Please note that the following module descriptions are provided without guarantee and are not legally binding. Only the applicable German version is legally binding.

BIO-B-KM1: State of the Art	in Biochemistr	ry a	nd Molecular Biology		Number of cred	it points (CP): 6
Module type (mandatory or electrodule):	etive	Depends on study program				
Content and qualification goals of module:		Content: Current topics in biochemistry, biotechnology, molecular biology, genetics, cell biology and physiology with emphasis on eukaryotic and prokaryotic model organisms and the scientific fields of the participating professorships  Qualification goals: 1.) Professional competence:  - Students acquire deep insights into the current state of research in selected topics in biochemistry, genetics, molecular biology, cell biology and physiology including suitable experimental approaches to solve scientific problems. 2.) Methodological competence:  - Students learn to cope with specialist literature in English. 3.) Action competence (socially relevant and strategic):  - Students learn to ask questions after scientific talks in English.				
Module (partial) exams (numbe scope, workload in CP):	r, form,	Written exam, 120 min				
Independent study time (in hour	rs (h)):	90				
Courses (forms of teaching)	Contact time (in semester hours)		Supplementary won (number, for For completing the module	Fo		Module (partial) exam accompanying the course (number, form, scope)
Lecture series Molecular life sciences (lecture)	3 x 2		-	-		-
Frequency of the module:		137	inter semester			
Requirement for participation in	the module:	- white semester				
Academic organizational unit:		Biologie/Biochemie				

BIO-B-KM2: Practical Bioinf	ormatics				Number of cred	lit points (CP): 6
Module type (mandatory or electrodule):	etive	Dep	pends on study program	1		
Content and qualification goals	of module:	Leccbio and cell Con resc pattlena task Qu 1.)	interpretation of high- lular molecular componences on biological sections and ontologies file bled to use the statistics independently with interpretation goals:  Professional competence Students understand the tools and methods.  They know important is structure analysis.  They rule the foundation Methodological compersudents understand the foundations of basic bits are able to select corresponding measure interpretations method Action competence (so	through the purpose of the purpose o	systems biological aghput data contains such as genes, more module convey bees, structures as available in the interpretation possibility of descriptive and estimated and communication methods a given biological at data the appropriate and defend their sublication presentation	cal aspects of the analysis ining information on etabolites and proteins. It is knowledge on well as metabolic internet. Students are etambitious data analysis ities of bioinformatics des for sequence and desired inferential statistics. It is problem with wriate data analysis and attegic):  The work with appropriate deparation students are
Module (partial) exams (numbe scope, workload in CP):	r, form,	Wr	itten exam, 90 min			
Independent study time (in hour	rs (h)):	120				
Courses (forms of teaching)	Contact time semester hou		Supplementary wo (number, for completing the module	orm, Fo		Module (partial) exam accompanying the course (number, form, scope)
Lecture and exercise (lecture and exercise)	2L + 2E		-		st for midterm riew	-
Frequency of the module:		Summer semester				
Requirement for participation in	the module:	-				
Academic organizational unit:		В	iologie/Biochemie			

BIO-B-RM1: Nanobiotechnolog	gy		Number of credi	it points (CP): 11	
Module type (mandatory or election module):	ive	Elective module			
Content and qualification goals o	f module:	Content:  Basic methods of Nanobiotechnology and the scientific concept relation to Biosensor Technology are taught. Different manipulation a detection techniques are presented and important combinations we biomolecules and sensors and their bioanalytical application introduced. By means of practically relevant examples the developm of single biosensors, their limitations and approaches of optimization discussed. Further topics are biosensors, Biochip Technology, Molecu Diagnostics, Point of Care Testing (POCT).  In the practical part methods of Nanobiotechnology are exemplated and different biosensors are prepared, characterized and test For this purpose the students are taught different immobilizate techniques for enzymes and proteins as well as different measurem techniques for the characterization of the sensor functioning. A specificus is placed on AFM techniques and optical biosensors. In seminar current developments in the field of Nanobiotechnology presented and discussed by the participants of the internship us specialist literature.			
		Qualification goals:  1.) Professional competence: The module deals with the basis Biochip Technology and Biose The students are introduced to develop experimental approach with a biotechnological and a be knowledge in the field of Nano specialisation chosen later and 2.) Methodological competence  - Using English technical lite - Documentation and presen - Planning of scientific expe of results - Manual skills for laborator 3.) Action competence (sociall - The students are able to int in a team The students are able to pre experiments in the framew	nsor Technology a scientific ways of nes. In the scope of biochemical oriental biotechnology. It from the profession e: erature tation of scientific riments, interpretal y practice y relevant and strateract within a ground an, carry out and desent and defend the	and their techniques. thinking and learn to f the module students ation are taught specific is independent from the onal orientation.  issues tion and documentation  tegic): up and to work together ocument experimental the results of the	
Module (partial) exams (number, scope, workload in CP):	·	Oral exam on seminar and lab Lab course protocol, approx 2			
Independent study time (in hours	(h)):	95			
`	Contact time semester hou	,		Module (partial) exam accompanying the	

		For completing the	For admission to	course (number, form,
		module	the module exam	scope)
Research topics of			-	-
Nanobiotechnology/	2 L + 2 S	-		
Biosensor Technology/				
Bioanalytics (lecture and				
seminar)				
Lab course (6 weeks) (lab	Supervision:	-	-	-
course)	5			
Frequency of the module:		Winter semester		
Requirement for participation in	the module:	-		
Academic organizational unit:		Biologie/Biochemie		

BIO-B-RM2: Cellular Signal Transduction	1	Number of credit points (CP): 11		
Module type (mandatory or elective module):	Elective module			
Content and qualification goals of module:	Content:  This module gives information about theoretical and practically relevant knowledge in the field of intracellular signal transduction. The module focuses on the biochemistry of cellular animal systems, physiological processes of plants are partially included. The module covers subjects like receptors, heterotrimeric G-proteins, ion channels, intracellular second messengers, kinases, phosphatases, proteases, small GTP-binding proteins, regulation of the cell cycle, transcription factors as well as mechanisms for termination of signaling processes. Beside the theoretical basic principles the cellular signaling mechanisms are illustrated by examples from pathobiochemistry. It is intended to explain principles to improve the classification of the transfer of intracellular signals in the human body.  This module is completed by attendance of the second part of the module 'Signal transduction II' in the summer semester. Here students present published articles which illustrate basic mechanisms of signal transduction by various clinical pictures. Techniques to rapidly cover the content of a publication and to transmit the take home message to an interested but also critical audience by using power point presentations and the blackboard are trained (multiplication). Additionally the assessment and critical appraisal of published data by reflection of the adequate questions, the used methods, the permitted conclusions which have been drawn from the shown data as well as the allocation of the topics into the context of the respective scientific field are practiced.			
	immunology and have deepene fields. The students are able to different parts of scientific field scientific decisions into the fran	reflect the relations between these ds. The students are able to make me of these fields.		
	making use of scientific methor theories and models are develor founded modifications of standadopt a scientific publication by	with a given scientific question by ds. The students know how scientific ped and are able to recommend well- lard methods. The students are able to y themselves, to critically try to get the and methods and to intelligibly illustrate		
	community of the course by	y relevant and strategic): esent and answer back their work to the y making use of appropriate presentation re able to work together in a team and to		

Module (partial) exams (number	r, form,	Written exam on lecture, 90 min; 70%					
scope, workload in CP):		Lab	course protocol, appro	ox. 20 pages, 30%			
Independent study time (in hour	rs (h)):	95					
Courses (forms of teaching)	Contact time	(in	Supplementary wo	rk for examination	Module (partial) exam		
	semester hou	rs)	(number, fo	orm, scope)	accompanying the		
			For completing the	For admission to	course (number, form,		
			module	the module exam	scope)		
Lab course (6 weeks) (lab	Supervision	n:	-	-	-		
course)	5						
Lecture and seminar (lecture			Presentation (20	-	-		
and seminar)	2 L + 2 S		min)				
Frequency of the module:		Winter and summer semester					
Requirement for participation in	the module:	-					
Academic organizational unit:		В	Biologie/Biochemie				

BIO-B-RM3: Evolutionary Go	enomics (Evo	lutio	n across Scales modul	e D) Number of cre	edit points (CP): 11		
Module type (mandatory or electrodule):	etive	Ele	ctive module				
Content and qualification goals of module:		Thi bio seq seq phy	Content: This course covers approaches and applications of sequence bioinformatics, including the analysis of data from next generation sequencing technologies. The course focuses on comparative analyses of sequence data but also covers approaches for small- and large-scale phylogenetic inference as well as methods and applications of evolutionary genomics research.				
		1.) Stu	alification goals: Professional competend dents understand the properties of the pro	inciples of computati	onal sequence analysis,		
		Stu	2.) Methodological competence: Students are able to computationally analyze biological sequence data using publicly available software.				
		3.) Action competence (socially relevant and strategic): Students are able to critically read literature written in English and put content of an article into a broader perspective.					
Module (partial) exams (numbe scope, workload in CP):	r, form,	Written exam (computer exam), 90 min Written exam on lecture, 90 min					
Independent study time (in hour	rs (h)):	95					
Courses (forms of teaching)	Contact time semester hor		Supplementary wo (number, for completing the module	rk for examination orm, scope)  For admission to the module exam	Module (partial) exam accompanying the course (number, form, scope)		
Bioinformatics of biological sequences/evolutionary genomics (lecture and exercise)	2 L + 2 E		-	-	-		
Computer lab course (2 weeks) (lab course)	2		Written report (approx. 20 pages)	-	-		
Frequency of the module:  Requirement for participation in the module:		Winter semester					
Academic organizational unit:	i me module:	В	iologie/Biochemie				

BIO-B-RM4: Antibody-Techn	ologies		Number of cred	lit points (CP): 11	
Module type (mandatory or electrodule):	etive El	ective module			
Content and qualification goals	W wi go sci pu tex Th wo art Du pu	ing to be held in English ientific research, teachin blications. Integration of atbooks with actual topic the seminar addresses publick. This includes the excicles as well as the acadaring the practical training rification and characterization.	andamental topics in in a. To intensify the insign includes the illustrated f those articles will exect of immunological resolications as an important amination with formal emic writing.	mmunology. Lectures are ght into current tion of original scientific tend the knowledge from esearch. tant part of scientific l structures of scientific about the generation,	
	1.) Th ha be	professional competence students will be equipends-on skills in the field familiar with the basics tentific publications.	ped with in-depth theo of immunology. Furth	hermore the students will	
	Th an au tec	Methodological compete students will be able to dresults from scientific thor scientific publication chinical methods to proceed the competer of the competer	o extrapolate fundame publications and gain ons. In addition they w	basic knowledge how to vill be capable of using	
	Th an pa pro	3.) Action competence (socially relevant and strategic): The students will know how to present and defend scientific procedures and results in written form as well as verbal in front of the seminar participants. On that account they use media appropriate for presentations. The students will achieve the ability of planning, performing and analyzing experiments in immunology.			
Module (partial) exams (number scope, workload in CP):		Presentation on lecture and seminar, 15 min Lab course protocol, approx. 20 pages			
Independent study time (in hour	rs (h)): 95				
Courses (forms of teaching)	Contact time (in semester hours)	Supplementary wo (number, for completing the module	rk for examination orm, scope)  For admission to the module exam	Module (partial) exam accompanying the course (number, form, scope)	
Lab course (6 weeks) (lab course)	Supervision: 5	-	-	-	

