the variety of indigenous flora and fauna, presentation of important plant families and animal groups, studying the characteristics important for determination, introduction to systematics. Moreover, subjects are included that present ecological aspects of the taxa dealt with.</p> <p>E: Applying literature to determine animal and plant species and to classify them systematically.</p> <p>EX: Excursions to the characteristic North German biotopes. The excursions focus on correct identification and classification of plants and animals according to the properties of the living organism.</p>			
Reader's advisory	<p>Botany: Rothmaler - Exkursionsflora von Deutschland, Band 2 - Grundband, Spektrum Akademischer Verlag</p> <p>Zoology: M. Schaefer: Brohmer - Fauna von Deutschland, from 20th edition</p>			
Links				
Language of instruction	German			
Duration (semesters)	2 Semester			
Module frequency	jährlich			
Module capacity	unlimited			
Reference text	<p>Modulverantwortung Teil Fauna (Wintersemester): Dr. Thomas Glatzel Modulverantwortung Teil Flora (Sommersemester): Prof. Dr. Dirk Albach</p>			
Modullevel / module level	AC (Aufbaucurriculum / Composition)			
Modulart / typ of module	Pflicht / Mandatory			
Lehr-/Lernform / Teaching/Learning method				
Vorkenntnisse / Previous knowledge				
Examination	Time of examination	Type of examination		
Final exam of module	<p>Botany: Written examination before the end of the lecture</p> <p>Zoology: Written examination before the end of the lecture</p>	<p>1 written examination (Botany 50 %)</p> <p>1 written examination (Zoology 50 %)</p> <p>ungraded minutes</p> <p>PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.</p>		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		2		28
Exercises		4		56
Study trip		1		14
Total time of attendance for the module				98 h

bio260 - General Microbiology

Module label	General Microbiology			
Module code	bio260			
Credit points	10.0 KP			
Workload	300 h			
Applicability of the module	<ul style="list-style-type: none"> Bachelor's Programme Biology (Bachelor) > Aufbaumodule 			
Responsible persons	<p>Rhiel, Erhard (Module counselling)</p> <p>Wöhlbrand, Lars (Module counselling)</p> <p>Rabus, Ralf Andreas (Authorized examiners)</p>			
Prerequisites				
Skills to be acquired in this module	<p>++ biological knowledge ++ knowledge of biological working methods + biologically relevant knowledge in the natural sciences and mathematics + interdisciplinary knowledge & thinking + abstract, logical, analytical thinking ++ deepened expertise in biological specialist field + independent learning and (research-based) working + data presentation and evidence-based discussion (written and spoken) ++ teamwork + project and time management + knowledge of safety and environmental issues</p> <p>Basic knowledge of microbiology; ability to assess and apply fundamental microbiological techniques.</p>			
Module contents	Imparting basic microbiological skills and working methods: Chemistry and structure of the cell, fundamentals of metabolism, taxonomy and phylogeny of microorganisms, diversity of microorganisms, insight into Applied Microbiology, propagation of microorganisms.			
Reader's advisory	Allgemeine Mikrobiologie, Schlegel 1992; Brock-Biology of Microorganisms, eds.: Madigan et al., 2003; Grundlagen der Mikrobiologie, Cypionka, 2003			
Links	http://www-icbm.de/~gmb/11429.html			
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	jährlich			
Module capacity	unlimited			
Modullevel / module level	AC (Aufbaucurriculum / Composition)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method				
Vorkenntnisse / Previous knowledge				
Examination	Time of examination	Type of examination		
Final exam of module		1 written examination Protocols		
		PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		2		28
Seminar		1		14
Practical training		4		56
Total time of attendance for the module				98 h

bio270 - Basic Concepts in Animal Physiology

Module label	Basic Concepts in Animal Physiology	
Module code	bio270	
Credit points	10.0 KP	
Workload	300 h	
Applicability of the module	<ul style="list-style-type: none"> Bachelor's Programme Biology (Bachelor) > Aufbaumodule 	
Responsible persons	<p>Heyers, Dominik (Authorized examiners)</p> <p>Köppl, Christine (Module counselling)</p> <p>Dedek, Karin (Module counselling)</p>	
Prerequisites		
Skills to be acquired in this module	<p>++ biological knowledge ++ knowledge of biological working methods + biologically relevant knowledge in the natural sciences and mathematics + statistics & scientific programming ++ abstract, logical, analytical thinking + deepened expertise in biological specialist field ++ independent learning and (research-based) working + teamwork</p> <p>Basic knowledge on physiological processes and their underlying mechanisms with a focus on human physiology. Performing, analysing and documenting physiological experiments.</p>	
Module contents	<p>The lecture (Vorlesung: 5.02.271 - Physiologie der Tiere und des Menschen) covers topics such as cell physiology, sensory physiology, neurophysiology, functions of the vegetative system, blood physiology/immune response, blood cycle, respiration and digestion. Emphasis will be on human physiology. In the following lab exercises, students get the opportunity to perform physiological experiments linking to topics from the lecture. By performing experiments on themselves and computer simulations students will gain insight into the underlying physiological principles.</p>	
Reader's advisory	<p>Klinke, Pape, Kurtz, Silbernagl: Physiologie, Aufl. 6, 2010 Schmidt, Lang, Heckmann: Physiologie des Menschen mit Pathophysiologie, Aufl. 31, 2011 (if available: Wehner, Gehring: Zoologie)</p>	
Links		
Language of instruction	German	
Duration (semesters)	1 Semester	
Module frequency	jährlich	
Module capacity	unlimited	
Modullevel / module level	AC (Aufbaucurriculum / Composition)	
Modulart / typ of module	Wahlpflicht / Elective	
Lehr-/Lernform / Teaching/Learning method		
Vorkenntnisse / Previous knowledge		
Examination	Time of examination	Type of examination
Final exam of module	within a few weeks after the winter term lecture period	written exam (100%)
		<p>To qualify for the exam, the following additional requirements need to be met:</p> <ul style="list-style-type: none"> regular participation in the laboratory experiments (no more than 1 day of absence) lab protocols for each experiment which have been accepted by the respective supervisors <p>A cumulative bonus can be obtained with good lab protocols. The decision whether a given protocol deserves the bonus lies with the respective supervisor of each experiment. The bonus improves the exam mark by maximally two steps (0.7). The bonus is optional, an exam mark of 1.0 is achievable without a bonus. A bonus</p>

Examination	Time of examination	Type of examination		
		cannot be applied to pass a failed exam.		
		PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		4		56
Exercises		3		42
Total time of attendance for the module				98 h

bio280 - Plant Physiology

Module label	Plant Physiology			
Module code	bio280			
Credit points	10.0 KP			
Workload	300 h			
Applicability of the module	<ul style="list-style-type: none"> Bachelor's Programme Biology (Bachelor) > Aufbaumodule 			
Responsible persons	<p>Zotz, Gerhard (Module counselling)</p> <p>Laubinger, Sascha (Authorized examiners)</p>			
Prerequisites				
Skills to be acquired in this module	<p>++ biological knowledge ++ knowledge of biological working methods + biologically relevant knowledge in the natural sciences and mathematics + statistics & scientific programming + abstract, logical, analytical thinking + independent learning and (research-based) working + teamwork + (scientific) communication skills</p> <p>Fundamentals of metabolism and developmental physiology of plants. Theoretical knowledge acquired from lectures and textbooks is improved by experiments, the instructions for experiments are applied independently, laboratory device is handled independently, measured values are calculated independently, the correctness of experimental results is assessed, the results obtained are interpreted and compared to theoretical expectations.</p>			
Module contents	<p>L: Theoretical knowledge of metabolism and of the control of development in plant organisms, introduction to genetic engineering. S: Presentation of experiments, presentation of theoretical fundamentals of experiments. L: Photosynthesis: Physiology of light and dark reactions, photosynthetic ability and environmental factors. Ecophysiology: Influence of mineral substances on plant growth, function of light as developmental factor, function of plant hormones as developmental factors.</p>			
Reader's advisory	<p>Campbell: Biologie; Taiz/Zeiger: Physiologie der Pflanzen (Verlag Spektrum); Buchanan/Gruissem/Jones: Biochemistry and molecular biology of plants (American Society of Plant Physiologists); Kutschera: Prinzipien der Pflanzenphysiologie (Spektrum Akademischer Verlag).</p>			
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	jährlich			
Module capacity	unlimited			
Modullevel / module level	AC (Aufbaucurriculum / Composition)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method				
Vorkenntnisse / Previous knowledge				
Examination	Time of examination	Type of examination		
Final exam of module	in the final week of the semester at the latest	Records		
		PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		2		28
Seminar		1		14
Practical training		4		56
Total time of attendance for the module				98 h

bio290 - Genetics

Module label	Genetics			
Module code	bio290			
Credit points	10.0 KP			
Workload	300 h			
Applicability of the module	<ul style="list-style-type: none"> Bachelor's Programme Biology (Bachelor) > Aufbaumodule 			
Responsible persons	Claußen, Maïke (Authorized examiners) Nothwang, Hans Gerd (Module counselling) Hartmann, Anna-Maria (Module counselling)			
Prerequisites				
Skills to be acquired in this module	++ biological knowledge ++ knowledge of biological working methods + biologically relevant knowledge in the natural sciences and mathematics + abstract, logical, analytical thinking ++ deepened expertise in biological specialist field ++ independent learning and (research-based) working ++ data presentation and evidence-based discussion (written and spoken) + teamwork ++ (scientific) communication skills + project and time management + knowledge of safety and environmental issues Fundamentals of genetics, performing experiments, quantitative analyses.			
Module contents	general and molecular genetics; mechanisms of mutation, recombination, DNA repair, regulation of transcription; quantitative experiments, prokaryotes and eukaryotes, human genome project, personalized medicine, genetic engineering, safety regulations, sterile working			
Reader's advisory	Campbell/Reece Biologie (latest edition, Pearson Verlag), Strachan & Read Molekulare Humangenetik (latest edition, Spektrum Verlag); Purves Biologie (latest edition, Spektrum Verlag).			
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	jährlich			
Module capacity	unlimited			
Modullevel / module level	AC (Aufbaucurriculum / Composition)			
Modulart / typ of module	Pflicht o. Wahlpflicht / compulsory or optional			
Lehr-/Lernform / Teaching/Learning method				
Vorkenntnisse / Previous knowledge				
Examination	Time of examination	Type of examination		
Final exam of module		Written examination (100%) ungraded presentation ungraded protocol PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		1		14
Exercises			WiSe	0
Seminar		1		14
Practical training		4	WiSe	56
Total time of attendance for the module				84 h

Akzentsetzungsmodule

bio300 - Evolutionary Biology

Module label	Evolutionary Biology	
Module code	bio300	
Credit points	15.0 KP	
Workload	450 h	
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 	
Responsible persons	<p>Bininda-Emonds, Olaf (Module responsibility)</p> <p>Bininda-Emonds, Olaf (Authorized examiners)</p> <p>Ahrichs, Wilko (Authorized examiners)</p> <p>Albach, Dirk Carl (Authorized examiners)</p> <p>Gerlach, Gabriele (Authorized examiners)</p> <p>Nolte, Arne (Authorized examiners)</p>	
Prerequisites		
Skills to be acquired in this module	<p>++ biological knowledge + knowledge of biological working methods ++ biologically relevant knowledge in the natural sciences and mathematics + statistics & scientific programming + interdisciplinary knowledge & thinking + abstract, logical, analytical thinking ++ deepened expertise in biological specialist field + independent learning and (research-based) working ++ data presentation and evidence-based discussion (written and spoken) + teamwork ++ (scientific) communication skills + project and time management</p> <p>Introduction to both microevolution (speciation and species concepts, adaptation and selection, behavioural ecology, reproduction systems) and macroevolution. Introduction to phylogenetics (phyloinformatics, molecular systematics, phylogeography).</p>	
Module contents	<p>The lecture imparts basic knowledge in areas including population biology, phylogenetic systematics, phyloinformatics, behavioural and reproduction ecology. These fundamentals are extended in the seminar and exercises.</p>	
Reader's advisory	<p>Freeman, S. and C.J. Herron. 2007. Evolutionary analysis. 4th edition. 800 pp.; Futuyma, D.J. 2007. Evolution. The original with translation. Spektrum Akademischer Verlag. 607 pp.; Knoop, V. and K. Müller. 2009. Gene und Stammbäume: ein Handbuch zur molekularen Phylogenetik. 2. Auflage. Spektrum Akademischer Verlag. 386 pp.; Zrzavy, J., D. Storch, and S. Mihulka. 2009. Evolution: ein Lese-Lehrbuch. Spektrum Akademischer Verlag. 493 pp</p>	
Links		
Language of instruction	German	
Duration (semesters)	1 Semester	
Module frequency	jährlich	
Module capacity	unlimited	
Modullevel / module level	AS (Akzentsetzung / Accentuation)	
Modulart / typ of module	Wahlpflicht / Elective	
Lehr-/Lernform / Teaching/Learning method		
Vorkenntnisse / Previous knowledge		
Examination	Time of examination	Type of examination
Final exam of module	Written examination in the final week of the semester or in the first week following the lecture period.	Written examination (60%) Portfolio (40%)
		PLEASE NOTE:

Examination		Time of examination	Type of examination	
			Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.	
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		2		28
Exercises		6		84
Seminar		2		28
Total time of attendance for the module				140 h

bio310 - General Ecology

Module label	General Ecology
Module code	bio310
Credit points	15.0 KP
Workload	450 h
Applicability of the module	<ul style="list-style-type: none">• Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule• Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule• Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule
Responsible persons	<p>Hillebrand, Helmut (Module responsibility)</p> <p>Niedringhaus, Rolf (Module counselling)</p> <p>Buchwald, Rainer (Module counselling)</p> <p>Striebel, Maren (Module counselling)</p> <p>Zotz, Gerhard (Module counselling)</p> <p>Schupp, Peter (Module counselling)</p> <p>Rohde, Sven (Module counselling)</p> <p>Zotz, Gerhard (Authorized examiners)</p> <p>Hillebrand, Helmut (Authorized examiners)</p> <p>Niedringhaus, Rolf (Authorized examiners)</p> <p>Buchwald, Rainer (Authorized examiners)</p> <p>Schupp, Peter (Authorized examiners)</p> <p>Rohde, Sven (Authorized examiners)</p> <p>Striebel, Maren (Authorized examiners)</p>
Prerequisites	Bestandene Pflichtmodule des Kerncurriculums
Skills to be acquired in this module	<ul style="list-style-type: none">++ biological knowledge++ knowledge of biological working methods++ biologically relevant knowledge in the natural sciences and mathematics+ statistics & scientific programming+ interdisciplinary knowledge & thinking++ abstract, logical, analytical thinking+ deepened expertise in biological specialist field+ independent learning and (research-based) working+ data presentation and evidence-based discussion (written and spoken)+ (scientific) communication skills
Module contents	<p>Allgemeine Ökologie VL (Hillebrand) 2 SWS, 3 KP; Präsenzzeit 21 h, Nachbereitungszeit 69 h; im Wintersemester</p> <p>Theoretische Grundlagen, Ressourcen, Populationsökologie, biologische Interaktionen, Lebensgemeinschaften, Ökosysteme</p> <p>PR/S, 4 SWS, 6 KP; Präsenzzeit 42 h, Nachbereitungszeit 138 h; im folgenden Sommersemester</p> <p>B.Sc. Biologie: alternativ 2 aus 5 Wahlpraktika</p> <p>B.Sc. Umweltwissenschaften: alternativ 1 aus 5 Wahlpraktika</p> <p>PR/S Vegetationsökologie / Naturschutz (Buchwald)</p> <p>Vegetationskundliche Aufnahmemethoden (Artenzusammensetzung, Struktur), Nährstoffverhältnisse des Oberbodens, Mikroklima, Naturschutzprojekte</p> <p>PR/S Zoo-Ökologie (Niedringhaus)</p> <p>Repräsentative Fragestellungen der (terrestrischen) Freiland-Ökologie, Problematik von Erfassungsmethoden sowie der Einfluss abiotischer und biotischer Faktoren auf Struktur und Dynamik von Populationen, Arbeiten im Freiland, Auswertungen im Labor</p> <p>PR/SE Funktionelle Ökologie der Pflanzen (Zotz, Bader)</p> <p>Analyse abiotischer Rahmenbedingungen (u.a. Mikroklima), Wasser-, Nährstoff-, Kohlenstoffhaushalt, Aspekte der Populationsbiologie, Analyse von Pflanzenbeständen (Struktur, Funktion), statistische Auswertung und Modellierung</p>

PR/S Aquatische Ökologie (Hillebrand, Moorhi)
 Experimentelle Analyse von Artwechselwirkungen, zum Beispiel Räuber-Beute und Konkurrenz.
 Experimentelles Design. Auswertung von Proben, Biomassebestimmungen, Auszählungen, Mikroskopie.
 Statistische Analyse. Schreiben unter wissenschaftlicher Publikationsnorm

PR/S Benthische Ökologie (Schupp, Rohde)
 Experimentelle Analyse abiotischer und biotischer Faktoren auf makrobenthische Organismen und
 Gemeinschaften. Salinitäts- und Temperatureinflüsse, Räuber-Beute Beziehungen, Konkurrenzeffekte,
 statistische Auswertung und Verfassung wissenschaftlicher Berichte.
 S Gemeinsames Symposium zu den Praktikumsergebnissen (O-Woche des folgenden Wintersemesters), 4h.