Lecture and seminar (lecture	2 L + 2 S	-	Active	-
and seminar)			participation in the	
			discussion	
Frequency of the module:		Winter semester		
Requirement for participation in the module:		-		
Academic organizational unit:		Biologie/Biochemie		

BIO-B-RM5: Novel Cloning Technologies for Future Biotechnolo			uture Biotechnology		Number of cred	lit points (CP): 11
Module type (mandatory or electrodule):	tive	Ele	ctive module			
Content and qualification goals of module:			Content:  The module consists of lecture, seminar and practical training.  Main area of interest for this module is the generation and integration of artificial biochemical pathways into organisms like bacteria and plants.  As the construction of highly complex pathways is nearly impossible with standard cloning methods, the module will introduce the students to novel cloning technologies for future construction of genes and genomes. Lecture will give main basic aspects of novel cloning technologies and biological pathways. Seminar will introduce examples and show the usage of appropriate software tools. Practical training deals with design of artificial pathways and planning of needed cloning strategies.			
			alification goals: Professional competend dents get deepened thee thetic biology and biote	oretic	•	knowledge in the field of
		Sturev: Sturev	tegies with subject-spe Action competence (so	the lartification artification	basics, methods a ficial biochemica software tools. y relevant and stra d discuss scientifi	l pathways and cloning ategic): c approaches in written
		Students are able to design, conduct and analyze biochemical pathways and cloning strategies self-reliantly.				
Module (partial) exams (number scope, workload in CP):	r, form,	Presentation on lecture and seminar, 20 min, 70% Lab course protocol, approx. 20 pages, 30%				
Independent study time (in hour	s (h)):	95				
Courses (forms of teaching)	Contact time (in semester hours)		Supplementary wo (number, for completing the module	Fo:		Module (partial) exam accompanying the course (number, form, scope)
Lecture and seminar (lecture and seminar)	2 L + 2 S		-	-		-
Lab course (6 weeks) (lab course)	Supervision: 5		-	-		-
Frequency of the module:  Requirement for participation in  Academic organizational unit:	the module:	-	ummer semester iologie/Biochemie			

BIO-B-RM6: Animal Models i Physiology	n Development	al Biology and Cell	Number of cred	it points (CP): 11	
Module type (mandatory or elect module):	tive	Elective module			
Content and qualification goals of	Tred do control of the control of th	e: Content:  The lecture and the seminar will focus on basic topics and current research questions related to the development and physiology of different animal model organisms. There will be an emphasis on comparative aspects of development and physiology in invertebra (e.g. Drosophila) and in vertebrates including the zebrafish, mourat.  The lecture will provide a broad overview of developmental concand processes that have been discovered in these animal models. Will also be an extensive theoretical introduction to the relevant methodology. In addition to classical genetic techniques, the lecture introduce students to modern molecular and genetic tools includin "OMICS" technologies, different methods of mutagenesis such as CRISPR/Cas9 technology, transgenesis methods and genetic tools have been developed for intravital imaging (e.g. the brainbow technology).			
Module (partial) exams (number	T d a in rectification of the control of the contro				
Module (partial) exams (number scope, workload in CP):		Oral exam, 30 min, 70% Lab course protocol, approx. 20 pages, 30%			
Independent study time (in hours			<del>-</del>		
macpendent study time (in nours	· (11)). 9				
Courses (forms of teaching)	Contact time (in semester hours)	• • • • • • • • • • • • • • • • • • • •		Module (partial) exam accompanying the	

		For completing the	For admission to	course (number, form,
		module	the module exam	scope)
Lab course (6 weeks) (lab	Supervision:	-	-	-
course)	5			
Animal Models in		-	Oral presentation	-
Developmental Biology and	2 L + 2 S			
Physiology (lecture and				
seminar)				
Frequency of the module:		Winter semester		
Requirement for participation in	equirement for participation in the module: -			
Academic organizational unit:		Biologie/Biochemie		

BIO-B-RM7: Bioelectronics		Number of credit points (CP): 11		
Module type (mandatory or elective module):	Elective module			
Content and qualification goals of module:	Content:  The course deals with the concept of biosensors. Topics are various detection and transduction techniques, coupling principles of biomolecules and sensors and their bioanalytical application. The development of biosensors, their limitations as well as solutions to the problems for optimization will be discussed for examples relevant for research and application.  Further topics are bioelectrochemistry, biochip technology, molecular diagnostics, point of care testing and nanotechnology.  The seminar deals with recent developments in the field of bioanalytics with special attention to nanobiotechnology, point of care diagnostics und bioelectronics. Original publications addressing individual topics will be presented by each student and critically discussed with the group. In the practical part the students will work on a one aspect of an ongoing research project in the field of biosensors- bioelectronics.			
	immunology and have deepene are able to reflect the relations	es of biochemistry, molecular biology and d knowledge in these fields. The students between these different parts of scientific make scientific decisions into the frame		
	making use of scientific method theories and models are develop founded modifications of stand adopt a scientific publication by	with a given scientific question by ds. The students know how scientific ped and are able to recommend well- ard methods. The students are able to y themselves, to critically try to get the and methods and to intelligibly illustrate		
	- Students can present and public.	y relevant and strategic): out and document experimental work. defend the results of the experiments in work together in a team and to work out a		
Module (partial) exams (number, form, scope, workload in CP):	m, Oral exam on lecture and seminar (30 min) Lab course protocol, approx. 20 pages			
Independent study time (in hours (h)): 95				
Courses (forms of teaching) Contact time semester hor	,			

		For completing the	For admission to	course (number, form,
		module	the module exam	scope)
Lab course (6 weeks) (lab course)	Supervision: 5	-	-	-
Research topics in biosensor technology (lecture and seminar)	2 L + 2 S	Presentation (20min)	-	-
			•	
Frequency of the module:		Winter semester		
Requirement for participation in	the module:	=		
Academic organizational unit:		Biologie/Biochemie		

BIO-B-RM8: Immunotechnology		Number of credi	it points (CP): 11
Module type (mandatory or elective module):	Elective module		
Content and qualification goals of module:			
	chromatography, cell culture techniques, and recombinant antibodies.  Qualification goals:  1.) Professional competence: The module provides in-depth knowledge in the field of immunology and molecular biotechnology. Students will learn about the scientific way of thinking and experimental procedures of central methods such gene therapy or protein engineering. The module covers the basics of modern antibody technologies and discusses the possibilities of the production and use of antibodies or other therapeutic agents.  2.) Methodological competence: Students will learn about modern immunotechnological and biotechnological methods and will be able to apply concepts of the about mentioned subject areas for the solution of current immunological and biotechnological questions.  3.) Action competence (socially relevant and strategic): Students can critically read a research article from the field of immunology and biotechnology and present and discuss it in front of the other participants using appropriate presentation media. Students can present the results of their experimental work in the form of a scientific paper.		about the scientific central methods such as covers the basics of possibilities of the nutic agents.  logical and aly concepts of the above in timmunological and tegic): In the field of discuss it in front of the media. Students can
Module (partial) exams (number, form, scope, workload in CP):	Oral exam, 30 min; 70% Lab course protocol, approx. 20 pages; 30%		
Independent study time (in hours (h)):	95		
Courses (forms of teaching) Contact times semester here.		work for examination r, form, scope)	Module (partial) exam accompanying the

		For completing the	For admission to	course (number, form,	
		module	the module exam	scope)	
Lab course (6 weeks) (lab course)	Supervision: 5	-	-	-	
Molecular Biotechnology (lecture)	2	-	-	-	
Special Immunology (lecture)	2	-	-	-	
Immunotechnology (seminar)	1	-	Presentation (approx. 10 min)	-	
Frequency of the module:		Winter semester			
Requirement for participation in the module: B		Basic knowledge of immunology and biotechnology is recommended.			
Academic organizational unit:		Biologie/Biochemie	Biologie/Biochemie		

BIO-B-RM9: Synthetic Biology		Number of credi	it points (CP): 11
Module type (mandatory or elective module):	Elective module		
Content and qualification goals of module:	The module will impart comprehensive knowledge in the field of synthetic biology. The lecture "Synthetic Biology" gives an overview about the development of synthetic biology, about current topics, the iGEM (international Genetically Engineered Machine) competition and encourages the development of new projects. During the seminar, students develop their own research project and write a research proposa that they will introduce to and discuss with the group (as presentation or poster). The practical part includes the planning and execution of a project within the field of synthetic biology. Modern methods of molecular biology, protein engineering, biochemistry and/or cell biology will be applied.		
	Qualification goals:		
	1.) Professional competence: The module provides knowled familiarizes the students with annual iGEM (International Competition. The module provsynthetic biology "parts - dev development of own projects.	modern issues of spenetically Engineer vides a modular wa	ynthetic biology and the red Machine) y of thinking about
	2.) Methodological competent The students learn or improve biology, biochemistry, cellular develop their own project idea Furthermore, they will have the work, which will be implemented the module. The practical prochemistry, molecular biology as well as working ac research literature.	their knowledge in r biology and/or pro- is and discuss them he option to plan the nted in the laborator art will deepen exp gy, cellular biology	otein design. They a within the group. eir own experimental ry in the practical part perimental skills in y and/or synthetic
	3.) Action competence (social Students can critically read a biology and present and discu appropriate presentation medidefend a project idea. Student experimental work as a poster	research article from ss it in front of the a. Students will be s will be able to int	other participants using able to present and roduce results of their
Module (partial) exams (number, form,	Research proposal (5-10 pp.)		ox. 15 min)
scope, workload in CP):	Scientific presentation, 20 min		
Independent study time (in hours (h)):	95		
Courses (forms of teaching) Contact times emester ho	,		Module (partial) exam accompanying the

		For completing the	For admission to	course (number, form,
		module	the module exam	scope)
Lab course (6 weeks) (lab course)	Supervision: 5	-	-	-
Lecture and seminar (lecture and seminar)	2 L + 2 S	-	Short presentation (5-10 min)	-
Frequency of the module:		Summer semester		
Requirement for participation in	the module:	-		
Academic organizational unit:		Biologie/Biochemie		