Reader's advisory	<p>VL Allgemeine Ökologie Nentwig, W., Bacher, S., Brandl, R., 2007. Ökologie kompakt. Spektrum Akademischer Verlag, Heidelberg. Vorlesungsunterlagen (Stud-IP)</p> <p>Vegetationsökologie / Naturschutz</p> <p>Zoo-Ökologie Nentwig et al., 2004. Ökologie. Spektrum Lehrbuch, Heidelberg. 466 S. Southwood, T.R.E. & P.A. Henderson 2000: Ecological Methods. Blackwell Science, Oxford. 574 S.</p> <p>Funktionelle Ökologie der Pflanzen Lambers, H., F. S. Chapin , & T. L. Pons. 2008. Plant Physiological Ecology. New York, Springer Verlag.</p> <p>Aquatische Ökologie Lampert, Sommer 1999: Limnoökologie. Thieme Praktikumskript</p> <p>Benthische Ökologie Sommer, U., 2005. Biologische Meereskunde. Springer</p>
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Links	
Language of instruction	German
Duration (semesters)	2 Semester
Module frequency	jährlich
Module capacity	unlimited
Modullevel / module level	AS (Akzentsetzung / Accentuation)
Modulart / typ of module	Wahlpflicht / Elective
Lehr-/Lernform / Teaching/Learning method	<p>V (2 SWS) , S (1 SWS) , PR (3 SWS) VL Ökologie (3 KP) Alternativ 2 aus 5 Wahlpraktika (5+1 KP): PR/SE Vegetationsökologie/Naturschutz PR/SE Funktionelle Ökologie der Pflanzen PR/SE Zoo-Ökologie PR/SE Aquatische Ökologie PR/SE Benthische Ökologie</p>

Vorkenntnisse / Previous knowledge		
Examination	Time of examination	Type of examination
Final exam of module	<p>VL: Ende des Wintersemesters PR: Ende des jeweiligen Praktikumblockes</p>	<p>2 Prüfungsleistungen: 1) Prüfung zur Vorlesung (Klausur; 30%) im 1. Semester des Moduls sowie 2) Portfolio zum Praktikum (Portfolio; 70%) im 2. Semester des Moduls Zum Bestehen des Moduls müssen alle Teilleistungen bestanden sein.</p> <p>Voraussetzung für die Vergabe von Kreditpunkten ist die aktive Teilnahme an: Seminar und Praktikum</p>

Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		2		28
Seminar		1		14
Practical training		3		42
Total time of attendance for the module				84 h

bio325 - Pollination and Dispersal - Concepts

Module label	Pollination and Dispersal - Concepts			
Module code	bio325			
Credit points	6.0 KP			
Workload	180 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 			
Responsible persons	<p>Albach, Dirk Carl (Module responsibility)</p> <p>von Hagen, Klaus Bernhard (Module counselling)</p> <p>Will, Maria (Module counselling)</p> <p>Albach, Dirk Carl (Authorized examiners)</p> <p>von Hagen, Klaus Bernhard (Authorized examiners)</p> <p>Will, Maria (Authorized examiners)</p>			
Prerequisites	bio256 Flora and Fauna			
Skills to be acquired in this module	<ul style="list-style-type: none"> + biological knowledge + knowledge of biological working methods + abstract, logical, analytical thinking + deepened expertise in biological specialist field + independent learning and (research-based) working + data presentation and evidence-based discussion (written and spoken) + teamwork + (scientific) communication skills + project and time management + knowledge of safety and environmental issues <p>Extended knowledge of biodiversity and evolution of plants focusing on reproduction, dispersal, germination and establishment of plants</p>			
Module contents	<p>L: Pollination, dispersal, germination of plants, plant breeding</p> <p>S: Pollination and dispersal biology of plants in a systematic context</p>			
Reader's advisory	The course does not follow a special textbook. The following German literature is recommended to students interested in the course: Dieter Heß – Die Blüte, Eugen Ulmer Verlag as well as Leins & Erbar -Blüte und Frucht, Schweizerbart'sche Verlagsbuchhandlung.			
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	The module will be offered every other year			
Module capacity	12			
Modullevel / module level	AS (Akzentsetzung / Accentuation)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method	Vorlesung, Seminar			
Vorkenntnisse / Previous knowledge				
Examination	Time of examination		Type of examination	
Final exam of module			portfolio	
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		2	SuSe	28
Seminar		2	SuSe	28
Total time of attendance for the module				56 h

bio326 - Pollination and Dispersal - Methods

Module label	Pollination and Dispersal - Methods	
Module code	bio326	
Credit points	6.0 KP	
Workload	180 h	
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule 	
Responsible persons	<p>Albach, Dirk Carl (Module responsibility)</p> <p>von Hagen, Klaus Bernhard (Module counselling)</p> <p>Will, Maria (Module counselling)</p> <p>Albach, Dirk Carl (Authorized examiners)</p> <p>von Hagen, Klaus Bernhard (Authorized examiners)</p> <p>Will, Maria (Authorized examiners)</p>	
Prerequisites	<p>bio325 Pollination and dispersal concepts</p> <p>bio256 Flora/Fauna</p>	
Skills to be acquired in this module	<ul style="list-style-type: none"> + biological knowledge + knowledge of biological working methods + abstract, logical, analytical thinking + deepened expertise in biological specialist field + independent learning and (research-based) working + data presentation and evidence-based discussion (written and spoken) + teamwork + (scientific) communication skills + project and time management + knowledge of safety and environmental issues <p>Extended knowledge of biodiversity and evolution of plants focusing on reproduction, dispersal, germination and establishment of plants</p>	
Module contents	Pollination, fertilisation, dispersal and germination biological experiments in regard of adaptation to environmental factors	
Reader's advisory	The course does not follow a special textbook. The following German literature is recommended to students interested in the course: Dieter Heß – Die Blüte, Eugen Ulmer Verlag as well as Leins & Erbar -Blüte und Frucht, Schweizerbart'sche Verlagsbuchhandlung.	
Links		
Language of instruction	German	
Duration (semesters)	1 Semester	
Module frequency	The module will be offered every other year	
Module capacity	12	
Modullevel / module level	AS (Akzentsetzung / Accentuation)	
Modulart / typ of module	Wahlpflicht / Elective	
Lehr-/Lernform / Teaching/Learning method	Übung	
Vorkenntnisse / Previous knowledge		
Examination	Time of examination	Type of examination
Final exam of module		Portfolio
Course type	Exercises	
SWS	4	
Frequency	SuSe	
Workload attendance	56 h	

bio327 - Pollination and Dispersal - Methods not just for Schools

Module label	Pollination and Dispersal - Methods not just for Schools	
Module code	bio327	
Credit points	9.0 KP	
Workload	270 h	
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 	
Responsible persons	<p>Albach, Dirk Carl (Module responsibility)</p> <p>von Hagen, Klaus Bernhard (Module counselling)</p> <p>Will, Maria (Module counselling)</p> <p>Albach, Dirk Carl (Authorized examiners)</p> <p>von Hagen, Klaus Bernhard (Authorized examiners)</p> <p>Will, Maria (Authorized examiners)</p>	
Prerequisites	<p>bio325 Pollination and dispersal concepts</p> <p>bio256 Flora/fauna</p>	
Skills to be acquired in this module	<p>+ biological knowledge</p> <p>+ knowledge of biological working methods</p> <p>+ abstract, logical, analytical thinking</p> <p>+ deepened expertise in biological specialist field</p> <p>+ independent learning and (research-based) working</p> <p>+ data presentation and evidence-based discussion (written and spoken)</p> <p>+ teamwork</p> <p>+ (scientific) communication skills</p> <p>+ project and time management</p> <p>+ knowledge of safety and environmental issues</p> <p>Extended knowledge of biodiversity and evolution of plants focusing on reproduction, dispersal, germination and establishment of plants</p>	
Module contents	The module introduces methods to study pollination, fertilisation, dispersal and germination in regard of adaptation to environmental factors. Experiments applicable to school lessons will be presented and especially thoroughly discussed.	
Reader's advisory	The course does not follow a special textbook. The following German literature is recommended to students interested in the course: Dieter Heß – Die Blüte, Eugen Ulmer Verlag as well as Leins & Erbar -Blüte und Frucht, Schweizerbart'sche Verlagsbuchhandlung.	
Links		
Language of instruction	German	
Duration (semesters)	1 Semester	
Module frequency	Das Modul wird alle zwei Jahre stattfinden.	
Module capacity	12	
Modullevel / module level	AS (Akzentsetzung / Accentuation)	
Modulart / typ of module	Wahlpflicht / Elective	
Lehr-/Lernform / Teaching/Learning method	Übung	
Vorkenntnisse / Previous knowledge		
Examination	Time of examination	Type of examination
Final exam of module	portfolio	
Course type	Exercises	
SWS	6	
Frequency	SuSe	
Workload attendance	84 h	

bio330 - Marine Ecology

Module label	Marine Ecology
Module code	bio330
Credit points	15.0 KP
Workload	450 h
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule
Responsible persons	<p>Moorthi, Stefanie (Module counselling)</p> <p>Hillebrand, Helmut (Module responsibility)</p> <p>Hillebrand, Helmut (Authorized examiners)</p> <p>Moorthi, Stefanie (Authorized examiners)</p>
Prerequisites	
Skills to be acquired in this module	<p>++ biological knowledge ++ knowledge of biological working methods ++ biologically relevant knowledge in the natural sciences and mathematics + statistics & scientific programming + interdisciplinary knowledge & thinking ++ abstract, logical, analytical thinking ++ deepened expertise in biological specialist field ++ independent learning and (research-based) working ++ data presentation and evidence-based discussion (written and spoken) + teamwork ++ (scientific) communication skills + project and time management</p> <p>Basic knowledge and practical experience in biological oceanography Apply theoretical concepts from different fields in marine ecology Analyse, present, and interpret results from the marine ecological literature and own investigations Acknowledge the importance of general ecological concepts for ecosystem management Gain experience in the application of field and lab methods in ecology</p>
Module contents	<p>Lecture Biological Oceanography 2 SWS = 3 CP. Presence time 24 h, additional study time 66h, winter-term Abiotic environmental conditions in marine systems (light, temperature, chemical and physical properties of the water, waves, tides, global distribution of water masses and currents. Pelagic communities, plankton (phyt-, zoo-, bacterio-, viroplankton), microbial loop, sedimentation, C-and N cycling, Nekton, Fisheries, El Nino, Benthic communities, estuaries.</p> <p>Exercise Concepts in marine ecology 6 SWS = 9 CP. Presence time 70 h, additional study time 200h, winter-term Practical and theoretical exercises on marine ecology, including field studies, experiments and working with case studies from the literature. The focus is on concepts here, pinpointing at general ecological frameworks.</p> <p>Lecture Marine Ecology 2 SWS = 3 CP. Presence time 24 h, additional study time 66h, winter-term Ecology of marine systems: estuaries, rocky and sediment coasts, pelagial, shelves, mangroves, seagrass meadows, coral reefs, deep sea, polar regions. The focus is on ecological specifics and interactions in the biotic communities of these systems. The second half of the lecture will focus on importance and consequences of overfishing, habitat destruction, pollution, climate change and bioinvasion on marine systems.</p>
Reader's advisory	C.M. Lalli, T.R. Parsons, Biological Oceanography: An Introduction, Elsevier, Oxford. U. Sommer, Biologische Meereskunde, Springer Verlag, Heidelberg.
Links	
Language of instruction	German
Duration (semesters)	2 Semester
Module frequency	jährlich
Module capacity	unlimited
Modullevel / module level	AS (Akzentsetzung / Accentuation)
Modulart / typ of module	Wahlpflicht / Elective
Lehr-/Lernform / Teaching/Learning method	
Vorkenntnisse / Previous knowledge	

Examination	Time of examination	Type of examination
Final exam of module	Written exam at the end of the Lecture Marine Ecology	1 written exam (Lecture) (50%), 1 oral presentation (Exercise) (50%)

PLEASE NOTE:
Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.

Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		4		56
Exercises		6		84
Total time of attendance for the module				140 h

bio340 - Morphology, Phylogeny, and Evolution of Metazoa

Module label	Morphology, Phylogeny, and Evolution of Metazoa			
Module code	bio340			
Credit points	15.0 KP			
Workload	450 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 			
Responsible persons	<p>Bininda-Emonds, Olaf (Module responsibility)</p> <p>Ahrichs, Wilko (Module counselling)</p> <p>Bininda-Emonds, Olaf (Authorized examiners)</p> <p>Ahrichs, Wilko (Authorized examiners)</p>			
Prerequisites				
Skills to be acquired in this module	<p>++ biological knowledge + knowledge of biological working methods ++ biologically relevant knowledge in the natural sciences and mathematics + statistics & scientific programming + interdisciplinary knowledge & thinking + abstract, logical, analytical thinking ++ deepened expertise in biological specialist field + independent learning and (research-based) working ++ data presentation and evidence-based discussion (written and spoken) + teamwork ++ (scientific) communication skills + project and time management</p> <p>Upon successful completion of the module the students will gain:</p> <ol style="list-style-type: none"> 1. a survey of topical subjects relating to the morphology and phylogeny of animals, 2. a thorough knowledge of the development of morphological characteristics, 3. technical skills in studying morphological structures, and 4. knowledge into recent hypotheses on the phylogeny of animals. 			
Module contents	<p>Lecture: Details regarding the morphology and evolution of Metazoa from an explicit phylogenetic framework Seminar: Presentation and discussion of recent subjects and issues relating to the evolution of Metazoa; presentation of individual metazoan taxa Exercise: Preparation and documentation of exemplary species of Metazoa; various field studies (e.g. visit to the Dierenpark Emmen or to the Zoo am Meer (Bremerhaven), sampling aquatic micrometazoans, observing birds)</p>			
Reader's advisory	Relevant literature will be announced during the first seminar and is contingent on the latest developments in the research field.			
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	jährlich			
Module capacity	unlimited			
Modullevel / module level	AS (Akzentsetzung / Accentuation)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method				
Vorkenntnisse / Previous knowledge				
Examination	Time of examination	Type of examination		
Final exam of module	Portfolio during the course of the seminar; written examination in the final week of the course or in the first week following the lecture period.	1 Written examination (50%), 1 Portfolio (50%), PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance

Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		2		28
Exercises		5		70
Seminar		2		28
Total time of attendance for the module				126 h

bio355 - Microscopical Anatomy

Module label	Microscopical Anatomy	
Module code	bio355	
Credit points	9.0 KP	
Workload	270 h	
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 	
Responsible persons	<p>Ahrichs, Wilko (Module responsibility)</p> <p>Kieneke, Alexander (Module counselling)</p> <p>Hoppenrath, Mona (Module counselling)</p> <p>Ahrichs, Wilko (Authorized examiners)</p> <p>Kieneke, Alexander (Authorized examiners)</p> <p>Hoppenrath, Mona (Authorized examiners)</p>	
Prerequisites		
Skills to be acquired in this module	<p>++ biological knowledge</p> <p>++ knowledge of biological working methods</p> <p>++ biologically relevant knowledge in the natural sciences and mathematics</p> <p>+ interdisciplinary knowledge & thinking</p> <p>++ abstract, logical, analytical thinking</p> <p>++ deepened expertise in biological specialist field</p> <p>++ independent learning and (research-based) working</p> <p>++ data presentation and evidence-based discussion (written and spoken)</p> <p>+ teamwork</p> <p>++ (scientific) communication skills</p> <p>+ project and time management</p> <p>+ knowledge of safety and environmental issues</p> <p>This course is designed for students to learn about the basic light and electron optical methods. Students will be able to work with preparative techniques for scanning electron microscopy, transmission electron microscopy, and light microscopy, and confocal scanning laser microscopy. Students completing this course will have learned basic principles for fixing and embedding biological materials for electron microscopy. Students will have learned how to operate a transmission electron microscope, a scanning electron microscope, several ultramicrotomes, a vacuum evaporator, a critical point dryer, and a sputter coater. Digital imaging techniques that will be learned will include print making, design and assembly of materials for publication, PowerPoint presentations, and poster design. Students will be introduced to the principles of light microscopy utilizing different optical systems and will have the opportunity to have hands-on experience with a Leica photomicroscope as well as the Leica SP5 confocal laser scanning.</p>	
Module contents	Microscopy of protists and micro metazoans. Students are required plan and carry out a research project that exposes them to some of the challenges and problems encountered by microscopical anatomy - and some of the techniques that are used to solve these problems. Students have to present a scientific poster, a short oral presentation and a scientific paper.	
Reader's advisory	Will be announced in the course.	
Links		
Language of instruction	German	
Duration (semesters)	1 Semester	
Module frequency	annually	
Module capacity	8 (For more applicants than places, a motivation letter decides on the admission.)	
Modullevel / module level	AS (Akzentsetzung / Accentuation)	
Modular / typ of module	Wahlpflicht / Elective	
Lehr-/Lernform / Teaching/Learning method	Vorlesung/Seminar, Übung	
Vorkenntnisse / Previous knowledge		
Examination	Time of examination	Type of examination

Examination		Time of examination	Type of examination		
Final exam of module		end of module	portfolio		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance	
Lecture and seminar		2	WiSe	28	
Exercises		3.5	WiSe	49	
Total time of attendance for the module				77 h	

bio360 - Marine Biodiversity

Module label	Marine Biodiversity
Module code	bio360
Credit points	15.0 KP
Workload	450 h
Applicability of the module	<ul style="list-style-type: none">• Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule• Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule• Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule
Responsible persons	<p>Glatzel, Thomas (Module responsibility)</p> <p>Martinez Arbizu, Pedro Miguel (Module counselling)</p> <p>Hoppenrath, Mona (Module counselling)</p> <p>Glatzel, Thomas (Authorized examiners)</p> <p>Martinez Arbizu, Pedro Miguel (Authorized examiners)</p> <p>Hoppenrath, Mona (Authorized examiners)</p>
Prerequisites	
Skills to be acquired in this module	<p>++ biological knowledge ++ knowledge of biological working methods + interdisciplinary knowledge & thinking + abstract, logical, analytical thinking ++ deepened expertise in biological specialist field ++ independent learning and (research-based) working ++ data presentation and evidence-based discussion (written and spoken) + teamwork + (scientific) communication skills + project and time management</p> <p>By active participation the students acquire the following knowledge/abilities/qualification:</p> <ul style="list-style-type: none">* Preparation and organization of sampling* Keeping organisms – field study* Marine deposits, development of marine sediments and their effects on the fauna* Methods of meiofauna and macrofauna sampling, also plankton sampling* Methods of quantitative community analysis* Diversity comparison of various sites applying statistical methods* Multivariate statistics for correlation of biocenoses and environmental variables* Biocenoses of marine habitats* Biology, morphology, systematics, behaviour and ecology of selected taxa in marine water systems* Formulation and definition of scientific questions and selection of methods* Habitat and biocenoses, interstitial, littoral (lotic, lenitic), diversity* Planning behavioural experiments* Presentation and discussion of scientific results* Independent scientific work in groups and presentation of results
Module contents	<p>The module gives an introduction to marine biodiversity research demonstrated by various animal groups from the Wadden Sea and the North Sea including independent sampling on the coast and on the islands. The students will collect the organisms in the field or on board using sampling equipment. In the laboratory course, the biology and morphology as well as the ecology and behaviour of certain species are investigated and documented. The morphology of marine sediments and their development are further aspects of this module.</p>
Reader's advisory	<p>Literatur: EMSCHERMANN, P., HOFRICHTER, O., KÖRNER, H. & D., ZISSLER, 1992: Meeresbiologische Exkursion – Beobachtung und Experiment. Gustav Fischer Verlag, Stuttgart, Jena, New York.</p> <p>GIERE, O., 2009: Meiofauna – The Microscopic Motile Fauna of Aquatic Sediments. Springer Verlag, Berlin-Heidelberg.</p> <p>GRZIMEK, B., 1979: Grzimeks Tierleben. 13 Bände. Dtv.</p> <p>GRUNER, H.-E., 1993: Urania Tierreich. 6 Bände. Urania-Verlag Leipzig, Jena, Berlin.</p> <p>GRUNER, H.-E., 1993: „Der Kaestner“, A., Lehrbuch der speziellen Zoologie. All volumes, Gustav Fischer Verlag, Jena, Stuttgart.</p> <p>HAYWARD, P. NELSON-SMITH, T., SHIELDS, C. & M. KREMER, 2008: Der neue Kosmos Strandführer - 1500 Arten der Küsten Europas. Franckh-Kosmos Verlag.</p> <p>HEMPEL, G., HEMPEL, I. & S. SCHIEL, 2006: Faszination Meeresforschung – Ein ökologisches Lesebuch. Hausschild.</p> <p>HIGGINS, R.P. & H., THIEL, 1988: Introduction to the Study of Meiofauna. Smithsonian Institution Press, Washington, D.C., London.</p>

RUNDLE, S.D., ROBERTSON, A.L. & J.M. SCHMID-ARAYA, 2002: Freshwater Meiofauna: Biology and Ecology. Backhuys Publishers, Leiden.
 SOMMER, U., 2005: Biologische Meereskunde. 2. Auflage, Springer Verlag, Berlin, Heidelberg.
 TARDENT, P., 1993: Meeresbiologie, eine Einführung. 2. Auflage, Georg Thieme Verlag, Stuttgart, New York.
 WESTHEIDE, W. & R., RIEGER, 2007/2004: Spezielle Zoologie. Band I, II. Gustav Fischer Verlag, Stuttgart, Jena.

The literature listed above is available in the university library. More reading will be recommended in the course of the lecture.

Literature inquiry:

web of science: [externhttp://www.bis.uni-oldenburg.de](http://www.bis.uni-oldenburg.de) - Datenbanken(DBIS) - Biologie - TOP-Datenbanken z.
 B. ASFA, Science Citation Index, Zoological Record
<http://www.biodiversitylibrary.org/bibliography/14107>
[externhttp://scholar.google.de/](http://scholar.google.de/)
[externhttp://www.vifabio.de](http://www.vifabio.de)
 Open access journals: [externhttp://www.doaj.org/](http://www.doaj.org/) - [externhttp://www.plosone.org](http://www.plosone.org)

Links	http://
Language of instruction	German
Duration (semesters)	1 Semester
Module frequency	jährlich
Module capacity	unlimited
Modullevel / module level	AS (Akzentsetzung / Accentuation)
Modulart / typ of module	Wahlpflicht / Elective
Lehr-/Lernform / Teaching/Learning method	

Vorkenntnisse / Previous knowledge		
Examination	Time of examination	Type of examination
Final exam of module	During lectures	1 Portfolio

PLEASE NOTE:
 Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.

Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		2		28
Exercises		9		126
Seminar		2		28
Total time of attendance for the module				182 h

bio375 - Flora - Advanced Concepts

Module label	Flora - Advanced Concepts			
Module code	bio375			
Credit points	6.0 KP			
Workload	180 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 			
Responsible persons	<p>Albach, Dirk Carl (Module responsibility)</p> <p>von Hagen, Klaus Bernhard (Module counselling)</p> <p>Will, Maria (Module counselling)</p> <p>Albach, Dirk Carl (Authorized examiners)</p> <p>von Hagen, Klaus Bernhard (Authorized examiners)</p> <p>Will, Maria (Authorized examiners)</p>			
Prerequisites	bio256 Flora and Fauna			
Skills to be acquired in this module	<p>+ biological knowledge</p> <p>+ knowledge of biological working methods</p> <p>+ deepened expertise in biological specialist field</p> <p>+ independent learning and (research-based) working</p> <p>+ data presentation and evidence-based discussion (written and spoken)</p> <p>+ (scientific) communication skills</p> <p>+ knowledge of safety and environmental issues</p> <p>The module is intended to give students in-depth knowledge on plant determination and the diversity of plants. Students shall increase their knowledge on species and learn and improve their abilities in plant determination and plant conservation. Subjects and methods relevant for nature conservation are emphasized. Along with these, students shall improve their systemic thinking with relation to nature in northwestern Germany and its flora. Students learn about plants and how to group them according to their phylogeny and evolutionary adaptations, so they can pass this knowledge on to others. Competence in assessment is conveyed in the areas of diversity and nature conservation to sensitize students for a respectful treatment of nature and passing on this ability to others. Finally, we will discuss sustainable use of plants and habitats and their restoration.</p>			
Module contents	<p>The module comprises a lecture in the Botanical Garden, where plants will be observed and investigated. This includes algae, bryophytes, ferns, gymnosperms and various families of angiosperms. The seminar is intended to let students study in-depth additional plant families with their typical characters.</p>			
Reader's advisory	Rothmaler - Exkursionsflora von Deutschland. Gefäßpflanzen: Grundband			
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	The module will be offered every other year			
Module capacity	12			
Modullevel / module level	AS (Akzentsetzung / Accentuation)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method	Vorlesung, Seminar			
Vorkenntnisse / Previous knowledge				
Examination	Time of examination		Type of examination	
Final exam of module			portfolio	
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		2	SuSe	28
Seminar		2	SuSe	28
Total time of attendance for the module				56 h

bio376 - Flora - Advanced Methods

Module label	Flora - Advanced Methods	
Module code	bio376	
Credit points	6.0 KP	
Workload	180 h	
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule 	
Responsible persons	<p>Albach, Dirk Carl (Module responsibility)</p> <p>von Hagen, Klaus Bernhard (Module counselling)</p> <p>Will, Maria (Module counselling)</p> <p>Albach, Dirk Carl (Authorized examiners)</p> <p>von Hagen, Klaus Bernhard (Authorized examiners)</p> <p>Will, Maria (Authorized examiners)</p>	
Prerequisites	<p>bio256 Flora and Fauna</p> <p>bio375 Flora - Advanced concepts</p>	
Skills to be acquired in this module	<p>+ biological knowledge</p> <p>+ knowledge of biological working methods</p> <p>+ deepened expertise in biological specialist field</p> <p>+ independent learning and (research-based) working</p> <p>+ data presentation and evidence-based discussion (written and spoken)</p> <p>+ (scientific) communication skills</p> <p>+ knowledge of safety and environmental issues</p> <p>The module is intended to give students in-depth knowledge on plant determination and the diversity of plants. Students shall increase their knowledge on species and learn and improve their abilities in plant determination and plant conservation. Subjects and methods relevant for nature conservation are emphasized. Along with these, students shall improve their systemic thinking with relation to nature in northwestern Germany and its flora. Students learn about plants and how to group them according to their phylogeny and evolutionary adaptations, so they can pass this knowledge on to others. Competence in assessment is conveyed in the areas of diversity and nature conservation to sensitize students for a respectful treatment of nature and passing on this ability to others. Finally, we will discuss sustainable use of plants and habitats and their restoration.</p>	
Module contents	The exercises will be used to apply the abilities to plant species in the vicinity of Oldenburg and to practice methods in mapping and surveying plant species.	
Reader's advisory	Rothmaler - Exkursionsflora von Deutschland. Gefäßpflanzen: Grundband	
Links		
Language of instruction	German	
Duration (semesters)	1 Semester	
Module frequency	The module will be offered every other year	
Module capacity	12	
Modullevel / module level	AS (Akzentsetzung / Accentuation)	
Modulart / typ of module	Wahlpflicht / Elective	
Lehr-/Lernform / Teaching/Learning method	Übung	
Vorkenntnisse / Previous knowledge		
Examination	Time of examination	Type of examination
Final exam of module	portfolio	
Course type	Exercises	
SWS	4	
Frequency	SuSe	
Workload attendance	56 h	