BIO-B-RM10: Modern Methods in Light M			scopy	Number of cre	Number of credit points (CP): 11	
Module type (mandatory or election module):	ve	Elective module				
Content and qualification goals of module:			Content: Topics of this course are modern light-microscopic techniques as used in cell biology and physiology (e.g. confocal microscopy, live cell imaging, 3D microscopy, ion imaging), but also classical light-microscopic techniques (i.e. brightfield microscopy, darkfield microscopy, phase contrast microscopy, polarization microscopy, differential interference contrast microscopy). The lecture presents the microscopic hardware and methods the in theory. The seminar discloses possible applications and problems of selected microscopic techniques. In the practical course, the students will execute exemplary experiments in cell biology and cell physiology in order to train various microscopic techniques.			
		1.) In The light the able	t-microscopic technique limits of the various light	and the theoretic fund ues. They will know ght microscopic tech	lamentals of the various possible applications and niques, and they will be hniques for addressing a	
		The tech	nniques during research	oply single-handedly n in life sciences. The	various light microscopic ey can identify problems vide and assess possible	
		3.) Action competence (socially relevant and str The students are able to work in a team. They ca scientific research in a proper manner. They are the applicability of a research technique. They ca sensitive scientific equipment in a responsible m			can document and present e able to critically assess can handle expensive,	
Module (partial) exams (number, scope, workload in CP):	form,	Oral exam, 30 min Lab course protocol, approx. 20 pages				
Independent study time (in hours	(h)):	95				
`	Contact time (in semester hours)			ork for examination form, scope)  For admission to the module exam	Module (partial) exam accompanying the course (number, form, scope)	
Modern Methods in Light Microscopy (6 weeks) (lab course)	Supervision 5	n:	-	-	-	
Modern Methods in Light Microscopy (lecture and seminar)	2 L + 2 S		Presentation (30 min)	-	-	

Frequency of the module:	Winter and summer semester
Requirement for participation in the module:	-
Academic organizational unit:	Biologie/Biochemie

BIO-B-RM11: Physiology of Microorganis	sms	Number of credit points (CP): 11	
Module type (mandatory or elective module):	Elective module		
Content and qualification goals of module:	Content:  The lecture Physiology of Microorganisms provides a comprehensive overview about the diversity of microbial life styles and its biochemical, physiological and molecular biological background. A special focus is given to the regulation of microbial activities and to the plethora of metabolic pathways featured by distinct bacterial groups in the different ecosystems. The lecture also includes cellular biology aspects of microorganisms.  In the seminar, the students will present and scientifically discuss current microbial trends and problems using recent publications in the field (in English).  The practical courses will provide basic and advanced experimental knowledge of microbiology. One course will be concerned with the adaptation of cyanobacteria to different environmental conditions and the specific role of secondary metabolites in the process using molecular biological, biochemical, and chemical analytical and microscopic techniques. An alternative practical course will focus on microorganisms in extreme habitats and their specific role in carbon cycles using physiological, microscopic and molecular biological techniques.		
	styles and the diver - The students gain and extremophilic - The students can microbial subdiscip	a basic knowledge about different microbial life rsity of biochemical pathways in microorganisms advanced knowledge about phototrophic bacteria microorganisms. reflect interconnections between the different plines. argue and render a judgement about current	
	physiological an microorganisms  The students can p related to the physi  The students are a to the physiology	e able to independently plan and conduct	
	<ul> <li>The student can protocol and discus</li> <li>The students can public audience usi</li> </ul>	(socially relevant and strategic): describe their experimental work in a written as it related to the scientific context.  bresent and defend original literature in front of a sing appropriate media tools.  ble to work in a team and to jointly collaborate on uestion	

			Written exam, 90 min; 70% Lab course protocol, approx. 20 pages; 30%			
		05				
Independent study time (in hou	18 (11)).	95				
Courses (forms of teaching) Contact time (semester hour			.		Module (partial) exam accompanying the	
			For completing the module	For admission to the module exam	course (number, form, scope)	
Physiology of phototrophic bacteria/Physiology of extremophilic bacteria (6 weeks) (lab course)	Supervision 5	n:	-	-	-	
Physiology of Microorganisms (lecture and seminar)	2 L + 2 S		-	Presentation (30 min)	-	
Frequency of the module:		Winter semester				
Requirement for participation in the module:						
Academic organizational unit:		В	Biologie/Biochemie			

<b>BIO-B-RM12: Current Aspects and Metho</b>	ods of Plant Cell Biology	Number of credit points (CP): 11
Module type (mandatory or elective module):	Elective module	
Content and qualification goals of module:	The lecture will focus on current research and methods in the cel biological analysis of plant growth and development. The topic discussed will be cellular and sub-cellular functions of plant hormon biosynthesis, transport and response pathways, membrane trafficking an recycling pathways, protein degradation pathways, control of cytoskeletal organisation and cell wall organisation during cell division cell elongation, cell and tissue polarity establishment. Furthermon relationships between epidermal patterning/cell-fate specification pathways, cell division, cell and tissue polarity establishment will be discussed as well as inter- and intracellular communication during tissue polarity establishment.  The practical work will involve the cell biological and physiological analysis of plant cell division, elongation, cell and tissue polarity. It will be oriented along current research questions addressed in the Grebergroup. Methods to be used will among others include live imaging of cytoskeletal elements, cell division and cell polarity by employing fluorescent proteins and confocal laser scanning microscopy fluorescence recovery after photobleaching and immunofluorescence localization methods. Interaction of visualized proteins will be analysed by protein-protein interaction methods and will be verified in vivo by phenotypic cell biological analysis of single and double mutants.  The seminar will discuss in detail original scientific articles about current topics in plant cell and developmental cell biology.  As such, the module will provide students with a basic understanding of current research questions and methods in plant cell biology. The students will be familiarized with the theoretical background, scientific approach and experimental methods in plant cell and developmental cell biology. The module will teach students specialized knowledge and capabilities in the cell biological analysis of biological processes; as such it forms a central part of the Masters course when intending to specialized on geneti	
	scientific literature Students can discuss scientifi - Students can present thei appropriate media and deal	c questions in writing in a concise manner.  r work to a scientific audience using with questions and/or comments in a
	scientific discussion about thei - Students can ask concise, to- research directions to follow up	he-point questions about possible future
Module (partial) exams (number, form, scope, workload in CP):	Oral exam, 30 min; 70% Lab course protocol, approx. 2	0 pages; 30%
Independent study time (in hours (h)):	95	

Courses (forms of teaching)	Contact time (ii	n Supplementary wo	Supplementary work for examination	
	semester hours)	(number, fo	(number, form, scope)	
		For completing the	For admission to	course (number, form,
		module	the module exam	scope)
Current aspects and methods	Supervision:	-	-	-
of plant cell biology (6	5			
weeks) (lab course)				
Current aspects and methods	2 L + 2 S	-	Presentation (30	-
of plant cell biology (lecture			min)	
and seminar)				
Frequency of the module:		Winter and summer sem	ester	
Requirement for participation in	the module:	-		
Academic organizational unit:		Biologie/Biochemie		

BIO-B-RM13: Evolutionary and Population Genetics			Number of c	eredit points (CP): 11		
Module type (mandatory or elec module):	tive E	lective module				
Content and qualification goals	T que ge ve ve ac ef po T ve th in lii	uestions and experimentations and experimentations are will include a daptations as well as a ffects of demographic opulation separation are he practical work will ertebrate sample sets and are being addressed aclude DNA extraction brary construction, DN he seminar will discussion.	ental approaches in ental approaches in emphasis on emphasis on the grade studies on the gradiscussions about the changes including ad gene flow among prinvolve DNA seque and will be guided but in the Hofreiter group, PCR, SNP typing, A hybridization capt is in detail original sci	on fundamental as well as current research al approaches in evolutionary and population emphasis on empirical studies, especially on e studies on the genetic basis of evolutionary secussions about the causes and evolutionary changes including populations size changes, gene flow among populations.  Involve DNA sequencing and/or SNP typing of d will be guided by current research questions in the Hofreiter group. Methods to be used will PCR, SNP typing, next generation sequencing hybridization capture, etc.  In detail original scientific articles about current population genetics.		
Modula (nartial) avena (nurch	T re T re T sc po ki an M ce In - sc - ag sc - i re	Qualification goals:  The module will provide students with a basic understandin research questions and methods in evolutionary and population. The students will be familiarized with the theoretical scientific approach and experimental methods in evolut population genetics. The module will teach students knowledge and capabilities in the evolutionary and population analysis of biological processes; as such it forms a central Masters course when intending to specialize on genetics, modellular biology.  In particular:  - Students will learn how to read and critically evaluted scientific literature in English.  - Students will learn how to extract the essential points firscientific literature.  - Students can discuss scientific questions in writing in a conconscientific discussion about their topic.  - Students can ask concise, to-the-point questions about possion research directions to follow up a given problem.				
Module (partial) exams (number, form, scope, workload in CP):		Oral exam, 30 min Lab course protocol, approx. 20 pages				
Independent study time (in hour	s (h)): 9:	5				
Courses (forms of teaching)	Contact time (in semester hours)		york for examination, form, scope)  For admission to the module exam	accompanying the course (number, form,		
Evolutionary and Population Genetics (6 weeks) (lab course)	Supervision: 5	-	-	-		

Evolutionary and Population	2 L + 2 S	-	Presentation (30	-
Genetics (lecture and			min)	
seminar)				
Frequency of the module:		Winter semester		
Requirement for participation in	the module:	-		
Academic organizational unit:		Biologie/Biochemie		

BIO-B-RM14: Physical Methods in Live Cell			Number of credit points (CP): 11			it points (CP): 11
Module type (mandatory or electrodule):	etive	Ele	ctive module			
Content and qualification goals	of module:	Content:  The aim of this course is to illustrate the application of mathematical methods (e.g. fluctuation analysis, signal correlation) in the context of quantitative fluorescence microscopy of biological molecules in living cells. Such cutting-edge methods are capable of providing precise information about protein-protein interaction in complex biological systems. The lecture covers the most modern approaches in the field of quantitative fluorescence microscopy including single molecule approaches (e.g. single molecule FRET, tracking), image correlation methods (e.g. k-space microscopy) as well as super-resolution microscopy (e.g. STED, STORM). A special aim is set on introducing computer programming methods related to the analysis of imaging dat (e.g. Montecarlo simulations, Fast-Fourier transformation for correlation analysis) using Matlab. The laboratory classes will provide the chance deepen the practical knowledge of the students in a selection of the above mentioned microscopy and programming techniques.  Qualification goals:  The students will actively participate in the seminars with presentation, which will foster their ability to critically read and presscientific literature.  In the experimental courses the students will learn to apply vari quantitative microscopy methods to study protein dynamics and protein interactions directly in cells.  The experimental part is carried out as a small, independent resea project, which allows developing skills to independently design and pscientific experiments and to work in a team.			tion) in the context of tal molecules in living providing precise complex biological proaches in the field of single molecule (a), image correlation per-resolution is set on introducing malysis of imaging data formation for correlation ill provide the chance to in a selection of the techniques.  The seminars with one ritically read and present learn to apply various in dynamics and protein-ll, independent research	
Module (partial) exams (numbe scope, workload in CP):	r, form,	Oral exam, 30 min Lab course protocol, approx. 20 pages				
Independent study time (in hour	rs (h)):	105				
Courses (forms of teaching)	Contact time (in semester hours)		Supplementary wo (number, for completing the module	Fo:		Module (partial) exam accompanying the course (number, form, scope)
Lab course, accompanying the lecture (6 weeks) (lab course)	Supervision: 5		-	-		-
Lecture and seminar (lecture and seminar)	2 L + 2 S		-	Pre	esentation (15 n)	-
Transport Cd 1.1						
Frequency of the module:  Requirement for participation in the module:			Summer semester			
Academic organizational unit:			Biologie/Biochemie			

BIO-B-RM15: Metalloproteins			Number of cred	Number of credit points (CP): 11		
Module type (mandatory or electrodule):	tive	Elec	ctive module			
Content and qualification goals of	of module:	The course deals with metalloenzymes, their biosynthesis, mechanism of action (catalysis) and protein structure. Main parts of the lecture are general principles of the synthesis of complex metallo-cofactors, the rol of the metal in these cofactors, and their relevance in the human body including associated diseases and therapies.  In the practical part the students will learn the purification and characterization of metall-containing proteins. The purified proteins will be characterized by spectroscopic methods, enzyme kinetics, protein-protein interactions (BLI, ITC, SPR) and metal analyses (ICP-OES). In the seminar original literature of current topics in protein analytics will be discussed.  Qualification goals:  1.) Professional competence:  The modul deals with basics of metal-containing proteins, the role of the metal, enzyme kinetics and protein biochemistry. The students a expected to learn how to solve scientific questions and how to approact them. The students will be familiarized with the theoretical backgroun scientific approach and experimental methods in the studies of metalloenzymes which comprise 30% of all proteins. The module witeach students specialized knowledge and capabilities in the analysis of biological and biochemical processes; as such it forms a central part of the Masters course when intending to specialize on biochemistry.  2.) Methodological competence:  Students will learn how to read and critically evaluate original scientific literature in English.  Students will learn how to extract the essential points from origin scientific literature.				etallo-cofactors, the role ce in the human body arification and he purified proteins will rme kinetics, proteinmalyses (ICP-OES).
						istry. The students are ons and how to approach the theoretical background, ods in the studies of roteins. The module will bilities in the analysis of it forms a central part of
			<ul> <li>3.) Action competence (socially relevant and strategic):</li> <li>Students can discuss scientific questions in writing in a concise manner.</li> <li>Students can present their work to a scientific audience using appropriate media and deal with questions and/or comments in a scientific discussion about their topic.</li> <li>Students can ask concise, to-the-point questions about possible future research directions to follow up a given problem.</li> </ul>			
Module (partial) exams (number, form,		Oral exam, 30 min				
scope, workload in CP):		Lab course protocol, approx. 20 pages				
Independent study time (in hours	s (h)):	95				
Courses (forms of teaching)	Contact time semester hour	`	Supplementary wor (number, for	For	scope) r admission to	Module (partial) exam accompanying the course (number, form,
			module	the	module exam	scope)

Research topics	2 L + 2 S	-	-	-	
Proteinanalytics and					
Metalloproteins (lecture and					
seminar)					
Proteinanalytic (6 weeks) (lab	Supervision:	-	-	-	
course)	5				
Frequency of the module:		Summer semester			
Requirement for participation in the module:		-			
Academic organizational unit:		Biologie/Biochemie			

BIO-B-RM16: Current Aspects	s of Plant Physiol	ogy	Number of cred	it points (CP): 11	
Module type (mandatory or elect module):	ive Ele	ctive module			
Content and qualification goals o	The app flux syn The beii incl qR sem topi	Content:  The lecture will focus on current research questions and experimental approaches in plant physiology and plant cell biology, such as metabor fluxes, photosynthesis, cell wall formation, cytoplasm genetics, host-symbiont interactions, abiotic stress tolerance and cellular signalling. The practical work will be guided by current research questions that a being addressed at the MPIMP, Potsdam/Golm. Methods to be used we include besides basic physiological and molecular biology methods, qRT-PCR, GC/MS, LC/MS, FTIR and fluorescence spectroscopy. The seminar will discuss in detail original scientific articles about current topics in plant physiology and plant cell biology.  Qualification goals:			
	The met biol bac rese	chods and challenges logy. The students kground, scientific ap	students with a basic of in modern plant phywill be familiarized approach and experim addressed, with a specific property of the students of t	understanding of current ysiology and plant cell I with the theoretical ental methods. Current cialized focus on OMICS	
	-	scientific literature.	w to read and critically English. ow to extract the essen	atial points from original	
	-	Action competence (so Students can discuss somanner Students can present the appropriate media and scientific discussion all Students can ask conciresearch directions to a	cientific questions in we heir work to a scientific deal with questions are bout their topic. ise, to-the-point questions	c audience using nd/or comments in a ons about possible future	
Module (partial) exams (number, scope, workload in CP):		Oral exam, 30 min; 70% Lab course protocol, approx. 20 pages; 30%			
Independent study time (in hours	(h)): 95				
,	Contact time (in semester hours)		orm, scope)  For admission to the module exam	Module (partial) exam accompanying the course (number, form, scope)	
Practical Course Current Aspects of Plant Physiology and Plant Cell Biology (6 weeks) (lab course)	Supervision: 5	-	-	-	

Current Aspects of Plant	2 L + 2 S	-	1 Presentation (30	-		
Physiology and Plant Cell			min)			
Biology (lecture and seminar)						
Frequency of the module:		Winter semester				
Requirement for participation in	the module:	-				
Academic organizational unit:		Biologie/Biochemie				

BIO-B-RM17: Current Problems and Mod Genetics and Epigenetics	dern Methods in Plant	Number of credit points (CP): 11			
Module type (mandatory or elective module):	Elective module				
Content and qualification goals of module:	le: Content:  The lecture will focus on current research questions and exper approaches in the genetic analysis of plant growth and develops such as meristem function, stem cells, control of meristem and identity, control of flowering time, regulation of organ and tist patterning, cellular differentiation, etc. It will also include a diaspects of plant epigenetics.  The practical work will involve the genetic analysis of plant of growth and long-term stress adaptation and will be guided by research questions that are being addressed in the Bäurle and groups. Methods to be used will include genetic mapping usin molecular markers, molecular cloning, expression analysis using genes and/or RT-PCR, clonal analysis, etc.  The seminar will discuss in detail original scientific articles at topics in plant genetics and epigenetics.				
	research questions and method focus on development. The student theoretical background, scientical plant genetics and epigenetics. specialized knowledge and cap biological processes; as such it	nts with a basic understanding of current in plant genetics and epigenetics with a dents will be familiarized with the fic approach and experimental methods in The module will teach students abilities in the genetic analysis of forms a central part of the Masters course in genetics, molecular and cellular biology.			
	scientific literature in Engl	read and critically evaluate original			
	<ul> <li>manner</li> <li>Students can present their value appropriate media and deal scientific discussion about</li> </ul>	work to a scientific audience using with questions and/or comments in a their topic. o-the-point questions about possible future			
Module (partial) exams (number, form, scope, workload in CP):	Oral exam, 30 min; 70% Lab course protocol, approx. 20	0 pages; 30%			
Independent study time (in hours (h)):	95				

Courses (forms of teaching)	Contact time (ii	n Supplementary wo	ork for examination	Module (partial) exam	
	semester hours)	(number, f	(number, form, scope)		
		For completing the	For admission to	course (number, form,	
		module	the module exam	scope)	
Current Problems and Modern	Supervision:	-	-	-	
Methods in Plant Genetics	5				
and Epigenetics (6 weeks)					
(lab course)					
Current Problems and Modern	2 L + 2 S	-	Presentation (30	-	
Methods in Plant Genetics			min)		
and Epigenetics (lecture and					
seminar)					
Frequency of the module:		Winter semester			
Requirement for participation in the module:		-			
Academic organizational unit:		Biologie/Biochemie			

(Evolution across Scales mod	n/Conserving ule C)		<b>V 1</b>		it points (CP): 11			
Module type (mandatory or elective module):		Ele	ective module					
Content and qualification goals of module:		Bas evo	Content:  Basic principles of conservation biology and genetics will be taught in an evolutionary framework, including genetic aspects such as inbreeding and drift vs. selection and adaptation. The concept of preserving "the evolutionary process" acting in taxa and ecosystems will be covered and discussed.  Qualification goals: 1.) Professional competence: Improvement of fundamental knowledge of microevolution and species conservation, including the use of molecular markers and population genetically data analysis.					
		1.) Imp						
		Stu PC:	2.) Methodological competence: Students can apply molecular techniques (such as DNA/RNA isolation, PCR, gel electrophoresis, and cloning) as well as data analyses with several programs. Training in current topics based on publications.					
		Tra que	3.) Action competence (socially relevant and strategic): Training in presentations of current topics and processing of self-made questions and results. Students are working in a team and could present results according to scientific standards orally and in writing.					
Module (partial) exams (number	er, form,	Ora	Oral exam, 15 min					
scope, workload in CP):	(1.))	0.5						
Independent study time (in hou	rs (n)):	95						
Courses (forms of teaching)	Contact time semester hor	`	* * *	ork for examination form, scope)  For admission to the module exam	Module (partial) exam accompanying the course (number, form, scope)			
Conservation Genetics (lecture)	2		-	Written exam (90 min)	-			
How much conservation is needed in Evolution? (seminar)	5		-	Presentation (15 min)	-			
Molecular population genetics/Conservation genetics (exercise)			-	Protocol	-			
Frequency of the module:		11	Vinter and summer same	aester				
Frequency of the module:		- '	Winter and summer semester					
Requirement for participation in the module:  Academic organizational unit:			- Biologie/Biochemie					

BIO-B-RM19: The Central Re (Evolution across Scale modul		onar	y Biology in Bioscienc	Number of cr	edit points (CP): 11		
Module type (mandatory or electrodule):	etive	Ele	Elective module				
Content and qualification goals of module:		Content: "Nothing makes sense in biology except in the light of evolution": This module aims at evaluating Dobzhansky's famous phrase by (1) a joint lecture series where different biological disciplines are discussed in the light of evolution, (2) a lecture series dealing with the major disputes/syntheses in evolutionary biology (Lamarckism vs. Darwinism, epigenetics, the modern synthesis, genotypic vs. phenotypic evolution) and a complementary seminar.					
		1.) Imp bio	Qualification goals: 1.) Professional competence: Improvement of fundamental knowledge and concepts of evolutionary biology based on current examples.  2.) Methodological competence: Training in current topics based on publications.				
		3.) Action competence (socially relevant and strategic): Training in presentations in current topics.					
		Home work, approx. 15 pages Oral exam, 15 min					
Independent study time (in hour	rs (h)):	240	)				
Courses (forms of teaching)	Contact time semester hou	`	Supplementary wo (number, for completing the module		Module (partial) exam accompanying the course (number, form, scope)		
State-of-the-art Evolutionary Biology (lecture)	2		-	-	-		
Nothing in biology makes sense, except in the light of Evolution (lecture)	1		-	-	-		
Integrative function of Evolutionary Biology (seminar)	1		-	Presentation (15 min)	-		
Main seminar Evolutionary Biology/Genetic Colloquium I (seminar)	1		-	Discussion participation			
Main seminar Evolutionary Biology/Genetic Colloquium II (seminar)			-	Discussion participation	-		
Frequency of the module:	.1 1 1	W	Winter and summer semester				
Requirement for participation in Academic organizational unit:	the module:	- B	- Biologie/Biochemie				