bio377 - Flora - Advanced Methods not just for schools

Module label	Flora - Advanced Methods not just for schools	
Module code	bio377	
Credit points	9.0 KP	
Workload	270 h	
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 	
Responsible persons	<p>Albach, Dirk Carl (Module responsibility)</p> <p>von Hagen, Klaus Bernhard (Module counselling)</p> <p>Will, Maria (Module counselling)</p> <p>Albach, Dirk Carl (Authorized examiners)</p> <p>von Hagen, Klaus Bernhard (Authorized examiners)</p> <p>Will, Maria (Authorized examiners)</p>	
Prerequisites	<p>bio375 Flora - Advanced Concepts</p> <p>bio256 Flora and Fauna</p>	
Skills to be acquired in this module	<p>+ biological knowledge</p> <p>+ knowledge of biological working methods</p> <p>+ deepened expertise in biological specialist field</p> <p>+ independent learning and (research-based) working</p> <p>+ data presentation and evidence-based discussion (written and spoken)</p> <p>+ (scientific) communication skills</p> <p>+ knowledge of safety and environmental issues</p> <p>The module is intended to give students in-depth knowledge on plant determination and the diversity of plants. Students shall increase their knowledge on species and learn and improve their abilities in plant determination and plant conservation. Subjects and methods relevant for nature conservation are emphasized. Along with these, students shall improve their systemic thinking with relation to nature in northwestern Germany and its flora. Students learn about plants and how to group them according to their phylogeny and evolutionary adaptations, so they can pass this knowledge on to others. Competence in assessment is conveyed in the areas of diversity and nature conservation to sensitize students for a respectful treatment of nature and passing on this ability to others. Finally, we will discuss sustainable use of plants and habitats and their restoration.</p>	
Module contents	<p>The exercises will be used to apply the abilities to identify plant species in the vicinity of Oldenburg and to practice methods in mapping and surveying plant species. Investigations applicable to school lessons will be presented and especially thoroughly discussed.</p>	
Reader's advisory	Rothmaler - Exkursionsflora von Deutschland. Gefäßpflanzen: Grundband	
Links		
Language of instruction	German	
Duration (semesters)	1 Semester	
Module frequency	The module will be offered every other year	
Module capacity	12	
Modullevel / module level	AS (Akzentsetzung / Accentuation)	
Modulart / typ of module	Wahlpflicht / Elective	
Lehr-/Lernform / Teaching/Learning method	Übung	
Vorkenntnisse / Previous knowledge		
Examination	Time of examination	Type of examination
Final exam of module		portfolio
Course type	Exercises	
SWS	6	
Frequency	SuSe	
Workload attendance	84 h	

bio385 - Specific Microbiology

Module label	Specific Microbiology			
Module code	bio385			
Credit points	12.0 KP			
Workload	360 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 			
Responsible persons	<p>Rabus, Ralf Andreas (Module responsibility)</p> <p>Rabus, Ralf Andreas (Authorized examiners)</p> <p>Wünsch, Daniel (Authorized examiners)</p>			
Prerequisites	<p>bio233 Basics in microbiology and genetics</p> <p>bio265 general microbiology</p>			
Skills to be acquired in this module	<p>THEORIE: verschiedene Kultivierungsstrategien (batch, fed-batch, kontinuierlich) und physiologische Interpretation von Meßparameteren (Wachstumsraten, Respirationsraten, Ertrag)</p> <p>PRAXIS: apparatives Verständnis von und praktischer Umgang mit Bioreaktoren inkl. Sensorsystemen</p>			
Module contents	<p>Grundlagen der Prozess-kontrollierten Kultivierung in Bioreaktoren</p> <p>TEIL A: Umgang mit Bioreaktoren inkl. Analyse und Regelung von Prozess-Parametern</p> <p>TEIL B: Kultivierung mariner Bakterien unter definierten Bedingungen im Bioreaktor, Bilanzierung von Stoffwechselaktivitäten</p>			
Reader's advisory	<p>Schmauder HP (1994) Methoden der Biotechnologie, Kapitel 3.2.2. Gustav Fischer Verlag Jena</p> <p>Chmiel H, Briechele S (1991) Bioprozesstechnik. Gustav Fischer Verlag Stuttgart</p>			
Links	www.icbm.de/ammb			
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	jährlich			
Module capacity	8			
Modullevel / module level	AS (Akzentsetzung / Accentuation)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method	Vorlesung, Seminar, Praktikum			
Vorkenntnisse / Previous knowledge	Chemie			
Examination	Time of examination		Type of examination	
Final exam of module			exam (50%) protocol (50%)	
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		2	WiSe	28
Seminar		2	WiSe	28
Practical training		6	WiSe	84
Total time of attendance for the module				140 h

bio395 - Plant Molecular Biology and Genetics I

Module label	Plant Molecular Biology and Genetics I			
Module code	bio395			
Credit points	6.0 KP			
Workload	180 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 			
Responsible persons	<p>Laubinger, Sascha (Module responsibility)</p> <p>Laubinger, Sascha (Authorized examiners)</p>			
Prerequisites				
Skills to be acquired in this module	<p>++ biological knowledge ++ knowledge of biological working methods + biologically relevant knowledge in the natural sciences and mathematics + statistics & scientific programming ++ interdisciplinary knowledge & thinking ++ abstract, logical, analytical thinking ++ deepened expertise in biological specialist field ++ independent learning and (research-based) working ++ data presentation and evidence-based discussion (written and spoken) ++ teamwork ++ (scientific) communication skills ++ project and time management + knowledge of safety and environmental issues</p> <p>The module serves the in-depth study of state-of-the-art techniques and problems in the field of molecular plant biology and plant genetics. Specialist competencies: basic knowledge in plant genetics, plant developmental genetics, plant/environment interactions and molecular basis of gene regulation General competencies: Presentation of scientific papers, presentation techniques, teamwork, problem solving competencies</p>			
Module contents	Part of this module is a lecture that addresses several topics of modern plant molecular biology. The main focus is on plant developmental genetics, plant/environment interactions and the underlying molecular mechanisms of gene regulation in plants. At the beginning of the module, the students will present diverse molecular biology techniques and the latest developments in the field in a "method and techniques" seminar. In a "literature" seminar, the students will present and discuss a recent publication on one of the above-mentioned topics.			
Reader's advisory	Literature will be handed out at the beginning of the course.			
Links				
Languages of instruction	German, English			
Duration (semesters)	1 Semester			
Module frequency	jährlich			
Module capacity	16			
Reference text	This module is mandatory for "Plant molecular biology and genetics II"			
Modullevel / module level	AS (Akzentsetzung / Accentuation)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method	Vorlesung, Seminar			
Vorkenntnisse / Previous knowledge				
Examination	Time of examination		Type of examination	
Final exam of module			Written examination (good seminar presentations improve the grade)	
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		2	WiSe	28
Seminar		2	WiSe	28
Total time of attendance for the module				56 h

bio396 - Plant Molecular Biology and Genetics II

Module label	Plant Molecular Biology and Genetics II	
Module code	bio396	
Credit points	6.0 KP	
Workload	180 h	
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 	
Responsible persons	<p>Laubinger, Sascha (Module responsibility)</p> <p>Laubinger, Sascha (Authorized examiners)</p>	
Prerequisites	bio395 Plant molecular biology and genetics I	
Skills to be acquired in this module	<p>++ biological knowledge ++ knowledge of biological working methods + biologically relevant knowledge in the natural sciences and mathematics + statistics & scientific programming ++ interdisciplinary knowledge & thinking ++ abstract, logical, analytical thinking ++ deepened expertise in biological specialist field ++ independent learning and (research-based) working ++ data presentation and evidence-based discussion (written and spoken) ++ teamwork ++ (scientific) communication skills ++ project and time management + knowledge of safety and environmental issues</p> <p>The module serves the in-depth study of state-of-the-art techniques and problems in the field of molecular plant biology and plant genetics. Specialist competencies: Acquiring basic skill in plant molecular biology, genetics and plant biochemistry Methodological competencies: molecular biology techniques, conducted independently General competencies: Presentation of scientific results, presentation techniques, teamwork, problem solving competencies</p>	
Module contents	Part of this module is a lecture that addresses several topics of modern plant molecular biology. The main focus is on plant developmental genetics, plant/environment interactions and the underlying molecular mechanisms of gene regulation in plants. At the beginning of the module, the students will present diverse molecular biology techniques and the latest developments in the field in a "method and techniques" seminar. In a "literature" seminar, the students will present and discuss a recent publication on one of the above-mentioned topics.	
Reader's advisory	Literature will be handed out at the beginning of the course.	
Links		
Languages of instruction	German, English	
Duration (semesters)	1 Semester	
Module frequency	annually	
Module capacity	16	
Modullevel / module level	AS (Akzentsetzung / Accentuation)	
Modulart / typ of module	Wahlpflicht / Elective	
Lehr-/Lernform / Teaching/Learning method	Übung	
Vorkenntnisse / Previous knowledge		
Examination	Time of examination	Type of examination
Final exam of module		portfolio (presentation, protocols)
Course type	Exercises	
SWS	4	
Frequency	WiSe	
Workload attendance	56 h	

bio405 - Introduction to Neurobiology I

Module label	Introduction to Neurobiology I			
Module code	bio405			
Credit points	12.0 KP			
Workload	360 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 			
Responsible persons	<p>Greschner, Martin (Module responsibility)</p> <p>Koch, Karl-Wilhelm (Module counselling)</p> <p>Janssen-Bienhold, Ulrike (Module counselling)</p> <p>Klump, Georg Martin (Module counselling)</p> <p>Greschner, Martin (Authorized examiners)</p> <p>Janssen-Bienhold, Ulrike (Authorized examiners)</p> <p>Klump, Georg Martin (Authorized examiners)</p>			
Prerequisites				
Skills to be acquired in this module	<p>++ deepened biological expertise</p> <p>++ deepened knowledge of biological working methods</p> <p>+ scientific/mathematical basic knowledge relevant for biology</p> <p>+ critical and analytical thinking</p> <p>++ data presentation and discussion in German (written and spoken)</p> <p>+ teamwork</p>			
Module contents	The lecture covers the molecular and cellular basis of neurobiology, the electrical properties of nerve cells, the organization and development of the nervous system and the function of the motor system. In the seminar, topics related to the lectures of the week are covered in more depth. In the exercises, the theoretical knowledge from the lectures will be tested in small experiments.			
Reader's advisory	Purves D. et al.: Neuroscience, Sinauer Associates, Sunderland USA, latest edition			
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	annually			
Module capacity	30			
Reference text	associated with the modules bio415 and bio416 Introduction to Neurobiology II in the winter semester			
Modullevel / module level	AS (Akzentsetzung / Accentuation)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method	Vorlesung, Seminar, Übung			
Vorkenntnisse / Previous knowledge	Grundlagen der Physiologie/ Zellbiologie			
Examination	Time of examination		Type of examination	
Final exam of module	end of semester		exam and protocol	
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		3	SuSe	42
Seminar		1	SuSe	14
Exercises		4	SuSe	56
Tutorial (optional)			SoSe und WiSe	0
Total time of attendance for the module				112 h

bio408 - Introduction to Neurobiology I

Module label	Introduction to Neurobiology I			
Module code	bio408			
Credit points	6.0 KP			
Workload	180 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 			
Responsible persons				
Prerequisites				
Skills to be acquired in this module				
Module contents				
Reader's advisory				
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency				
Module capacity	unlimited			
Modullevel / module level	BW (Bereichswahlmodul / Range selection)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method				
Vorkenntnisse / Previous knowledge				
Examination	Time of examination		Type of examination	
Final exam of module			Klausur	
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		3	SuSe	32
Seminar		1	SuSe	14
Total time of attendance for the module				46 h

bio415 - Introduction to Neurobiology II

Module label	Introduction to Neurobiology II			
Module code	bio415			
Credit points	6.0 KP			
Workload	180 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 			
Responsible persons	<p>Klump, Georg Martin (Module responsibility)</p> <p>Thiel, Christiane Margarete (Module counselling)</p> <p>Köppl, Christine (Module counselling)</p> <p>Greschner, Martin (Module counselling)</p> <p>Klump, Georg Martin (Authorized examiners)</p> <p>Thiel, Christiane Margarete (Authorized examiners)</p> <p>Köppl, Christine (Authorized examiners)</p> <p>Greschner, Martin (Authorized examiners)</p>			
Prerequisites				
Skills to be acquired in this module	++ deepened biological expertise ++ deepened knowledge of biological working methods + scientific/mathematical basic knowledge relevant for biology + critical and analytical thinking			
Module contents	The lecture covers the basics of systemic neuroscience with a focus on processing in sensory systems, the plasticity of the nervous system and the mechanisms underlying cognitive processing. In the seminar, topics related to the lectures of the week are covered in more depth.			
Reader's advisory	Purves D. et al.: Neuroscience, Sinauer Associates, Sunderland USA, latest edition			
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency				
Module capacity	30			
Modullevel / module level	AS (Akzentsetzung / Accentuation)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method	Vorlesung, Seminar			
Vorkenntnisse / Previous knowledge	Grundlagen der Physiologie/ Wahrnehmung			
Examination	Time of examination		Type of examination	
Final exam of module	end of semester		written exam	
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		3	WiSe	42
Seminar		1	WiSe	14
Total time of attendance for the module				56 h

bio416 - Experiments in Neurobiology II

Module label	Experiments in Neurobiology II	
Module code	bio416	
Credit points	6.0 KP	
Workload	180 h	
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodul • Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodul • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodul • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodul 	
Responsible persons	<p>Klump, Georg Martin (Module responsibility)</p> <p>Thiel, Christiane Margarete (Module counselling)</p> <p>Langemann, Ulrike (Module counselling)</p> <p>Klump, Georg Martin (Authorized examiners)</p> <p>Thiel, Christiane Margarete (Authorized examiners)</p> <p>Langemann, Ulrike (Authorized examiners)</p>	
Prerequisites	bio415 "Introduction to Neurobiology II"	
Skills to be acquired in this module	<p>++ deepened biological expertise</p> <p>++ deepened knowledge of biological working methods</p> <p>++ data analysis skills</p> <p>++ data presentation and discussion in German and English (written and spoken)</p> <p>+ teamwork</p> <p>+ scientific/mathematical basic knowledge relevant for biology</p>	
Module contents	The exercise immediately follows the module "Introduction to Neurobiology II". By experimenting with each other, the students deepen their knowledge in the fields of cognitive neuroscience and hearing science. The students analyze their own data (incl. statistics) and present these in a written report.	
Reader's advisory	Purves D. et al.: Neuroscience, Sinauer Associates, Sunderland USA, latest edition	
Links		
Language of instruction	German	
Duration (semesters)	1 Semester	
Module frequency	annually	
Module capacity	30	
Modullevel / module level	AS (Akzentsetzung / Accentuation)	
Modulart / typ of module	Wahlpflicht / Elective	
Lehr-/Lernform / Teaching/Learning method	Übung	
Vorkenntnisse / Previous knowledge	Neurobiologie II	
Examination	Time of examination	Type of examination
Final exam of module	end of module	portfolio (data analysis, presentation)
Course type	Exercises	
SWS	4	
Frequency	WiSe	
Workload attendance	56 h	

bio420 - Biochemistry of the Cell

Module label	Biochemistry of the Cell			
Module code	bio420			
Credit points	6.0 KP			
Workload	180 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 			
Responsible persons	<p>Scholten, Alexander (Module responsibility)</p> <p>Scholten, Alexander (Authorized examiners)</p>			
Prerequisites				
Skills to be acquired in this module	<p>++ biological knowledge + knowledge of biological working methods + biologically relevant knowledge in the natural sciences and mathematics + abstract, logical, analytical thinking + data presentation and evidence-based discussion (written and spoken) ++ (scientific) communication skills</p>			
Module contents	supramolecular organization in the cell, interactions of biomolecules, signalling fluxes			
Reader's advisory	Biochemie, Müller-Esterl Biochemie, Lubert Stryer Lehninger Prinzipien der Biochemie, David L. Nelson und Michael M. Cox Principles of Biochemistry, Horton et al.			
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	annually			
Module capacity	20			
Modullevel / module level	AS (Akzentsetzung / Accentuation)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method	Vorlesung, Seminar, Übung			
Vorkenntnisse / Previous knowledge	Biochemie und Molekularbiologie			
Examination	Time of examination		Type of examination	
Final exam of module	during the semester		oral presentation	
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		1	WiSe	14
Exercises		1	WiSe	14
Seminar		2	WiSe	28
Total time of attendance for the module				56 h