BIO-B-RM21: Molecular Biology and Gen	nome Research	Number of credit points (CP): 11
Module type (mandatory or elective	Elective module	
Module type (mandatory or elective module):  Content and qualification goals of module:		
	model organisms. In conjunctive seminar, the students will learn approaches in the light of alter.  Qualification goals: 1.) Professional competence: Students - acquire an overview of me genomics and experimental data in these experimental data in these experimental data in the seminary of the different sub-disciplines to find optimal solutions  2.) Methodological competence Students - acquire an overview of acquire an overview of acquire an overview of acquire and experimental data in these to find optimal solutions	nodern methods of molecular biology, tal systems biology; ecting, analysing and presenting e research areas; mental limitations and strengths of the of molecular biology and genome research for addressing scientific questions.  e:  dvanced methods of molecular biology, tal systems biology; e on techniques of molecular biology,

Module (partial) exams (numbe scope, workload in CP):	er, form,	efficiently for exploration can develop experim question using mole.  3.) Action competence (so Students gain the capacity to present their reseate to work in a team an field of molecular are to plan experiments autonomously in a decent to self-organize, which experiments;  to design (small) reconsistency of the approximate to the self-organize consistency of t	ring new scientific quenental strategies to appeular-biological and grocially relevant and stratch using appropriate adjointly address a scient genome-oriented bieffectively and to mare fined time window; ich enables the paralle search projects independent used; ditimely to establish expressions approaches used;	media; entific problem in the ology; nage time and resources l realization of mdently and to assess the		
Independent study time (in hou	rs (h)):	95				
Courses (forms of teaching)	Contact time (i semester hours		ork for examination form, scope)  For admission to the module exam	Module (partial) exam accompanying the course (number, form, scope)		
Lab course (6 weeks) (lab course)	Supervision: 5	1110 4411	-	-		
New Technologies in Genomics Research (lecture)	2	-	-	-		
Literature seminar Plant Genomics and Systems Biology (seminar)	2	Presentation (20 min)	-	-		
Frequency of the module:		Winter semester				
Requirement for participation in Academic organizational unit:	n the module:	Biologie/Biochemie				

BIO-B-RM22: Current Research in Biochem Biology in Local Research Institutes and Biot			•		Number of cred	it points (CP): 11
Module type (mandatory or electrodule):	etive	Ele	ective module			
Content and qualification goals of module:  T the state of the state o		The the studenthe pra	Content: The module is designed to familiarize students with current research in the areas of Biochemistry and Molecular Biology. For this purpose, students must attend a lecture and seminar of the modules offered under the WPM module list, and in addition they must complete a 6-week practical course in a local research institute or biotechnology company in the Potsdam and Berlin area.			
	<ul> <li>Qualification goals: <ul> <li>Students will learn how to read and critically evaluate scientific literature in English.</li> <li>Students will learn how to extract the essential points from scientific literature.</li> <li>Students will learn how to evaluate and present and d scientific data</li> <li>Students can present their work to a scientific audience appropriate media and deal with questions and/or comme scientific discussion about their topic.</li> <li>Students can ask concise, to-the-point questions about poss future research directions to follow up a given problem.</li> </ul> </li> </ul>				ntial points from original I present and document cientific audience using s and/or comments in a tions about possible	
Module (partial) exams (number scope, workload in CP):	r, form,	Oral exam, 30 min; 70% Lab course protocol, approx. 20 pages; 30%				
Independent study time (in hour	rs (h)):	95				
Courses (forms of teaching)	Contact time (i semester hours		Supplementary won (number, for For completing the module	For		Module (partial) exam accompanying the course (number, form, scope)
Practical course (6 weeks) (lab course)	Supervision:		-	-		-
Lecture and seminar (lecture and seminar)	2 L + 2 S		-	Pres	sentation (20	-
Frequency of the module: Winter and summer semester						
Requirement for participation in	the module:	Winter and summer semester				
Academic organizational unit:	i die module.	- Biologie/Biochemie				
readonne organizational unit.		ט	1010Gic/ Diochemic			

BIO-B-VM: Advanced Research Practical			Number of cred	Number of credit points (CP): 5	
Module type (mandatory or elect module):	ive	Mai	ndatory module		
Content and qualification goals of	1	Content: General introduction into scientific research and the scientific method; literature research; preparatory experiments for the Master thesis. The main qualification goals of this module is to prepare students for their Master thesis via practical work in the laboratory, training in specialized methods and theoretical preparation by literature research. This will allow students to start working on their Master thesis project without time delay.			
		1.) I Ger liter mai Mas met allo	Professional competence and introduction into strature research; preparation qualification goals of ster thesis via practical chods and theoretical provestional processions of the start worked delay.	cientific research and tory experiments for t this module is to preg work in the laboratory eparation by literature	he Master thesis. The pare students for their y, training in specialized research. This will
		2.)]	scientific literature ir Students will learn he scientific literature.	ow to read and critical English.	ntial points from original
		3.)	manner. Students can present appropriate media an scientific discussion Students can ask con	scientific questions in their work to a scienti d deal with questions	writing in a concise fic audience using and/or comments in a
Module (partial) exams (number, scope, workload in CP):	, form,	Res	earch report for the ma	ster thesis (1 page), no	ot graded
Independent study time (in hours	(h)):	120			
`	Contact time ( semester hours	•	Supplementary wor (number, for For completing the	orm, scope) For admission to	Module (partial) exam accompanying the course (number, form,
Lab course (4 weeks) (lab course)	Supervision:	:	module -	the module exam	scope)
Frequency of the module: Requirement for participation in	the module:	W	inter and summer seme	ester	
Academic organizational unit:		В	iologie/Biochemie		

BIO-B-WM1: Biochemistry A			Number of cred	it points (CP): 8
Module type (mandatory or electrodule):	etive	Elective module		
Content and qualification goals	of module:	Content:  This lecture focuses on current research questions and experimental approaches in the biochemical analysis of biological processes, such as cell biochemistry, metal-containing proteins, protein-protein and protein-lipid interactions and antibody production and use, etc. Applied aspects of modern biochemistry will be discussed.  The practical work will include the biochemical analysis of the different processes and will be guided by current research questions, which will be addressed in the respective research groups organizing the lab course. The methods include protein expression and purification, isolation and analysis of oligosaccharides from glycoproteins, isolation of bacterial glycans, glycobiology, characterization of proteins by spectroscopic methods, measurements of enzyme kinetics, protein-protein and protein-glycan interactions (BLI, ITC, SPR), protein stability and protein conformation or structure, etc.  In the seminar original literature of current topics in biochemistry will be discussed.		
		Qualification goals: The module will give students are research questions and methods research. Students will become scientific approaches and exper research; they will gain practice methods. The module will provibiochemical analysis of biologic part of the master's program if biochemistry, protein science of	s in biochemistry familiar with the rimental methods al experience by e vide special knowl ical processes; the the intention is to	with a focus on basic theoretical principles, in current biochemical exercising these ledge and skills in the use represent a central
		<ul> <li>Students will learn how to scientific literature in Eng</li> <li>Students will learn how to scientific literature.</li> <li>Students can discuss scienmanner.</li> <li>Students can present their appropriate media and de scientific discussion about</li> <li>Students can ask concise, future research directions</li> </ul>	glish. o extract the essentific questions in r work to a sciential with questions at their topic. to-the-point ques	writing in a concise fic audience using and/or comments in a tions about possible
Module (partial) exams (numbe scope, workload in CP):	r, form,	An exam in one of the following Written exam, 90 min Oral exam, 30 min	g forms:	
Independent study time (in hour	rs (h)):	120		
Courses (forms of teaching)	Contact time semester hou			Module (partial) exam accompanying the

		For completing the	For admission to	course (number, form,
		module	the module exam	scope)
Lecture and seminar (lecture	4	-	Presentation (15	-
and seminar)			min) or Exercises	
			(70%)	
Lab course (4 weeks) (lab	4	Lab course protocol	-	-
course)		(15 pages)		
Frequency of the module:		Winter and summer semester		
Requirement for participation in	the module:	-		
Academic organizational unit:		Biologie/Biochemie		

BIO-B-WM2: Biotechnology A		Number of credit points (CP): 8
Module type (mandatory or elective module):	Elective module	
Content and qualification goals of module:	approaches in biotechnology, s protein expression and purificate oligosaccharides from glycoproglycobiology, nanotechnology, etc.  The practical work will focus of modern biotechnology and will which will be addressed in the lab course. Methods such as in characterization of antibodies a measurements of protein-prote ITC, SPR), protein stability and use of biosensors etc. will be ta	oteins, isolation of bacterial glycans, biosensors, novel cloning technologies, on examples and relevant methods for the guided by current research questions, respective research groups organizing the vitro protein expression and purification, and proteins using spectroscopic methods, in and protein-glycan interactions (BLI, di protein conformation or structure, the
	current research questions and on current research problems. at the University of Potsdam and Potsdam area. Students will be principles, scientific approaches biotechnology, as well as the less practical experience by exercise provide special knowledge and solutions to existing problems,	Ints with a detailed understanding of procedures in biotechnology with a focus. These aspects will be addressed by groups and biotechnology companies in the Berlincome familiar with the theoretical and experimental methods in current egal and social aspects; they will gain ing these methods. The module will skills in finding biotechnological which will be a central part of the intends to specialize in biochemistry, gy.
	scientific literature in Eng - Students will learn how to scientific literature Students can discuss scient manner Students can present their appropriate media and descientific discussion about Students can ask concise.	o extract the essential points from original ntific questions in writing in a concise r work to a scientific audience using al with questions and/or comments in a
Module (partial) exams (number, form, scope, workload in CP):	An exam in one of the followir Written exam, 90 min Oral exam, 30 min	
Independent study time (in hours (h)):	120	