bio430 - Analytical Biochemistry

Module label	Analytical Biochemistry			
Module code	bio430			
Credit points	6.0 KP			
Workload	180 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 			
Responsible persons	<p>Koch, Karl-Wilhelm (Module responsibility)</p> <p>Scholten, Alexander (Module counselling)</p> <p>Koch, Karl-Wilhelm (Authorized examiners)</p> <p>Scholten, Alexander (Authorized examiners)</p>			
Prerequisites				
Skills to be acquired in this module	<p>++ biological knowledge ++ knowledge of biological working methods + biologically relevant knowledge in the natural sciences and mathematics + abstract, logical, analytical thinking + deepened expertise in biological specialist field ++ data presentation and evidence-based discussion (written and spoken) + teamwork</p> <p>The students get a survey of current techniques in Biochemistry and learn some essential techniques such as column chromatography and enzyme kinetic measurements in practice. They understand the theoretical fundamentals of these techniques and assess experimentally collected data bases.</p>			
Module contents	Bioanalytical methods in theory and practice			
Reader's advisory	Bioanalytik, Lottspeich/Engels			
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	annually			
Module capacity	20			
Modullevel / module level	AS (Akzentsetzung / Accentuation)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method	Vorlesung, Seminar, Übung			
Vorkenntnisse / Previous knowledge	Biochemie, Molekularbiologie			
Examination	Time of examination		Type of examination	
Final exam of module	during semester		oral presentation and protocoll	
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		1	SuSe	14
Seminar		1	SuSe	14
Exercises		2	SuSe	28
Total time of attendance for the module				56 h

bio440 - Microfauna, Mircoflora & Protista of limnic and marine habitats

Module label	Microfauna, Mircoflora & Protista of limnic and marine habitats
Module code	bio440
Credit points	6.0 KP
Workload	180 h
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule
Responsible persons	<p>Ahrichs, Wilko (Module responsibility)</p> <p>Kieneke, Alexander (Module counselling)</p> <p>Hoppenrath, Mona (Module counselling)</p> <p>Ahrichs, Wilko (Authorized examiners)</p> <p>Kieneke, Alexander (Authorized examiners)</p> <p>Hoppenrath, Mona (Authorized examiners)</p>
Prerequisites	
Skills to be acquired in this module	<p>++ biological knowledge ++ knowledge of biological working methods ++ biologically relevant knowledge in the natural sciences and mathematics + statistics & scientific programming ++ interdisciplinary knowledge & thinking + abstract, logical, analytical thinking ++ deepened expertise in biological specialist field ++ independent learning and (research-based) working ++ data presentation and evidence-based discussion (written and spoken) + teamwork ++ (scientific) communication skills + project and time management</p> <p>The objectives of the module are the teaching and learning of methods in the field of taxonomy, systematics, morphology, ecology, and evolution. Competencies for finding, identifying, preparing, micro-copying, illustrating, describing, and publishing species are taught. It learns how a scientific collection is created and managed. Another goal is the teaching of basics of molecular systematics and barcoding. The focus is on taxa of the microfauna and protists of limnic and marine habitats. The goal is the knowledge of biotic and abiotic properties of aquatic habitats, their formation and biodiversity. The students should learn to hypothesize structural adaptations of organisms to aquatic habitats.</p>
Module contents	<p>We study microfauna and protists of limnic and marine habitats. Microfauna refers to microscopic animals. They live together with protists aquatic habitats in high diversity. Animals of the microfauna and protists usually belong to groups that developed early in evolution. The study of communities of these groups give a unique insight into the evolution of animals and protists. The microfauna and the protists are little studied compared to other groups of animals and offer great potential. But they must be examined under the optical microscope. This requires special techniques and knowledge. Fortunately, through digital techniques, the investigation and publications have been greatly simplified. We will make excursions to ponds, ponds, lakes, rivers, bogs, sea beaches, etc. It teaches where, when, and how to find species of microfauna and protists. The collected organisms are determined, prepared, microscoped, photographed, drawn, and digitally illustrated. Art descriptions are produced. Attention is paid to the correct application of nomenclature rules. We show how a scientific collection is built and managed. For this purpose, basic knowledge in SQL database technology is taught. Dichotomous, synoptic, and digital identification keys are presented and developed. In addition to the classical morphological methods, it will be shown how species for molecular barcoding and phylogenetic analyzes are investigated. The students will create art portraits. The results are communicated in the form of posters, short lectures, and scientific publications.</p>
Reader's advisory	Will be announced in the course.
Links	
Language of instruction	German
Duration (semesters)	1 Semester
Module frequency	irregular
Module capacity	12 () For more applicants than places, a motivation letter decides on the admission.

Modullevel / module level	AS (Akzentsetzung / Accentuation)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method	Seminar, Übung, Exkursion			
Vorkenntnisse / Previous knowledge	Lichtmikroskopie			
Examination	Time of examination		Type of examination	
Final exam of module	Portfolio			
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Study trip		1	SuSe	14
Seminar		1	SuSe	14
Exercises		2	SuSe	28
Total time of attendance for the module				56 h

bio450 - Posters, Pictures, Presentations and Papers

Module label	Posters, Pictures, Presentations and Papers	
Module code	bio450	
Credit points	9.0 KP	
Workload	270 h	
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 	
Responsible persons	<p>Bininda-Emonds, Olaf (Module responsibility)</p> <p>Ahrichs, Wilko (Module counselling)</p> <p>Bininda-Emonds, Olaf (Authorized examiners)</p> <p>Ahrichs, Wilko (Authorized examiners)</p>	
Prerequisites		
Skills to be acquired in this module	<p>+ interdisciplinary knowledge & thinking</p> <p>+ abstract, logical, analytical thinking</p> <p>+ deepened expertise in biological specialist field</p> <p>++ independent learning and (research-based) working</p> <p>++ data presentation and evidence-based discussion (written and spoken)</p> <p>++ (scientific) communication skills</p> <p>+ project and time management</p> <p>Practical experience with four forms of scientific presentation: papers, presentations, scientific drawings, and posters. The students will learn / gain: 1) the logical and structural form of a scientific paper (or protocol or thesis) so as to communicate their results more effectively; 2) the distillation of the key information out of a project and its focused presentation in a lecture or poster; 3) experience with constructive criticism in a group setting as well as the critical assessment of scientific studies; 4) experience with scientific English; and 5) the art of scientific drawing, including the making of high-quality photo montages for papers or posters through microphotography and digital editing.</p>	
Module contents	<p>Theoretical part: General tips regarding the logical and structural form of a scientific paper, presentation, or posters, including how to avoid making the most common mis-takes.</p> <p>Practical part: Critical analysis of selected papers from the (evolutionary biological) literature. Writing of a scientific paper using pre-given results. Construction and presentation of a lecture and poster in front of the group based on a recent paper from the literature. Through the feedback obtained in this process, improvements will be made in both cases. Microscopic photography of selected zoological specimens that will then be transferred to / drawn on transparent paper before being rescanned for digital editing. High-quality photo montages of both the photos themselves and the drawings derived from them will be obtained through diverse software (e.g., Ado-be Illustrator or InDesign).</p>	
Reader's advisory	None. The relevant scientific literature will be distributed during the course.	
Links		
Languages of instruction	German, English	
Duration (semesters)	1 Semester	
Module frequency	annually	
Module capacity	10 (Letter of motivation)	
Modullevel / module level	AS (Akzentsetzung / Accentuation)	
Modulart / typ of module	Wahlpflicht / Elective	
Lehr-/Lernform / Teaching/Learning method	Übung	
Vorkenntnisse / Previous knowledge	Erfahrungen in der Anwendung von Excel oder ähnlichen Software-Programmen mit Graph-Fähigkeiten, von Adobe Photoshop, und von PowerPoint, Keynote oder ähnlichen Software-Programmen	
Examination	Time of examination	Type of examination
Final exam of module	Portfolio (100%)	
Course type	Exercises	
SWS	6	
Frequency	SuSe	

Workload attendance

84 h

bio460 - Diversity of marine Invertebrates

Module label	Diversity of marine Invertebrates
Module code	bio460
Credit points	6.0 KP
Workload	180 h
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule
Responsible persons	<p>Glatzel, Thomas (Module responsibility)</p> <p>Glatzel, Thomas (Authorized examiners)</p>
Prerequisites	
Skills to be acquired in this module	<p>++ biological knowledge + knowledge of biological working methods + interdisciplinary knowledge & thinking ++ deepened expertise in biological specialist field ++ independent learning and (research-based) working ++ data presentation and evidence-based discussion (written and spoken) + teamwork ++ (scientific) communication skills ++ project and time management + knowledge of safety and environmental issues</p> <p>By actively participating in this module the students acquire qualifications in the fields stated below: -Survey of recent subjects concerning the biology and morphology of aquatic organisms -Extended knowledge of how morphological characteristics have developed -Technical skills in preparing and documenting morphological structures -Knowledge of organizational principles of these structures</p>
Module contents	The module serves an extended examination of selected aquatic animals from a function morphological point of view. Living and fixed animals are investigated and histological preparations are analysed. Thus, the morphology, anatomy, and histology are studied in detail. The biology and ecology of these animals are also considered, which enables the organisms to be studied very intensively and provides an illustrative basis for theoretical discussions.
Reader's advisory	<p>AX, P., 1995: Das System der Metazoa. I, II, III. Ein Lehrbuch der phylogenetischen Systematik. Gustav Fischer Verlag, Stuttgart, Jena. Textbook with somehow different ideas! Very well illustrated! Illustrations are suitable for presentations!</p> <p>GRUNER, H.-E., 1993: „Der Kaestner“, A., Lehrbuch der speziellen Zoologie. All volumes, Gustav Fischer/Spektrum Akademischer Verlag, Jena, Stuttgart. Many interesting details are found only in these volumes!</p> <p>GRÜTER, W., 2001: Leben im Meer – Vielfalt und Zusammenhänge. Dr. Friedrich Pfeil Verlag, München. This book arouses your curiosity about the underwater world.</p> <p>HAYWARD, P. NELSON-SMITH, T., SHIELDS, C. & M. KREMER, 2008: Der neue Kosmos Strandführer - 1500 Arten der Küsten Europas. Franckh-Kosmos Verlag. This coastal guide provides excellent and clearly arranged colour tables for individual groups.</p> <p>HOFRICHTER, R., 2002: Das Mittelmeer, Fauna-Flora-Ökologie. Band I, II, Spektrum Akademischer Verlag, Heidenberg, Berlin. Numerous details on individual groups in the second part.</p> <p>WESTHEIDE, W. & R., RIEGER, 2013: Spezielle Zoologie. Band I, II. Gustav Fischer Verlag, Stuttgart, Jena. The textbook absolute! My explicit recommendation!</p> <p>The literature listed above is available in the university library in Wechloy. Further reading will be recommended in the course of the lecture.</p> <p>Literature inquiry: web of science: http://rzblx10.uni-regensburg.de/dbinfo/dbliste.php?bib_id=ubol&colors=7&ocolors=40&lett=f&gebiete=5 – Data banks(DBIS) - Biology - TOPData banks e.g. ASFA, Science Citation Index, Zoological Record http://www.biodiversitylibrary.org/bibliography/14107 http://scholar.google.de/ http://www.vifabio.de Open access journals: http://www.doaj.org/ - www.plosone.org</p>
Links	
Language of instruction	German
Duration (semesters)	1 Semester
Module frequency	annually
Module capacity	15

Modullevel / module level	AS (Akzentsetzung / Accentuation)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method	Seminar, Übung			
Vorkenntnisse / Previous knowledge				
Examination	Time of examination		Type of examination	
Final exam of module	During the lecture		portfolio	
PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.				
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Exercises		3	WiSe	42
Seminar		1	WiSe	14
Total time of attendance for the module				56 h

bio470 - Marine Biology Field Trip

Module label	Marine Biology Field Trip			
Module code	bio470			
Credit points	6.0 KP			
Workload	180 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 			
Responsible persons	<p>Ahrichs, Wilko (Module responsibility)</p> <p>Kieneke, Alexander (Module counselling)</p> <p>Ahrichs, Wilko (Authorized examiners)</p> <p>Kieneke, Alexander (Authorized examiners)</p>			
Prerequisites	Motivationsschreiben bei mehr Teilnehmern als Plätzen.			
Skills to be acquired in this module	<p>++ biological knowledge ++ knowledge of biological working methods ++ biologically relevant knowledge in the natural sciences and mathematics + statistics & scientific programming + interdisciplinary knowledge & thinking + abstract, logical, analytical thinking ++ deepened expertise in biological specialist field ++ independent learning and (research-based) working ++ data presentation and evidence-based discussion (written and spoken) + teamwork ++ (scientific) communication skills + project and time management</p> <p>On completion of this modul students will: have a basic knowledge of the diversity of marine life; un-derstand the fundamental physiochemical and physiological processes underlying the productivity of marine environments; understand the ecological dynamics of marine ecosystems; appreciate the role of humans in disturbing and exploiting marine ecosystems; have developed a critical, analytical ap-proach to scientific research; have developed skills in writing scientific reports and in oral communica-tion of scientific information.</p>			
Module contents	Microscopy of marine fauna and flora of the wadden sea; Students are required plan and carry out a research project that exposes them to some of the challenges and problems encountered by field bi-ologists - and some of the techniques that are used to solve these problems. Students have to present a scientific poster and a short oral presentation.			
Reader's advisory	Will be announced in the course.			
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	annually			
Module capacity	14 (For more applicants than places, a letter of moti-vation decides on the admission.)			
Modullevel / module level	AS (Akzentsetzung / Accentuation)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method	Seminar, Übung, Exkursion			
Vorkenntnisse / Previous knowledge	Kenntnisse der Großgruppen der Tiere, der Pflanzen und der Protisten			
Examination	Time of examination		Type of examination	
Final exam of module	Modulende		portfolio	
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Seminar		2	SuSe	28
Exercises		2	SuSe	28
Study trip		2	SuSe	28
Total time of attendance for the module				84 h

bio472 - Marine Biology Field Trip

Module label	Marine Biology Field Trip			
Module code	bio472			
Credit points	6.0 KP			
Workload	180 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 			
Responsible persons				
Prerequisites				
Skills to be acquired in this module				
Module contents				
Reader's advisory				
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency				
Module capacity	unlimited			
Modullevel / module level	BW (Bereichswahlmodul / Range selection)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method				
Vorkenntnisse / Previous knowledge				
Examination	Time of examination		Type of examination	
Final exam of module			Portfolio	
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Seminar		2	SoSe oder WiSe	28
Exercises		2	SoSe oder WiSe	28
Total time of attendance for the module				56 h