Courses (forms of teaching)	Contact time (in	n Supplementary wo	Supplementary work for examination		
	semester hours	(number, fo	orm, scope)	accompanying the	
		For completing the	For admission to	course (number, form,	
		module	the module exam	scope)	
Lecture and seminar (lecture	4	-	Presentation (15	-	
and seminar)			min) or Exercises		
			(70%)		
Lab course (4 weeks) (lab	4	Lab course protocol	-	-	
course)		(15 pages)			
	<u> </u>				
Frequency of the module:		Winter and summer semester			
Requirement for participation in	the module:	-			
Academic organizational unit:		Biologie/Biochemie			

BIO-B-WM3: Protein Science	A				Number of credi	it points (CP): 8
Module type (mandatory or electrodule):	tive	Elect	tive module			
Content and qualification goals of		Content:  This lecture focuses on current research questions and experimental approaches in protein science, such as in vitro protein expression, purification, functional characterization, structure determination and application in biotechnological contexts, etc.  Applied aspects of modern biochemistry will be discussed.  The practical work will include the biochemical analysis of proteins and will be guided by current research questions, which will be addressed in the respective research groups organizing the lab course.  Methods for in vitro protein expression and purification from prokaryotic and eukaryotic cells, the characterization of proteins by spectroscopic methods, measurements of protein-protein interactions (BLI, ITC, SPR), protein stability and protein conformation or structure will be taught. The design of proteins including binding ligands is of interest.  In the seminar original literature of current topics in biochemistry will be discussed.  Qualification goals:  The module will provide students with a detailed understanding of current research questions and methods in protein science with a focus on structural and functional characterization. Students will become familiar with the theoretical principles, scientific approaches and experimental methods of current biochemical analysis of proteins. They should gain practical experience in the application of these methods. The module will provide special knowledge and skills in protein science; these represent a central part of the master's program if the intention is to specialize in biochemistry, protein science or biotechnology.  - Students will learn how to read and critically evaluate original scientific literature in English.  - Students can discuss scientific questions in writing in a concise manner.  - Students can present their work to a scientific audience using appropriate media and deal with questions and/or comments in a scientific discussion about their topic.  - Students can ask concise, to-the-point questions about possible future r				
					n science with a focus dents will become approaches and alysis of proteins. They n of these methods. The s in protein science; ram if the intention is to	
					writing in a concise fic audience using and/or comments in a tions about possible	
Module (partial) exams (number, form, scope, workload in CP):		An exam in one of the following forms: Written exam, 90 min Oral exam, 30 min				
Independent study time (in hours	s (h)):	120				
Courses (forms of teaching)	Contact time (	hours) (number, form) For completing the   I		For		Module (partial) exam accompanying the course (number, form, scope)

Lecture and seminar (lecture	4	-	Presentation (15	-
and seminar)			min) or Exercises	
			(80%)	
Lab course (4 weeks) (lab	4	Lab course protocol	-	-
course)		(15 pages)		
			•	
Frequency of the module:		Winter and summer semester		
Requirement for participation in	the module:	-		
Academic organizational unit:		Biologie/Biochemie		

BIO-B-WM4: Genome Research and Syst	ems Biology A	Number of credit points	(CP): <b>8</b>
Module type (mandatory or elective module):	Elective module		
Content and qualification goals of module:	Content:  This lecture focuses on current research questions and experimental approaches in genomics and systems biology, such as genome strue and evolution, transcriptomics, proteomics and metabolomics, high throughput analysis and screening, imaging and image analysis, bioinformatics and mathematical modeling of biological processes. Evolutionary and applied aspects of genomics and systems biology relation to human diseases and plant breeding are discussed. The practical work will include genomic and systems biology analysis a biological processes and will be guided by current research question that will be addressed in the respective research groups organizing lab course. Practical work will include methods of molecular clonin expression analysis using reporter genes and/or RT-PCR, analysis metabolic measurements etc  In the seminar original literature of current topics in biochemistry with discussed.		nome structure mics, high- nalysis, processes, etc. as biology in sed. The analysis of ch questions rganizing the ular cloning, analysis of analysis,
	research questions and me focus on genetic model sy theoretical principles, scie genomics and systems bio application of these method knowledge and skills in the biological processes; these	tudents with a basic understand thods in genomics and systems stems. Students will become fantific approaches and experime logy. They will gain practical eds. The module will provide spe genomic and systems biology represent a central part of the to specialize in genetics and getems biology.	s biology with a miliar with the ental methods in experience in the pecial analysis of master's
	scientific literature in Students will learn h scientific literature. Students can discuss manner. Students can present appropriate media ar scientific discussion Students can ask cor	ow to extract the essential poir scientific questions in writing their work to a scientific audied deal with questions and/or c	in a concise ence using comments in a
Module (partial) exams (number, form, scope, workload in CP):	An exam in one of the foll Written exam, 90 min Oral exam, 30 min	owing forms:	
Independent study time (in hours (h)):	120		
Courses (forms of teaching) Contact times semester ho			le (partial) exan

		For completing the	For admission to	course (number, form,
		module	the module exam	scope)
Lecture and seminar (lecture	4	-	Presentation (15	-
and seminar)			min) or Exercises	
			(80%)	
Lab course (4 weeks) (lab	4	Lab course protocol	-	-
course)		(15 pages)		
Frequency of the module:		Winter and summer semester		
Requirement for participation in	the module:	-		
Academic organizational unit:		Biologie/Biochemie		

BIO-B-WM5: Molecular Biology A			Number of cred	lit points (CP): 8	
Module type (mandatory or elect module):	iive	Elective module			
Content and qualification goals of		Content:  This lecture focuses on current research questions and experimental approaches in molecular biology, such as genome structure and evolution, transcriptomics, high-throughput analysis, novel cloning techniques, functional analysis of genes and proteins, bioinformation Applied aspects of molecular biology, especially for human disease plant breeding, will be discussed.  The practical work will include the molecular biological analysis of biological processes and will be guided by current research question which will be addressed in the respective research groups organizing lab course. Comprehensive methods for molecular cloning, express analysis using reporter genes and/or RT-PCR, protein interaction so and protein expression in yeast etc. will be taught.  In the seminar original literature of current topics in biochemistry with discussed.  Qualification goals:			ne structure and lysis, novel cloning teins, bioinformatics, etc. of for human diseases and cological analysis of ent research questions, ch groups organizing the lar cloning, expression rotein interaction screens ent.
		The module will provid research questions and a genetic model systems. theoretical principles, so molecular biology. The application of these met knowledge and skills in processes; these represe	methods Student cientific y should shods. T the mo	nts with a basic understanding of current is in molecular biology with a focus on its will become familiar with the exapproaches and experimental methods in digain practical experience in the The module will provide special elecular biological analysis of biological intral part of the master's program if the etics and genomics, molecular, cellular	
		<ul> <li>scientific literature</li> <li>Students will learn scientific literature</li> <li>Students can discumanner.</li> <li>Students can prese appropriate media scientific discussion</li> </ul>	e in Eng n how to e. uss scient ent their and de on about concise,	glish. o extract the essentific questions in work to a scient al with questions at their topic. to-the-point questions	Illy evaluate original Intial points from original In writing in a concise If audience using Intial and/or comments in a Intial points from original
Module (partial) exams (number, form, scope, workload in CP):		An exam in one of the following forms: Written exam, 90 min Oral exam, 30 min			
Independent study time (in hours	s (h)):	120			
Courses (forms of teaching)	Contact time (semester hour		f, form,		Module (partial) exam accompanying the course (number, form, scope)

Lecture and seminar (lecture	4	-	-			
and seminar)			min) or Exercises			
			(80%)			
Lab course (4 weeks) (lab	4	Lab course protocol	-	-		
course)		(15 pages)				
Frequency of the module:		Winter and summer semester				
Requirement for participation in	the module:	-				
Academic organizational unit:		Biologie/Biochemie				

BIO-B-WM6: Cellular and Developmental			Number of credit points (CP):				
Module type (mandatory or electrodule):	etive	Elect	ive module				
Content and qualification goals	of module:	Content:  This lecture focuses on current research questions and experimental approaches in genetic and molecular analysis of cell biology and development, such as cell differentiation, stem cell biology, pattern formation, cell cycle control, cell motility, regulation of organ and tiss growth, morphogenesis, cell differentiation, etc.  Interdisciplinary aspects of cell and developmental biology will be discussed, especially with regard to human diseases and plant breeding. The practical work will include the genetic, molecular and cell biological analysis of growth and development and will be guided by current research questions, which will be addressed in the respective research groups organizing the lab course. Methods of light and fluorescence microscopy, antibody staining, molecular cloning, expression analysis using reporter genes and/or RT-PCR, clonal analysis, etc. will be taught In the seminar original literature of current topics in biochemistry will discussed.					
		The resear focus theoretical a know processinten	dification goals:  module will provide studer  arch questions and methods  s on genetic model systems  retical principles, scientific  and developmental biology  pplication of these method  vledge and skills in the mo-  cesses; these represent a cen-  tion is to specialize in gene-  systems biology.	s in cell and developments. Students will be approaches and ear. They should gains. The module will be approaches the module will be approache the module will be approached to the module will be approached to the module will be approached to the approached the	opmental biology with a scome familiar with the experimental methods in an practical experience in analysis of biological aster's program if the		
		<ul> <li>Students will learn how to read and critically evaluate origin scientific literature in English.</li> <li>Students will learn how to extract the essential points from a scientific literature.</li> <li>Students can discuss scientific questions in writing in a condmanner.</li> <li>Students can present their work to a scientific audience using appropriate media and deal with questions and/or comments scientific discussion about their topic.</li> <li>Students can ask concise, to-the-point questions about possil future research directions to follow up a given problem.</li> </ul>					
Module (partial) exams (number scope, workload in CP):	r, form,	Writt	xam in one of the followin ten exam, 90 min exam, 30 min	g forms:			
Independent study time (in hour	Independent study time (in hours (h)): 12						
Courses (forms of teaching)	Contact time semester hou		Supplementary work for (number, form,		Module (partial) exam accompanying the		

		For completing the	For admission to	course (number, form,		
		module	the module exam	scope)		
Lecture and seminar (lecture	4	-	Presentation (15	-		
and seminar)			min) or Exercises			
			(80%)			
Lab course (4 weeks) (lab	4	Lab course protocol	-	-		
course)		(15 pages)				
Frequency of the module:		Winter and summer semester				
Requirement for participation in	the module:	-				
Academic organizational unit:		Biologie/Biochemie				