bio473 - Evolutionsgeschichte des Lebens: Leben im Wandel der Erdzeitalter

Module label	Evolutionsgeschichte des Lebens: Leben im Wandel der Erdzeitalter			
Module code	bio473			
Credit points	6.0 KP			
Workload	180 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 			
Responsible persons				
Prerequisites				
Skills to be acquired in this module				
Module contents				
Reader's advisory				
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency				
Module capacity	unlimited			
Modullevel / module level	BW (Bereichswahlmodul / Range selection)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method				
Vorkenntnisse / Previous knowledge				
Examination	Time of examination		Type of examination	
Final exam of module			Portfolio	
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Seminar		2	SoSe oder WiSe	28
Exercises		1	SoSe oder WiSe	14
Study trip		1	SoSe oder WiSe	14
Total time of attendance for the module				56 h

bio480 - Functional Morphology of Plants

Module label	Functional Morphology of Plants			
Module code	bio480			
Credit points	6.0 KP			
Workload	180 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 			
Responsible persons	<p>Zotz, Gerhard (Module responsibility)</p> <p>Einzmann, Helena (Module counselling)</p> <p>Zotz, Gerhard (Authorized examiners)</p> <p>Einzmann, Helena (Authorized examiners)</p>			
Prerequisites				
Skills to be acquired in this module	<p>++ biological knowledge + knowledge of biological working methods + biologically relevant knowledge in the natural sciences and mathematics + interdisciplinary knowledge & thinking + abstract, logical, analytical thinking ++ deepened expertise in biological specialist field + independent learning and (research-based) working</p> <p>Students acquire knowledge in macroscopic and microscopic morphology of plants, always putting form in the context of function Students understand the concepts of allometry and scaling Students put this knowledge in the context of theoretical concepts of ecology and evolution Students learn experimental techniques in diverse topics, e.g. biomechanics or water relations</p>			
Module contents	<p>V: Functional Morphology of Plants (1 SWS) E: Mikroskopie, biomechanical Experiments, Form/Function Experiments regarding water uptake, storage and loss (2 SWS) S new studies in the field of functional morphology (1 SWS)</p>			
Reader's advisory	<p>Kadereit JW, et al (2014) Strasburger Lehrbuch der Botanik. 37. Aufl. Spektrum Akademischer Verlag Eschrich, W. (1995) Funktionelle Pflanzenanatomie. Springer</p>			
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	annually			
Module capacity	8			
Modullevel / module level	AS (Akzentsetzung / Accentuation)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method	Vorlesung, Seminar, Übung			
Vorkenntnisse / Previous knowledge	Ökologie, Flora			
Examination	Time of examination	Type of examination		
Final exam of module		1 Portfolio (oral presentation and 1 report) OR 1 Written examination		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		1	WiSe	14
Seminar		1	WiSe	14
Exercises		2	WiSe	28
Total time of attendance for the module				56 h

bio320 - Pollination and Dispersal Biology

Module label	Pollination and Dispersal Biology			
Module code	bio320			
Credit points	15.0 KP			
Workload	450 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 			
Responsible persons	<p>von Hagen, Klaus Bernhard (Module counselling)</p> <p>Albach, Dirk Carl (Authorized examiners)</p>			
Prerequisites				
Skills to be acquired in this module	<p>+ biological knowledge + knowledge of biological working methods + abstract, logical, analytical thinking + deepened expertise in biological specialist field + independent learning and (research-based) working + data presentation and evidence-based discussion (written and spoken) + teamwork + (scientific) communication skills + project and time management + knowledge of safety and environmental issues</p> <p>Extended knowledge of biodiversity and evolution of plants focusing on reproduction, dispersal, germination and establishment of plants</p>			
Module contents	<p>L: Pollination, dispersal, germination of plants, plant breeding S: Pollination and dispersal biology of plants in a systematic context LC: Pollination, fertilisation, dispersal and germination biological experiments in regard of adaptation to environmental factors</p>			
Reader's advisory	<p>The course does not follow a special textbook. The following German literature is recommended to students interested in the course: Dieter Heß – Die Blüte, Eugen Ulmer Verlag as well as Leins & Erbar -Blüte und Frucht, Schweizerbart'sche Verlagsbuchhandlung.</p>			
Links	http://			
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	jährlich			
Module capacity	unlimited			
Modullevel / module level	AS (Akzentsetzung / Accentuation)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method				
Vorkenntnisse / Previous knowledge				
Examination	Time of examination	Type of examination		
Final exam of module	Four weeks after the end of the exercises at the latest.	1 Portfolio		
		PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		2		28
Seminar		1		14
Practical training		5		70
Total time of attendance for the module				112 h

bio350 - Organismic Microanatomy

Module label	Organismic Microanatomy			
Module code	bio350			
Credit points	15.0 KP			
Workload	450 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 			
Responsible persons	<p>Ahlich, Wilko (Authorized examiners)</p> <p>Hoppenrath, Mona (Module counselling)</p> <p>Kieneke, Alexander (Module counselling)</p>			
Prerequisites				
Skills to be acquired in this module	<ul style="list-style-type: none"> ++ biological knowledge ++ knowledge of biological working methods ++ biologically relevant knowledge in the natural sciences and mathematics + interdisciplinary knowledge & thinking ++ abstract, logical, analytical thinking ++ deepened expertise in biological specialist field ++ independent learning and (research-based) working ++ data presentation and evidence-based discussion (written and spoken) + teamwork ++ (scientific) communication skills + project and time management + knowledge of safety and environmental issues 			
Module contents	Zell und Gewebelehre der Tiere und Protisten; Anpassungsleistungen von Organismen unterschiedlicher Lebensräume; Vorstellung traditioneller und aktueller Hypothesen zur Phylogenie und Evolution der Tiere;			
Reader's advisory	Wird zur Beginn der Veranstaltungen bekannt gegeben.			
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	jährlich			
Module capacity	unlimited			
Modullevel / module level	AS (Akzentsetzung / Accentuation)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method				
Vorkenntnisse / Previous knowledge				
Examination	Time of examination	Type of examination		
Final exam of module	Modulende	Bachelor: 1 Portfolio Master of Education: 1 oral exam		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		3		42
Exercises		5		70
Study trip		1		14
Total time of attendance for the module				126 h

bio370 - Flora Advanced Plant Biodiversity

Module label	Flora Advanced Plant Biodiversity			
Module code	bio370			
Credit points	15.0 KP			
Workload	450 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 			
Responsible persons	<p>Albach, Dirk Carl (Authorized examiners)</p> <p>von Hagen, Klaus Bernhard (Module counselling)</p>			
Prerequisites	passed module Flora/Fauna			
Skills to be acquired in this module	<p>+ biological knowledge + knowledge of biological working methods + deepened expertise in biological specialist field + independent learning and (research-based) working + data presentation and evidence-based discussion (written and spoken) + (scientific) communication skills + knowledge of safety and environmental issues</p> <p>The module is intended to give students in-depth knowledge on plant determination and the diversity of plants. Students shall increase their knowledge on species and learn and improve their abilities in plant determination and plant conservation.</p>			
Module contents	<p>The module comprises a lecture in the Botanical Garden, where plants will be observed and investigated. This includes algae, bryophytes, ferns, gymnosperms and various families of angiosperms. The seminar is intended to let students study in-depth additional plant families with their typical characters. The exercises will be used to apply the abilities to plant species in the vicinity of Oldenburg and to practice methods in mapping and surveying plant species.</p>			
Reader's advisory	Rothmaler - Exkursionsflora von Deutschland. Gefäßpflanzen: Grundband			
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	im 2-Jahres-Zyklus			
Module capacity	unlimited			
Reference text	The module will be offered biennially.			
Modullevel / module level	AS (Akzentsetzung / Accentuation)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method				
Vorkenntnisse / Previous knowledge				
Examination	Time of examination	Type of examination		
Final exam of module	Portfolio	1 Portfolio		
	PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.	Voraussetzung für die Vergabe von Kreditpunkten ist die aktive Teilnahme an: S, Ü		
		ERGÄNZENDER HINWEIS: Zusätzlich gelten die von den Modulverantwortlichen festgelegten Rahmenbedingungen wie Anwesenheit und geforderte unbenotete Leistungen.		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		2		28
Exercises		5		70
Seminar		3		42
Total time of attendance for the module				140 h

bio380 - Specific Microbiology

Module label	Specific Microbiology			
Module code	bio380			
Credit points	15.0 KP			
Workload	450 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 			
Responsible persons	<p>Rabus, Ralf Andreas (Authorized examiners)</p> <p>Trautwein, Kathleen (Module counselling)</p>			
Prerequisites				
Skills to be acquired in this module	<p>++ biological knowledge ++ knowledge of biological working methods ++ biologically relevant knowledge in the natural sciences and mathematics + interdisciplinary knowledge & thinking ++ abstract, logical, analytical thinking ++ deepened expertise in biological specialist field + independent learning and (research-based) working + data presentation and evidence-based discussion (written and spoken) ++ teamwork + project and time management + knowledge of safety and environmental issues</p> <p>Emphasis on: Theory: Different cultivation strategies (batch, fed-batch, continuous) and physiological interpretation of measuring parameters (growth rates, respiration rates, yield) Practice: Knowledge of device and handling of bioreactors including sensor systems</p>			
Module contents	<p>Fundamentals of process-controlled cultivation in bioreactors Part A: Handling of bioreactors, determination of the $k_L a$ value (oxygen yield rate) Part B: Cultivation of marine bacteria under controlled conditions in a bioreactor, balance of metabolic activities</p>			
Reader's advisory	<p>Schmauder HP (1994) Methoden der Biotechnologie, Kapitel 3.2.2. Gustav Fischer Verlag Jena Chmiel H, Briechele S (1991) Bioprozesstechnik. Gustav Fischer Verlag Stuttgart</p>			
Links	<p>www.icbm.de/ammb/index.html</p>			
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	jährlich			
Module capacity	unlimited			
Modullevel / module level	AS (Akzentsetzung / Accentuation)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method				
Vorkenntnisse / Previous knowledge				
Examination	Time of examination	Type of examination		
Final exam of module		<p>1 written examination (50%) 1 record (50%)</p> <p>PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.</p>		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		4		56
Exercises		6		84
Seminar				
Total time of attendance for the module				140 h

bio400 - Basic Concepts in Neurobiology I

Module label	Basic Concepts in Neurobiology I			
Module code	bio400			
Credit points	15.0 KP			
Workload	450 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 			
Responsible persons	<p>Greschner, Martin (Authorized examiners)</p> <p>Koch, Karl-Wilhelm (Authorized examiners)</p> <p>Janssen-Bienhold, Ulrike (Module counselling)</p> <p>Richter-Landsberg, Christiane (Module counselling)</p> <p>Goldbaum, Olaf (Module counselling)</p>			
Prerequisites				
Skills to be acquired in this module	<p>++ biological knowledge ++ knowledge of biological working methods + abstract, logical, analytical thinking + deepened expertise in biological specialist field + data presentation and evidence-based discussion (written and spoken)</p> <p>Imparting basic knowledge and relations of neurobiology. Transfer achievement: Preparing scientific records from the results of independent experiments.</p>			
Module contents	<p>In its first part, the lecture (4 H/W) covers the molecular and cellular fundamentals of neurobiology, the electrical processes in nervous cells, the organization and development of the nervous system, its function explained by simple circuits as well as the sensorimotor integration underlying any behaviour.</p> <p>In the seminar (1 H/W), individual subjects of the lecture are consolidated. In the subsequent block laboratory course (6 H/W), this theoretical knowledge is verified under real-world conditions by simple experiments related to the subjects dealt with in the lecture. Unobjectionable scientific minutes are to be prepared of the experiments and the individual results are to be presented in a seminar paper.</p>			
Reader's advisory	Purves D. et al.: Neuroscience, Sinauer Associates, Sunderland USA, latest edition each.			
Links	http://			
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	jährlich			
Module capacity	unlimited			
Modullevel / module level	AS (Akzentsetzung / Accentuation)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method				
Vorkenntnisse / Previous knowledge				
Examination	Time of examination	Type of examination		
Final exam of module		1 written examination, signed minutes		
		PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		4		56
Exercises		6		84
Tutorial		2		28
Seminar		1		14

Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Total time of attendance for the module				182 h

bio410 - Basic Concepts in Neurobiology II

Module label	Basic Concepts in Neurobiology II			
Module code	bio410			
Credit points	15.0 KP			
Workload	450 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 			
Responsible persons	<p>Klump, Georg Martin (Authorized examiners)</p> <p>Langemann, Ulrike (Module counselling)</p> <p>Thiel, Christiane Margarete (Module counselling)</p> <p>Köppl, Christine (Module counselling)</p>			
Prerequisites				
Skills to be acquired in this module	<p>++ biological knowledge ++ knowledge of biological working methods + abstract, logical, analytical thinking + deepened expertise in biological specialist field + data presentation and evidence-based discussion (written and spoken)</p> <p>Basic knowledge and relations of sensory science, cognition, and motor functions are imparted. Transfer achievement: Presentation of personal experimental results.</p>			
Module contents	<p>The lecture covers the anatomy and function of simple sensory and motory systems as well as higher cognitive functions. Selected subjects are treated in more detail in the seminar. In the subsequent block practical course, this theoretical knowledge is verified under real-world conditions by simple experiments related to the subjects dealt with in the lecture including data analysis and presentation of results.</p>			
Reader's advisory	<p>Purves D, Augustine GJ, Fitzpatrick D, Hall WC, LaMantia AS, McNamara JO, White LE (2008) Neuroscience. Palgrave Macmillan</p>			
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	jährlich			
Module capacity	unlimited			
Modullevel / module level	AS (Akzentsetzung / Accentuation)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method				
Vorkenntnisse / Previous knowledge				
Examination	Time of examination	Type of examination		
Final exam of module	Written examination in the course of the semester vacation (usually in March)	1 written examination		
		PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		4		56
Exercises		5		70
Seminar		1		14
Total time of attendance for the module				140 h

bio390 - Plant molecular biology and genetics

Module label	Plant molecular biology and genetics			
Module code	bio390			
Credit points	15.0 KP			
Workload	450 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Akzentsetzungsmodule • Master of Education Programme (Gymnasium) Biology (Master of Education) > Mastermodule 			
Responsible persons	Laubinger, Sascha (Authorized examiners)			
Prerequisites				
Skills to be acquired in this module	<p> ++ biologische Fachkenntnisse ++ Kenntnisse biologischer Arbeitstechniken + biologierelevante naturwissenschaftliche/mathematische Grundkenntnisse + Statistik und wissenschaftliches Programmieren ++ fächerübergreifende(s) Kenntnisse & Denken ++ Abstraktes, logisches, analytisches Denken ++ vertiefte Fachkompetenz in biologischem Spezialgebiet ++ Selbstständiges Lernen und (forschendes) Arbeiten ++ Datenpräsentation und evidenzbasierte Diskussion in Wort und Schrift ++ Teamfähigkeit ++ (wissenschaftliche) Kommunikationsfähigkeit ++ Projekt- und Zeitmanagement + Kenntnisse von Sicherheits- und Umweltbelangen </p> <p> Das Modul dient, unter Einbezug moderner Methoden und Techniken, dem vertieften Erlernen der wissenschaftlichen Herangehensweise zur Lösung von Problemen im Bereich molekularen Pflanzenbiologie und Pflanzengenetik. Fachkompetenzen: Grundkenntnisse in Pflanzengenetik, Pflanze/Umwelt-Interaktionen und molekulare Grundlagen der Genregulation Methodenkompetenzen: Erlernen von molekularbiologischer Grundtechniken, selbständig angewandt Handlungskompetenzen: Präsentation von wissenschaftlichen Arbeiten, Vortragstechniken, Teamfähigkeit, Problemlösungskompetenzen </p>			
Module contents	<p> In der interaktiv gestalteten Vorlesung für die Teilnehmenden wird das Basiswissen vermittelt. Hauptfokus besteht dabei auf Pflanze/Umwelt-Interaktionen und die zugrundeliegenden molekularen Mechanismen der Genregulation in Pflanzen. Im Praktikum werden wir an ausgewählten Beispielen molekulare und genetische Techniken erlernen und durchführen (z.B. Mutantanalysen, Isolation von RNA/DNA, Bestimmung der Genaktivität mittel qRT-PCR, Analyse von Spleißmustern, Methoden zur Bestimmung von Protein/Protein-Interaktionen). Zu Beginn des Moduls werden die molekularbiologische Techniken und neuste Entwicklungen im Rahmen eines Methodenseminars von den Studierenden vorgestellt Den Abschluss des Moduls bildet ein gemeinsames Literaturseminar, bei dem aktuelle Arbeiten zum oben genannten Themenkreis von den Studierenden vorgestellt und diskutiert werden. </p>			
Reader's advisory	Aktuelle Literaturvorschläge werden mit den Studierenden in der Vorbesprechung besprochen.			
Links				
Languages of instruction	German, English			
Duration (semesters)	1 Semester			
Module frequency	jährlich im Wintersemester			
Module capacity	12 (16)			
Modullevel / module level	AS (Akzentsetzung / Accentuation)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method	3 SWS Vorlesung 3 SWS Seminar 4 SWS Übung			
Vorkenntnisse / Previous knowledge				
Examination	Time of examination		Type of examination	
Final exam of module	KL			
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		3	WiSe	42
Seminar		3	WiSe	42

Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Practical training		4	WiSe	56
Total time of attendance for the module				140 h

Naturwissenschaftliche Grundlagen

bio150 - Statistics for Biologists

Module label	Statistics for Biologists		
Module code	bio150		
Credit points	6.0 KP		
Workload	180 h		
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Naturwissenschaftliche Grundlagen • Dual-Subject Bachelor's Programme Biology (Bachelor) > Ergänzungsmodule 		
Responsible persons	Kretzberg, Jutta (Module responsibility)		
	Kretzberg, Jutta (Authorized examiners)		
Prerequisites			
Skills to be acquired in this module	[nop] + knowledge of biological working methods ++ biologically relevant knowledge in the natural sciences and mathematics ++ statistics & scientific programming + interdisciplinary knowledge & thinking ++ abstract, logical, analytical thinking + independent learning and (research-based) working + data presentation and evidence-based discussion (written and spoken) + teamwork [/nop] Knowledge in applied statistics Basic knowledge of programming language R Ability to plan, conduct and interpret statistical analysis of biological data		
Module contents	Introduction to applied statistics - background and application in R: Logic, set theory, combinatorics, probability theory, distributions, descriptive statistics, inferential statistics, statistical tests, ANOVA, study design, Bayes' statistics, correlation, regression, curve fitting		
Reader's advisory	A detailed script for lecture and exercises is available in Stud.IP		
Links			
Language of instruction	German		
Duration (semesters)	1 Semester		
Module frequency	jährlich		
Module capacity	unlimited		
Reference text	Übungen mit R können auf einem eigenen Laptop oder im Rechnerraum absolviert werden		
Modullevel / module level	EB (Ergänzungsbereich / Complementary)		
Modulart / typ of module	Pflicht / Mandatory		
Lehr-/Lernform / Teaching/Learning method	Vorlesung, Übung		
Vorkenntnisse / Previous knowledge	Schulmathematik, sicherer Umgang mit Computern		
Examination	Time of examination	Type of examination	
Final exam of module	within two weeks after lecture time	written exam (+15% bonus points from exercises)	
Course type	Comment	SWS	Frequency
			Workload of compulsory attendance
Lecture		2	--
Exercises		2	--
Total time of attendance for the module			56 h

bio251 - Exercises in Biochemistry and Molecular Biology

Module label	Exercises in Biochemistry and Molecular Biology			
Module code	bio251			
Credit points	6.0 KP			
Workload	180 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Naturwissenschaftliche Grundlagen • Dual-Subject Bachelor's Programme Biology (Bachelor) > Ergänzungsmodule 			
Responsible persons	<p>Scholten, Alexander (Module responsibility)</p> <p>Laubinger, Sascha (Module counselling)</p> <p>Nolte, Arne (Module counselling)</p> <p>Scholten, Alexander (Authorized examiners)</p> <p>Laubinger, Sascha (Authorized examiners)</p> <p>Nolte, Arne (Authorized examiners)</p>			
Prerequisites	admission of BSc students in Biology			
Skills to be acquired in this module	++ biological knowledge ++ knowledge of biological working methods + biologically relevant knowledge in the natural sciences and mathematics + abstract, logical, analytical thinking + data presentation and evidence-based discussion (written and spoken) + teamwork + knowledge of safety and environmental issues			
Module contents	General introduction to principles of laboratory work in Biochemistry and Cell Biology			
Reader's advisory	Script			
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency				
Module capacity	unlimited			
Modullevel / module level	EB (Ergänzungsbereich / Complementary)			
Modulart / typ of module	Pflicht / Mandatory			
Lehr-/Lernform / Teaching/Learning method	Übunge, Seminar			
Vorkenntnisse / Previous knowledge	VL Biochemie und Zellbiologie			
Examination	Time of examination		Type of examination	
Final exam of module	during semester		written exam; additionally ungraded protocolls	
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Seminar		1	SuSe	14
Exercises		3	SuSe	42
Total time of attendance for the module				56 h

che101 - Basic Chemistry

Module label	Basic Chemistry			
Module code	che101			
Credit points	6.0 KP			
Workload	180 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Naturwissenschaftliche Grundlagen • Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Ergänzungsmodule 			
Responsible persons	Wark, Michael (Module responsibility)			
Prerequisites				
Skills to be acquired in this module	<p>Die Studierenden haben grundlegende Kenntnisse über den Aufbau von Atomen und Molekülen. Sie kennen das Periodensystem der chemischen Elemente, die Eigenschaften wichtiger Elemente und deren wichtigste Verbindungen und Reaktionen. Die Gleichgewichte in wässriger Lösung sind Ihnen vertraut. Sie können Gleichgewichtseinstellungen zur Lösung kleiner analytischer Aufgabenstellungen einsetzen und diese Gleichgewichte formelhaft beschreiben. Sie kennen Säuren und Basen sowie Reduktions- und Oxidationsreaktionen. Ausgewählte Methoden zur Quantifizierung von chemischen Verbindungen mittels Spektroskopie sind den Studierenden bekannt. Die Studierenden kennen die wichtigsten organischen Moleküle und Naturstoffklassen.</p>			
Module contents	<p>V: Allgemeine und Anorganische Chemie (3 SWS)</p> <p>Aufbau des Periodensystems; Grundlagen der chemischen Bindung; Nomenklatur chemischer Verbindungen; stöchiometrische Gesetze; chemische Gleichgewichte; fundamentale Stoffchemie; Struktur wichtiger Verbindungen; Säuren und Basen; Reduktionen und Oxidationen; Einführung in Methoden der Spektroskopie und der Chromatographie.</p> <p>Ü: Übung zur Vorlesung Allgemeine und Anorganische Chemie (1 SWS)</p>			
Reader's advisory	<p>Zeeck: Chemie für Mediziner, Urban & Schwarzenberg; Latscha/Katzmaier: Chemie für Biologen, Springer; Riedel: Anorganische Chemie, de Gruyter; Holleman-Wiberg: Lehrbuch der Anorganischen Chemie, de Gruyter; Skript zur Vorlesung</p>			
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	jährlich			
Module capacity	unlimited			
Reference text	6 KP / WiSe: V 101, Ü 101Ü			
Modullevel / module level				
Modulart / typ of module	je nach Studiengang Pflicht oder Wahlpflicht			
Lehr-/Lernform / Teaching/Learning method				
Vorkenntnisse / Previous knowledge				
Examination	Time of examination	Type of examination		
Final exam of module	Klausur am Beginn der vorlesungsfreien Zeit (normalerweise Anfang Februar)	written exam (100%)		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		3	WiSe	42
Exercises		1	WiSe	14
Total time of attendance for the module				56 h

che102 - Basic Chemistry Laboratory

Module label	Basic Chemistry Laboratory	
Module code	che102	
Credit points	6.0 KP	
Workload	180 h	
Applicability of the module	<ul style="list-style-type: none">• Bachelor's Programme Biology (Bachelor) > Naturwissenschaftliche Grundlagen• Bachelor's Programme Mathematics (Bachelor) > Nebenfachmodule• Dual-Subject Bachelor's Programme Biology (Bachelor) > Ergänzungsmodule	
Responsible persons	Koch, Rainer (Module responsibility)	
Prerequisites	bestandene Modulprüfung che101 (Nachweis chemischer Grundkenntnisse für Laborsicherheit)	
Skills to be acquired in this module	Die Studierenden beherrschen die praktischen Grundlagen der allgemeinen und anorganischen Chemie. Sie lernen die Arbeit im chemischen Labor anhand von Standardprozeduren kennen und machen sich mit den Grundregeln der chemischen Laborpraxis vertraut. Sie können die Durchführung und die Beobachtung chemischer Experimente nach den Regeln guter wissenschaftlicher Praxis dokumentieren und die Ergebnisse von Versuchen aussagekräftig und fundiert protokollieren.	
Module contents	VL: Theoretische Grundlagen der im Praktikum durchgeführten Versuche PR: Einführung in die Laborpraxis: Erlernen wichtiger Standardprozeduren im chemischen Labor.	
Reader's advisory	Lehrbücher der allgemeinen und anorganischen Chemie, z.B. Riedel, Anorganische Chemie, de Gruyter; Holleman-Wiberg, Lehrbuch der Anorganischen Chemie, de Gruyter; Zeeck: Chemie für Mediziner, Urban & Schwarzenberg; Latsche/Katzmaier: Chemie für Biologen, Springer; Praktikumsskript.	
Links		
Language of instruction	German	
Duration (semesters)	1 Semester	
Module frequency	jährlich	
Module capacity	unlimited (Die maximale Teilnehmerzahl ist beim Modulverantwortlichen zu erfragen.)	
Reference text	VL 5.07.714, PR 5.07.713	
Modullevel / module level		
Modulart / typ of module	je nach Studiengang Pflicht oder Wahlpflicht	
Lehr-/Lernform / Teaching/Learning method		
Vorkenntnisse / Previous knowledge		
Examination	Time of examination	Type of examination
Final exam of module		not graded
Course type	Lecture	
SWS	6	
Frequency	WiSe	
Workload attendance	84 h	

che190 - Basic Organic Chemistry

Module label	Basic Organic Chemistry	
Module code	che190	
Credit points	6.0 KP	
Workload	180 h	
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Naturwissenschaftliche Grundlagen • Bachelor's Programme Chemistry (Bachelor) > Aufbaumodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Ergänzungsmodule • Dual-Subject Bachelor's Programme Chemistry (Bachelor) > Aufbaumodule • Master of Education Programme (Special Needs Education) Chemistry (Master of Education) > Mastermodule • Master of Education Programme (Vocational and Business Education) Chemistry (Master of Education) > Mastermodule 	
Responsible persons	<p>Christoffers, Jens (Module responsibility)</p> <p>Christoffers, Jens (Authorized examiners)</p> <p>Hilt, Gerhard (Authorized examiners)</p> <p>Doye, Sven (Authorized examiners)</p> <p>Hilt, Gerhard (Module counselling)</p> <p>Doye, Sven (Module counselling)</p> <p>Christoffers, Jens (Module counselling)</p>	
Prerequisites		
Skills to be acquired in this module	<p>Kenntnisse</p> <p>Grundlegende Stoffsystematik der Organischen Chemie, Reaktionsweisen organischer Verbindungen, grundlegende Reaktionsmechanismen, Fertigkeiten</p> <p>Beherrschung der Grundlagen der Organischen Chemie: Stoffklassen, funktionelle Gruppen, Nomenklatur; Formulieren organisch-chemischer Reaktionsgleichungen, Transformationen funktioneller Gruppen, Aufbau von Kohlenstoff-Kohlenstoff-Bindungen; Benennung der Konfiguration chiraler Verbindungen</p>	
Module contents	<p>Mit dem Besuch dieses Moduls erwerben die Studierenden das Basiswissen der Organischen Chemie. Hierzu zählen insbesondere Kenntnisse über die Stoffsystematik, die Nomenklatur, eine Übersicht über funktionelle Gruppen, deren Herstellung und wichtigste Eigenschaften, die Stereochemie, die Reaktivität organischer Verbindungen, grundlegende Reaktionsmechanismen, wichtige synthetische Makromoleküle und die bedeutendsten Naturstoffklassen.</p>	
Reader's advisory	Wird in der Vorlesung bekannt gegeben	
Links		
Language of instruction	German	
Duration (semesters)	1 Semester	
Module frequency	jährlich	
Module capacity	unlimited	
Reference text	Empfohlene Belegung 3 (WiSe)	
Modullevel / module level	AC (Aufbaucurriculum / Composition)	
Modulart / typ of module	je nach Studiengang Pflicht oder Wahlpflicht	
Lehr-/Lernform / Teaching/Learning method	V (4 SWS)	
Vorkenntnisse / Previous knowledge		
Examination	Time of examination	Type of examination
Final exam of module	In der vorlesungsfreien Zeit entsprechend separater Ankündigung	written exam
Course type	Lecture	
SWS	4	
Frequency	WiSe	
Workload attendance	56 h	

che290 - Experimental Organic Chemistry

Module label	Experimental Organic Chemistry		
Module code	che290		
Credit points	6.0 KP		
Workload	180 h		
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Naturwissenschaftliche Grundlagen • Dual-Subject Bachelor's Programme Biology (Bachelor) > Ergänzungsmodule • Dual-Subject Bachelor's Programme Chemistry (Bachelor) > Aufbaumodule • Master of Education Programme (Vocational and Business Education) Chemistry (Master of Education) > Mastermodule 		
Responsible persons	<p>Doye, Sven (Module responsibility)</p> <p>Christoffers, Jens (Authorized examiners)</p> <p>Doye, Sven (Authorized examiners)</p> <p>Martens, Jürgen (Authorized examiners)</p> <p>Hilt, Gerhard (Authorized examiners)</p> <p>Christoffers, Jens (Module counselling)</p> <p>Doye, Sven (Module counselling)</p> <p>Hilt, Gerhard (Module counselling)</p>		
Prerequisites	Erfolgreiche Teilnahme am Modul "Grundvorlesung Organische Chemie"		
Skills to be acquired in this module	Den Studierenden soll der Ausbau ihrer grundlegenden Kenntnisse über die Reaktivität organisch-chemischer Substanzen in Theorie und Praxis ermöglicht werden. Hierfür werden die Studierenden in die Lage versetzt, unter sicherheits- und umweltrelevanten Gesichtspunkten fach- und ordnungsgemäß mit einfachen Chemikalien umzugehen und selbständig organisch-chemische Experimente durchzuführen. Sie erlangen darüber hinaus grundlegende Fähigkeiten zur Präsentation wissenschaftlicher Sachverhalte in schriftlicher und mündlicher Form.		
Module contents	Mit diesem Modul bauen die Studierenden ihr Basiswissen der Organischen Chemie weiter aus und wenden es im Rahmen dieses Praktikums im Labor an. Sie erlernen dabei grundlegende Arbeitstechniken aus dem Bereich der präparativen Organischen Chemie, indem sie ausgewählte organische Reaktionen und Analysemethoden (z.B. Substitution, Eliminierung, Polymerisation, Veresterung, Verseifung, Oxidation, Reduktion, Aldolkondensation, Extraktion, Dünnschichtchromatographie) eigenhändig durchführen.		
Reader's advisory			
Links	http://www.chemie.uni-oldenburg.de/oc...		
Language of instruction	German		
Duration (semesters)	1 Semester		
Module frequency	jährlich		
Module capacity	70		
Reference text	6 KP / SoSe: PR 204, S 205 / 4. FS / Doye		
Modullevel / module level			
Modulart / typ of module			
Lehr-/Lernform / Teaching/Learning method	PR + SE (6 SWS)		
Vorkenntnisse / Previous knowledge	Sichere Beherrschung der theoretischen Grundlagen der Organischen Chemie		
Examination	Time of examination	Type of examination	
Final exam of module	Konsultationen zu den Experimenten und Anfertigung von Versuchsprotokollen begleitend zum Praktikum, ein Vortrag im Anschluss an das Praktikum (Termine laut Aushang), eine mündliche Prüfung von maximal 45 Minuten Dauer nach erfolgreichem Abschluss der anderen zu erbringenden Leistungen und Terminvereinbarung mit einem der möglichen Prüfer spätestens zum Ende des Semesters	KL	
Course type	Comment	SWS	Frequency
			Workload of compulsory attendance

Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Seminar	Blockveranstaltung		SuSe	15
Practical training	Blockveranstaltung		SuSe	65
Total time of attendance for the module				80 h

mat980 - Mathematics for the Life Sciences

Module label	Mathematics for the Life Sciences				
Module code	mat980				
Credit points	6.0 KP				
Workload	180 h				
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Naturwissenschaftliche Grundlagen • Dual-Subject Bachelor's Programme Biology (Bachelor) > Erganzungsmodule 				
Responsible persons	Vertman, Boris (Module responsibility) Schöpfer, Frank (Module responsibility) Harmand, Peter (Authorized examiners)				
Prerequisites					
Skills to be acquired in this module	Aufbauend auf einem mittleren Abiturwissen werden Teile des Schulstoffs wiederholt (Ableitung und Integral), ergänzt (allgemeiner Abbildungsbegriff, Folgen und Reihen) und weiterentwickelt (Taylorreihe, Differentialgleichungen). Die Mathematik wird dabei im wesentlichen ohne Beweise als Handwerkszeug präsentiert. Die Ideen hinter den Begriffen und die Bedeutung der Ergebnisse werden jedoch ausführlich erklärt. Die Studierenden sollen - ihr Schulwissen wiederholen und festigen, - die Anwendung von Mathematik in der Biologie mit zahlreichen praktischen Übungsaufgaben lernen, - ihr allgemeines Wissen mathematischer Methoden und Modelle verbreitern und üben, - die grundlegenden Formen von diskreten und kontinuierlichen, ungebremsten und gebremsten Wachstumsprozessen kennenlernen, - erfahren, wie analytisches und abstraktes Denken bei dem Studium realer Probleme helfen kann.				
Module contents	Folgen und Konvergenz: Abbildungen und Funktionen, rekursiv definierte Folgen und diskrete Wachstumsmodelle, Konvergenz, Reihen. Reelle Funktionen: Grenzwert und Stetigkeit, Exponential- und trigonometrische Funktionen, Koordinatentransformationen. Differential- und Integralrechnung: Ableitung und Integral, Mittelwertsatz, Taylorentwicklung, Newton-Verfahren, Hauptsatz, uneigentliche Integrale. Differentialgleichungen: Einfache Differentialgleichungen 1. Ordnung (linear homogen, logistisch), Richtungsfeld, stationäre Zustände und Stabilität, Anwendungen. Differentialgleichungen höherer Ordnung und Systeme (Schwingungsgleichung, Lotka-Volterra-Modell).				
Reader's advisory					
Links					
Language of instruction	German				
Duration (semesters)	1 Semester				
Module frequency	jährlich				
Module capacity	unlimited				
Reference text	6 KP 1 V: 981, 1 Ü: 982 1. FS				
Modullevel / module level	BC (Basiscurriculum / Base curriculum)				
Modulart / typ of module	Wahlpflicht / Elective				
Lehr-/Lernform / Teaching/Learning method	Vorlesung + Übung				
Vorkenntnisse / Previous knowledge					
Examination	Time of examination		Type of examination		
Final exam of module	Vorlesungsende		KL		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance	
Lecture		3		42	
Exercises		1		14	
Total time of attendance for the module					56 h

phy910 - Physics for Students of Biology and Dual Subject Chemistry

Module label	Physics for Students of Biology and Dual Subject Chemistry	
Module code	phy910	
Credit points	6.0 KP	
Workload	180 h	
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Naturwissenschaftliche Grundlagen • Dual-Subject Bachelor's Programme Biology (Bachelor) > Ergänzungsmodule • Dual-Subject Bachelor's Programme Chemistry (Bachelor) > Aufbaumodule 	
Responsible persons	<p>Gülker, Gerd (Module responsibility)</p> <p>Gütay, Levent (Module responsibility)</p>	
Prerequisites	Keine	
Skills to be acquired in this module	<p>Die Studierenden sollen folgende Fähigkeiten erlangen: Theorie: - Verständnis von Naturvorgängen und ihre mathematische Beschreibung - Erhebung und quantitative Analyse von Messdaten - Verständnis der physikalischen Grundlagen von Messapparaturen mit Schwerpunkt auf die in der Biologie häufig verwendeten Messinstrumente. Praxis - Vertiefung und Überprüfung ihrer theoretischen Kenntnisse aus Vorlesungen und Lehrbuch am eigenen Experiment - Teamfähigkeit durch gemeinsames Durchführen der Experimente handwerkliche Fähigkeiten beim Umgang mit Messapparaturen sachkenntliches Arbeiten mit Messanleitungen - Protokollierung einer Messung</p>	
Module contents	<p>Vorlesung und Praktikum geben eine Einführung in die Physik, wobei schwerpunktmäßig die grundlegenden Sachverhalte aus Mechanik, Optik, Elektrodynamik, Wärmelehre sowie Atom- und Kernphysik behandelt werden. Zusätzlich werden allgemeine Themen wie Messfehler und Fehlerrechnung behandelt.</p>	
Reader's advisory	<p>Giancoli, C.D., „Physik“, Verlag Pearson Studium Tipler, P.A., „Physik“, Spektrum Akademischer, Heidelberg Und ausgewählte Kapitel aus: Halliday, D., Resnick, R., Walker, J.: „Fundamentals of physics“, Wiley VCH Weltner, K., „Mathematik für Physiker 1+2“, Springer Verlag Außerdem speziell für das Praktikum: Anleitungsskript zum Praktikum Geschke, D., „Physikalisches Praktikum“, Teubner Walcher, W., „Praktikum der Physik“, Teubner Westphal W.H., „Physikalisches Praktikum“, Vieweg</p>	
Links	http://www.uni-oldenburg.de/physik/lehre/praktika/bio-che/bio/	
Language of instruction	German	
Duration (semesters)	1 Semester	
Module frequency	jährlich	
Module capacity	unlimited	
Modullevel / module level	---	
Modulart / typ of module	je nach Studiengang Pflicht oder Wahlpflicht	
Lehr-/Lernform / Teaching/Learning method	Vorlesung mit optionalem, jedoch dringlich empfohlenen Tutorium, Praktikum	
Vorkenntnisse / Previous knowledge		
Examination	Time of examination	Type of examination
Final exam of module	Modulende	1 written exam or 1 oral exam
Course type	Seminar	
SWS		
Frequency		
Workload attendance	0 h	

bio250 - Biochemistry

Module label	Biochemistry			
Module code	bio250			
Credit points	6.0 KP			
Workload	180 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Naturwissenschaftliche Grundlagen • Dual-Subject Bachelor's Programme Biology (Bachelor) > Ergänzungsmodule 			
Responsible persons	Koch, Karl-Wilhelm (Authorized examiners) Scholten, Alexander (Module counselling)			
Prerequisites				
Skills to be acquired in this module	++ biological knowledge ++ knowledge of biological working methods + biologically relevant knowledge in the natural sciences and mathematics ++ abstract, logical, analytical thinking + independent learning and (research-based) working ++ data presentation and evidence-based discussion (written and spoken) ++ teamwork + (scientific) communication skills + project and time management + knowledge of safety and environmental issues The students have a survey of the arrangement, function, and biosynthesis of the most important substance classes and metabolic processes, learn basic experimental methods of biochemistry and are able to present and interpret experimental results.			
Module contents	The module gives an introduction to conceptions and methods of biochemistry.			
Reader's advisory	General textbooks of Biochemistry, e.g.: Biochemie, Müller-Esterl Biochemie, Lubert Stryer Lehninger Prinzipien der Biochemie, David L. Nelson und Michael M. Cox Principles of Biochemistry, Horton et al.			
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	jährlich			
Module capacity	unlimited			
Modullevel / module level	EB (Ergänzungsbereich / Complementary)			
Modulart / typ of module	Wahlpflicht / Elective			
Lehr-/Lernform / Teaching/Learning method				
Vorkenntnisse / Previous knowledge				
Examination	Time of examination	Type of examination		
Final exam of module	Written examination following the end of lectures or end of the semester.	1 written examination signed minutes PLEASE NOTE: Additional conditions regarding attendance and ungraded activities as determined by the persons responsible for the module will apply.		
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		2		28
Tutorial			WiSe	0
Seminar		1		14
Practical training		2		28
Total time of attendance for the module				70 h

Abschlussmodul

bam - Bachelor's Thesis Module

Module label	Bachelor's Thesis Module	
Module code	bam	
Credit points	15.0 KP	
Workload	450 h	
Applicability of the module	<ul style="list-style-type: none"> Bachelor's Programme Biology (Bachelor) > Abschlussmodul 	
Responsible persons	der Biologie, Lehrende (Authorized examiners)	
Prerequisites		
Skills to be acquired in this module	<p>Successful completion of the Bachelor module demonstrates that students are able to work on a problem in the field of Biology within a fixed period applying scientific methods.</p> <ul style="list-style-type: none"> ++ biological knowledge ++ knowledge of biological working methods + statistics & scientific programming + abstract, logical, analytical thinking ++ deepened expertise in biological specialist field ++ independent learning and (research-based) working ++ data presentation and evidence-based discussion (written and spoken) + (scientific) communication skills ++ project and time management 	
Module contents	<p>Preparing the Bachelor thesis Active participation in the seminar of the research group, in which the Bachelor's thesis is written</p>	
Reader's advisory	Supervisors may supply an initial reading list with important literature. The students are expected to find and use further literature as needed.	
Links		
Languages of instruction	German, English	
Duration (semesters)	1 Semester	
Module frequency	halbjährlich	
Module capacity	unlimited	
Modullevel / module level	Abschlussmodul (Abschlussmodul / Conclude)	
Modulart / typ of module	Pflicht / Mandatory	
Lehr-/Lernform / Teaching/Learning method		
Vorkenntnisse / Previous knowledge		
Examination	Time of examination	Type of examination
Final exam of module	Bachelor's thesis (12 CP) and accompanying seminar (3 CP)	
Course type	Seminar	
SWS	1	
Frequency	--	
Workload attendance	14 h	

Frühere Module

che100 - Introduction to Chemistry

Module label	Introduction to Chemistry			
Module code	che100			
Credit points	12.0 KP			
Workload	360 h			
Applicability of the module	<ul style="list-style-type: none"> • Bachelor's Programme Biology (Bachelor) > Frühere Module • Bachelor's Programme Chemistry (Bachelor) > Basismodule • Dual-Subject Bachelor's Programme Biology (Bachelor) > Frühere Module • Dual-Subject Bachelor's Programme Chemistry (Bachelor) > Basismodule 			
Responsible persons	Beckhaus, Rüdiger (Module responsibility) Albers, Lena (Authorized examiners) Beckhaus, Rüdiger (Authorized examiners) Weiz, Alexander (Module counselling)			
Prerequisites	Dokumentierte Teilnahme an der Sicherheitsbelehrung vor Beginn des Praktikums			
Skills to be acquired in this module	Die Studierenden haben nach intensivem Durcharbeiten des Moduls: • den Aufbau der Atome sowie des Periodensystems verstanden, • die chemische Bindung im Hinblick auf die grundlegende Bindungstheorie verstanden, • den Unterschied verschiedener Reaktionsarten und deren Mechanismus verstanden und • ein grundlegendes Wissen über wichtige Verbindungen im Alltag, Industrie und Technik erworben. Fertigkeiten (Können) Vorlesung Die Studierenden können nach intensivem Durcharbeiten des Moduls: • die unterschiedlichen Typen der chemischen Bindung zuordnen, • chemische Verbindungen systematisch benennen, • Reaktionsgleichungen aufstellen und ausgleichen, • sowie die unterschiedlichen Reaktionstypen zuordnen. Praktikum Sie lernen die Arbeit im chemischen Labor anhand von Standardprozeduren kennen und machen sich mit den Grundregeln der chemischen Laborpraxis vertraut. Sie sind in der Lage, stöchiometrische Beziehungen selbstständig zu erkennen und zur Lösung theoretischer und laborpraktischer Aufgabenstellungen einzusetzen. Die Studierenden haben grundlegende Kenntnisse über Vorkommen, Darstellung und Eigenschaften der chemischen Elemente und kennen deren wichtigste Verbindungen und Reaktionen.			
Module contents	Vorlesung Experimentalvorlesung zur Allgemeinen und Anorganischen Chemie: • Aufbau der Atome • Aufbau des Periodensystems • Grundlagen der chemischen Bindung • Nomenklatur chemischer Verbindungen • stöchiometrische Gesetze • chemische Gleichgewichte • Säure- / Basereaktionen • Redoxreaktionen • Komplexbildungen • Struktur wichtiger Verbindungen • Fundamental Stoffchemie • Vorführung chemischer Experimente Praktikum • Einführung in die Laborpraxis: Erlernen wichtiger Standardprozeduren im chemischen Labor. Übungen • Übungen zu den Inhalten der Vorlesung, Klausurvorbereitung			
Reader's advisory				
Links				
Language of instruction	German			
Duration (semesters)	1 Semester			
Module frequency	jährlich			
Module capacity	unlimited			
Reference text	WiSe			
Modullevel / module level	BC (Basiscurriculum / Base curriculum)			
Modulart / typ of module	Pflicht / Mandatory			
Lehr-/Lernform / Teaching/Learning method	VL (4 SWS) + PR (6 SWS) + SEM (1 SWS) Interaktive Tafelvorlesung, fachliche Inhalte werden durch passende Experimente verdeutlicht.			
Vorkenntnisse / Previous knowledge				
Examination	Time of examination		Type of examination	
Final exam of module	In der vorlesungsfreien Zeit entsprechend separater Ankündigung		KL	
Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Lecture		4		56
Exercises		1		14
Practical training		6		84

Course type	Comment	SWS	Frequency	Workload of compulsory attendance
Seminar				
Total time of attendance for the module				154 h