BIO-B-WM7: Biochemistry B				Number of credit points (CP): 6		
Module type (mandatory or electrodule):	etive	Ele	ctive module			
Content and qualification goals of module:			d interactions and antibonodern biochemistry wi	ical a ontair ody p ill be	analysis of biolog ning proteins, pro production and us discussed.	ical processes, such as tein-protein and protein-
		The rese scie rese biod part	alification goals: e module will give stude earch questions and met earch. Students will becentific approaches and e earch. The module will per chemical analysis of biot tof the master's program chemistry, protein scien	thods come experi provi ologic m if t	in biochemistry familiar with the imental methods ide special knowl cal processes; the he intention is to	with a focus on basic theoretical principles, in current biochemical edge and skills in the se represent a central
		-	Students can discuss manner. Students can present	scient their about	clish.  b extract the essentific questions in  work to a sciential with questions to their topic.	writing in a concise fic audience using and/or comments in a tions about possible
Module (partial) exams (numbe scope, workload in CP):	r, form,	An exam in one of the following forms: Written exam, 90 min Oral exam, 30 min				
Independent study time (in hour	rs (h)):	120				
Courses (forms of teaching)	Contact time semester hou		Supplementary wor (number, for For completing the module	For		Module (partial) exam accompanying the course (number, form, scope)
Lecture and seminar (lecture and seminar)	4	1			sentation (15 n) or Exercises %)	-
Frequency of the module:  Requirement for participation in	the module:	W	inter and summer seme	ester		
Academic organizational unit:	iologie/Biochemie					

BIO-B-WM8: Biotechnology B				Number of credi	it points (CP): 6	
Module type (mandatory or electrodule):	etive	Ele	ctive module			
			ntent: s lecture focuses on cur roaches in biotechnolog tein expression and puri gosaccharides from glyc cobiology, nanotechnolog	gy, su ificat copro ogy,	ich as antibody pricon, isolation and teins, isolation of biosensors, novel	roduction and use, l analysis of bacterial glycans, l cloning technologies,
			_	rature	e of current topics	s in biochemistry will be
		The curron on cat the Pots print biots provided the provi	discussed.  Qualification goals:  The module will provide students with a detailed understanding of current research questions and procedures in biotechnology with a focus on current research problems. These aspects will be addressed by groups at the University of Potsdam and biotechnology companies in the Berlin-Potsdam area. Students will become familiar with the theoretical principles, scientific approaches and experimental methods in current biotechnology, as well as the legal and social aspects. The module will provide special knowledge and skills in finding biotechnological solutions to existing problems, which will be a central part of the master's program if the student intends to specialize in biochemistry, protein science or biotechnology.  - Students will learn how to read and critically evaluate original scientific literature in English.  - Students will learn how to extract the essential points from original scientific literature.  - Students can discuss scientific questions in writing in a concise manner.  - Students can present their work to a scientific audience using appropriate media and deal with questions and/or comments in a scientific discussion about their topic.  - Students can ask concise, to-the-point questions about possible			be addressed by groups companies in the Berlin- th the theoretical all methods in current sects. The module will solotechnological entral part of the ize in biochemistry, ally evaluate original writing in a concise fic audience using and/or comments in a
Module (partial) exams (number scope, workload in CP):	r, form,	Wri	exam in one of the follo	owing	g forms:	
Independent study time (in hour	rs (h)):	120				
Courses (forms of teaching)	Contact time semester hou		Supplementary wor (number, for completing the module	For		Module (partial) exam accompanying the course (number, form, scope)
Lecture and seminar (lecture and seminar)	4		-	Pre	sentation (15 n) or Exercises	-
Frequency of the module:		W	inter and summer seme	ester		
Requirement for participation in	the module:	-				
Academic organizational unit:	B	iologie/Biochemie				

BIO-B-WM9: Protein Science B				Number of	Number of credit points (CP): 6	
Module type (mandatory or electrodule):	etive	Ele	ctive module			
			roaches in protein scier ification, functional cha lication in biotechnolog plied aspects of modern	rece, such as in vitra racterization, stru gical contexts, etc. biochemistry wil	ecture determination and	
		on s fam exp	structural and functional structural and functional structural with the theoretical erimental methods of conductive dule will provide special structure.	and methods in pr l characterization. l principles, scien urrent biochemica l knowledge and s rt of the master's	otein science with a focus. Students will become stific approaches and al analysis of proteins. The skills in protein science; program if the intention is to	
		-	scientific literature in Students will learn he scientific literature. Students can discuss manner. Students can present appropriate media an scientific discussion	English.  ow to extract the extract the extract the extract the extract the extract their work to a set did deal with question about their topic.	essential points from original as in writing in a concise ientific audience using ons and/or comments in a questions about possible a given problem.	
Module (partial) exams (numbe scope, workload in CP):	r, form,	An exam in one of the following forms: Written exam, 90 min				
Independent study time (in hour	rs (h)):	120	al exam, 30 min			
Courses (forms of teaching)	Contact time semester hou		Supplementary wor (number, for For completing the module		accompanying the course (number, form,	
Lecture and seminar (lecture and seminar)	4		-	Presentation (15 min) or Exercise (80%)	-	
Frequency of the module:		Winter and summer semester				
Requirement for participation in the module:			-			
Academic organizational unit:			iologie/Biochemie			

BIO-B-WM10: Genome Research and Systo			Biology B	Number of cred	Number of credit points (CP): 6	
Module type (mandatory or elective module):	e	Ele	ctive module			
Content and qualification goals of module:			evolution, transcripton oughput analysis and sc informatics and mathen olutionary and applied a tion to human diseases	d systems biology, surics, proteomics and reening, imaging and natical modeling of biaspects of genomics arand plant breeding w	ich as genome structure metabolomics, high- image analysis, ological processes, etc. and systems biology in	
		The rese focus theorem kno biol program	earch questions and met as on genetic model sys- pretical principles, scient omics and systems biolowledge and skills in the logical processes; these gram if the intention is lecular, cellular and sys- Students will learn he scientific literature in Students will learn he scientific literature. Students can discuss manner. Students can present appropriate media an scientific discussion Students can ask con-	chods in genomics and stems. Students will be attific approaches and ogy. The module will be genomic and system represent a central patto specialize in genetitems biology. Ow to read and critical a English. Ow to extract the essentific questions in their work to a scientid deal with questions	s biology analysis of art of the master's and genomics,  lly evaluate original artial points from original artial writing in a concise article audience using and/or comments in a stions about possible	
Module (partial) exams (number, f scope, workload in CP):	orm,	An exam in one of the following forms: Written exam, 90 min Oral exam, 30 min				
Independent study time (in hours (	h)):	120				
	ontact time emester hor		Supplementary won (number, for For completing the module		Module (partial) exam accompanying the course (number, form, scope)	
Lecture and seminar (lecture and seminar)	4		-	Presentation (15 min) or Exercises (80%)	-	
Frequency of the module: Requirement for participation in th	e module:	W	inter and summer seme	ester		
Academic organizational unit:	e mouule.	B	iologie/Biochemie			

research questions and methods in molecular biology with a focus on genetic model systems. Students will become familiar with the theoretical principles, scientific approaches and experimental methods in molecular biology. The module will provide special knowledge and skills in the molecular biological analysis of biological processes; these represent a central part of the master's program if the intention is to specialize in genetics and genomics, molecular, cellular and systems biology.  - Students will learn how to read and critically evaluate original scientific literature in English.  - Students will learn how to extract the essential points from original scientific literature.  - Students can discuss scientific questions in writing in a concise manner.  - Students can present their work to a scientific audience using appropriate media and deal with questions and/or comments in a scientific discussion about their topic.  - Students can ask concise, to-the-point questions about possible future research directions to follow up a given problem.  Module (partial) exams (number, form, scope, workload in CP):  Module (partial) exams (number, form, oral exam, 30 min  Independent study time (in hours (h)):  120  Courses (forms of teaching)  Contact time (in semester hours)  Supplementary work for examination (number, form, scope)  Module (partial) examination accompanying the	BIO-B-WM11: Molecular Biology B			Number of cred	Number of credit points (CP): 6		
Content and qualification goals of module:    This lecture focuses on current research questions and experimental approaches in molecular biology, such as genome structure and evolution, transcriptomics, high-throughput analysis, novel cloning techniques, functional analysis of genes and proteins, bioinformatics, et Applied aspects of molecular biology, especially for human diseases an plant breeding, will be discussed.    Qualification goals:   The module will provide students with a basic understanding of current research questions and methods in molecular biology with a focus on genetic model systems. Students will be come familiar with the theoretical principles, scientific approaches and experimental methods in molecular biology. The module will provide special knowledge and skills in the molecular biological analysis of biological processes; these represent a central part of the master's program if the intention is to specialize in genetics and genomics, molecular, cellular and systems biology.		tive	Ele	ctive module			
The module will provide students with a basic understanding of current research questions and methods in molecular biology with a focus on genetic model systems. Students will become familiar with the theoretical principles, scientific approaches and experimental methods i molecular biology. The module will provide special knowledge and skills in the molecular biological analysis of biological processes; these represent a central part of the master's program if the intention is to specialize in genetics and genomics, molecular, cellular and systems biology.  - Students will learn how to read and critically evaluate original scientific literature in English.  - Students will learn how to extract the essential points from original scientific literature.  - Students can discuss scientific questions in writing in a concise manner.  - Students can discuss scientific questions in writing in a concise manner.  - Students can present their work to a scientific audience using appropriate media and deal with questions and/or comments in a scientific discussion about their topic.  - Students can ask concise, to-the-point questions about possible future research directions to follow up a given problem.  Module (partial) exams (number, form, scope, workload in CP):  Written exam, 90 min  Oral exam, 30 min  Independent study time (in hours (h)):  120  Courses (forms of teaching)  Contact time (in semester hours)    Supplementary work for examination (number, form, scope)   For completing the module exam accompanying the course (number, form scope)   For completing the module exam accompanying the scope; workload accompanying the scope; (80%)   Presentation (15 min) or Exercises (80%)	Content and qualification goals of module:			s lecture focuses on cur roaches in molecular bi- lution, transcriptomics, nniques, functional anal- plied aspects of molecu- nt breeding, will be disc he seminar original liter	ology, such as genome high-throughput analysis of genes and protection lar biology, especially cussed.	e structure and ysis, novel cloning teins, bioinformatics, etc. for human diseases and	
Scope, workload in CP):  Written exam, 90 min Oral exam, 30 min  Courses (forms of teaching)  Courses (forms of teaching)  Contact time (in semester hours)  For completing the module exam scope)  Lecture and seminar (lecture and seminar)  Contact time (in semester hours)  For completing the module exam scope)  Presentation (15 min) or Exercises (80%)  Winter and summer semester				<ul> <li>Qualification goals:</li> <li>The module will provide students with a basic understanding of current research questions and methods in molecular biology with a focus on genetic model systems. Students will become familiar with the theoretical principles, scientific approaches and experimental methods in molecular biology. The module will provide special knowledge and skills in the molecular biological analysis of biological processes; these represent a central part of the master's program if the intention is to specialize in genetics and genomics, molecular, cellular and systems biology.</li> <li>Students will learn how to read and critically evaluate original scientific literature in English.</li> <li>Students will learn how to extract the essential points from original scientific literature.</li> <li>Students can discuss scientific questions in writing in a concise manner.</li> <li>Students can present their work to a scientific audience using appropriate media and deal with questions and/or comments in a scientific discussion about their topic.</li> <li>Students can ask concise, to-the-point questions about possible</li> </ul>			
Courses (forms of teaching)  Contact time (in semester hours)  (number, form, scope)  For completing the module exam scope)  Course (number, form scope)  Course (number, form scope)  Presentation (15 min) or Exercises (80%)  Frequency of the module:  Winter and summer semester	· · · · · · · · · · · · · · · · · · ·	r, form,	Written exam, 90 min				
semester hours)    Semester hours   (number, form, scope)   accompanying the course (number, form scope)	Independent study time (in hour	s (h)):	120				
Lecture and seminar (lecture and seminar)  4 - Presentation (15 min) or Exercises (80%)  Frequency of the module: Winter and summer semester	Courses (forms of teaching)			(number, for For completing the	orm, scope) For admission to	course (number, form,	
	`	4		-	Presentation (15 min) or Exercises	-	
Academic organizational unit: Biologie/Biochemie	Requirement for participation in	the module:	-		ester		

<b>BIO-B-WM12: Cellular and Developmental B</b>			logy B	Number of cred	it points (CP): 6
Module type (mandatory or electiv module):	e	Elec	ctive module		
Content and qualification goals of module:			wth, morphogenesis, ce ordisciplinary aspects of cussed, especially with	molecular analysis of differentiation, stem c ol, cell motility, regula- ell differentiation, etc. f cell and developmen regard to human disea	cell biology and ell biology, pattern ation of organ and tissue
		The rese focus theo cell kno proceinte	earch questions and metas on genetic model systematical principles, scienand developmental bid wledge and skills in the cesses; these representantion is to specialize in systems biology.  Students will learn he scientific literature in Students will learn he scientific literature.  Students can discuss manner.  Students can present appropriate media an scientific discussion Students can ask con	thods in cell and deve- stems. Students will be ntific approaches and clogy. The module will be molecular biological a central part of the management of the control of	analysis of biological aster's program if the es, molecular, cellular aster's program if the es, molecular, cellular as a concise as a concise and/or comments in a stions about possible
Module (partial) exams (number, for scope, workload in CP):	·	An exam in one of the following forms: Written exam, 90 min Oral exam, 30 min			
Independent study time (in hours (l	1)):	120			
`	ontact time emester hou		Supplementary wo (number, for completing the module		Module (partial) exam accompanying the course (number, form scope)
Lecture and seminar (lecture and seminar)	4		-	Presentation (15 min) or Exercises (80%)	-
Frequency of the module: Requirement for participation in th	e module:	W	inter and summer sem	ester	
Academic organizational unit:	c module.	B	iologie/Biochemie		

BIO-B-WM13: Current Resea Biology in Local Research Ins	Number of cred	it points (CP): 6					
Module type (mandatory or electrodule):	etive	Ele	ective module				
Content and qualification goals	of module:	The fiel mu in a	st attend the lecture and	molecular biology. For a seminar of one of the week internship at a reg	or this purpose, students elective modules and, gional research institute		
	c	1 1 1 1	<ul> <li>Qualification goals: <ul> <li>Students will learn how to read and critically evaluate original scientific literature in English.</li> <li>Students will learn how to extract the essential points from original scientific literature.</li> <li>Students can discuss scientific questions in writing in a concise manner.</li> <li>Students can present their work to a scientific audience using appropriate media and deal with questions and/or comments in a scientific discussion about their topic.</li> <li>Students can ask concise, to-the-point questions about possible future research directions to follow up a given problem.</li> </ul> </li> </ul>				
Module (partial) exams (numbe scope, workload in CP):			al exam, 30 min				
Independent study time (in hour	rs (h)):	135	5				
Courses (forms of teaching)	Contact time semester hou			rk for examination orm, scope)  For admission to the module exam	Module (partial) exam accompanying the course (number, form, scope)		
Lecture (lecture)	2		-	-	-		
Seminar (seminar)	1		-	Presentation (20 min)	-		
Lab course (2 weeks; in a research department of a regional research institute or a biotechnological company in Potsdam or Berlin) (lab course)			-	Lab course protocol (15 pages)	-		
Frequency of the module:		V	Winter and summer semester				
Requirement for participation in	the module:	-	-				
Academic organizational unit:			Biologie/Biochemie				

BIO-B-WM14: Biochemistry and Molecular Biology as Reflected other Sciences A					Number of cred	lit points (CP): 8	
Module type (mandatory or electrodule):	etive	Ele	Elective module				
Content and qualification goals	of module:	Stu	ntent: dents choose from the civersity of Potsdam.	course	catalog of the F	Faculty of Sciences at the	
		1.)	alification goals: Professional competend	ce:			
		-	and their significance	e for bit the conships	iochemistry and ollection, analys between sub-di	is and presentation of isciplines and their	
			Methodological compedents  can work interdiscipl learn how the differe can be combined in a questions;	linary; ent tech	nniques from the	e above-mentioned fields n up new scientific	
		3.) Action competence (socially relevant and strategic): Students can decide which interdisciplinary topics are relevant to them.					
Module (partial) exams (numbe scope, workload in CP):	r, form,	mo	tfolio review, (report the dule and summarizes the n. 1 page per course)		•	-	
Independent study time (in hour	rs (h)):	150					
Courses (forms of teaching)	Contact time semester hou	`	Supplementary won (number, for For completing the module	For a		Module (partial) exam accompanying the course (number, form, scope)	
Lecture and exercise (lecture 6 and exercise)		- Exercises or - presentation			-		
Frequency of the module:			Winter and gummar gamaster				
Requirement for participation in the module:			Winter and summer semester				
Academic organizational unit:			Biologie/Biochemie (20%) Chemie (20%) Mathematik (20%) Physik (20%) Informatik (20%)				

BIO-B-WM15: Biochemistry and Molecular Biology as Reflected in other Sciences B					Number of credit points (CP): 6		
Module type (mandatory or elective module):			Elective module				
Content and qualification goals of module:		Content: Students choose from the course catalog of the Faculty of Sciences at the University of Potsdam.					
		Qualification goals: 1.) Professional competence: Students - gain an insight into different mathematical and scientific contents and their significance for biochemistry and molecular biology; - will be introduced to the collection, analysis and presentation of experimental data;					
		- can reflect on relationships between sub-disciplines and their significance in approaches to solving scientific problems.  2.) Methodological competence: Students					
		<ul> <li>can work interdisciplinary;</li> <li>learn how the different techniques from the above-mentioned fields can be combined in a practical way to open up new scientific questions;</li> <li>3.) Action competence (socially relevant and strategic):</li> <li>Students can decide which interdisciplinary topics are relevant to them.</li> </ul>					
Module (partial) exams (number, form, scope, workload in CP):		Portfolio review, (report that formulates competences acquired in the module and summarizes the essential aspects in a scientifically way) (min. 1 page per course)					
Independent study time (in hours (h)):		120					
Courses (forms of teaching)	Contact time (in semester hours)		Supplementary wo (number, f) For completing the module	For ac		Module (partial) exam accompanying the course (number, form, scope)	
Lecture and exercise (lecture and exercise)	4		-	Exerc	rises or ntation	-	
Frequency of the module:		l vi	Vintar and summar same	. ogtor			
Requirement for participation in the module:			Winter and summer semester				
Academic organizational unit:		C N P	Biologie/Biochemie (20%) Chemie (20%) Mathematik (20%) Physik (20%) Informatik (20%)				

35.11	BIO-B-WM16: Biochemistry and Molecula												
Module type (mandatory or electrodule):	etive	Ele	ective module										
Content and qualification goals of module:		Content:											
		Consolidation of biochemical and molecular biological topics and natural											
		phenomena as well as specific scientific techniques and methods.											
		Qualification goals:  1.) Professional competence: Students  - gain an insight into different mathematical and scientific contents and their significance for biochemistry and molecular biology;  - will be introduced to the collection, analysis and presentation of											
								experimental data; - can reflect on relationships between sub-disciplines and their significance in approaches to solving scientific problems.  2.) Methodological competence:					
							2.)						
							Stu	Students					
									-	<ul> <li>can work interdisciplinary;</li> <li>learn how the different techniques from the above-mentioned fields can be combined in a practical way to open up new scientific questions;</li> <li>3.) Action competence (socially relevant and strategic):</li> </ul>			
				-									
				Students can decide which interdisciplinary topics are relevant to them.									
Module (partial) exams (number	r, form,	Portfolio review, (report that formulates competences acquired in the											
scope, workload in CP):	*		module and summarizes the essential aspects in a scientifically way)										
		(min. 1 page per course)											
Independent study time (in hours (h)):		150											
Courses (forms of teaching)	Contact tim	o (in	Supplementary we	ork for examination	Module (partial) exam								
Courses (forms of teaching)	Contact time (ii semester hours)		11		accompanying the								
			(number, form, scope)  For completing the For admission to		course (number, form								
			module	the module exam	scope)								
Lecture and exercise (lecture	6		-	Exercises or	-								
and exercise)				presentation									
Frequency of the module:		Winter and summer semester											
Requirement for participation in the module:			Biologie/Biochemie (16%)										
Academic organizational unit:			Chemie (12%)										
			Mathematik (12%)										
			Physik (12%)										
			Informatik (12%)										
			Ernährungswissenschaften (12%)										
			Geoökologie (12%)										
		1	Geowissenschaften (12%										

BIO-B-WM17: Biochemistry	and Molecula	r Bio	ology in Practice B	Number of cred	lit points (CP): 6		
Module type (mandatory or elective module):		Elective module					
Content and qualification goals of module:		Content: Consolidation of biochemical and molecular biological topics and natural phenomena as well as specific scientific techniques and methods.  Qualification goals: 1.) Professional competence: Students - gain an insight into different mathematical and scientific contents and their significance for biochemistry and molecular biology; - will be introduced to the collection, analysis and presentation of experimental data; - can reflect on relationships between sub-disciplines and their significance in approaches to solving scientific problems. 2.) Methodological competence: Students - can work interdisciplinary; - learn how the different techniques from the above-mentioned fields can be combined in a practical way to open up new scientific questions; 3.) Action competence (socially relevant and strategic): Students can decide which interdisciplinary topics are relevant to them.					
							Module (partial) exams (number, form, scope, workload in CP):
Independent study time (in hours (h)):		120					
Courses (forms of teaching)	Contact time (in semester hours)			rk for examination orm, scope)  For admission to the module exam	Module (partial) exam accompanying the course (number, form, scope)		
Lecture and exercise (lecture and exercise)			-	Exercises or presentation	-		
Frequency of the module:		V	Vinter and summer sem	ester			
Requirement for participation in the module:		-					
Academic organizational unit:		Biologie/Biochemie (16%) Chemie (12%) Mathematik (12%) Physik (12%) Informatik (12%) Ernährungswissenschaften (12%) Geoökologie (12%)					
			ieoökologie (12%) ieowissenschaften (12%	(o)			