Study Schedule Master

Molecular Cell Biology

		Compulsory modules	Elective modules	Internship; Study Abroad	∑ credits per semester
1. Sem.	Oct Nov Dec Jan Feb March	Biochemistry 4 ECTS A ECTS Developmental Biology and Physiology 4 ECTS Biophysics and Statis 4 ECTS Biophysics and Statis 4 ECTS Examination Module 2 ECTS Examination Module 2 ECTS	ites		30
2. Sem.	Apr May June July Aug Sep	Teacher Seminar Series 2 ECTS Soft Skills Course / Bioethics 5 ECTS SECTS	Elective period 1 Elective period 2 S ECTS Elective period 4 S ECTS Elective period 7 S ECTS Four electives to be taken in 4 out of 7 periods Elective periods Elective period 7 Elective period 8 Elective period		30
3. Sem.	Oct Nov Dec Jan Feb March	Student Presentation 2 ECTS		Project/Exchange 12 ECTS	30
4. Sem.	Apr May June July Aug Sep	Master thesis 30 ECTS			30
					120

Compulsory modules

Elective modules

Biochemistry	
lecture & tutorial	4
30 hours weekly contact	credits
time (4 SWS)	
Molecular Genetics	
lecture & tutorial	4
30 hours weekly contact	credits
time	1
Developmental Biology	
and Physiology	4
lecture & tutorial	credits
30 h wkly contact time	
Molecular Cell Biology	
lecture & tutorial	4
30 h weekly contact time	credits
Biophysics and Statistics	
lecture & tutorial	4
30 hours weekly contact	credits
time	
Mandatory Basic Course	
practical exercise	8
40 hours weekly contact	credits
time	
Examination Module	1
examination	2
1 hour contact time	credits

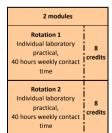
Teacher Seminar Series	
seminar	2
2 hours weekly contact	credite
time	
Soft Skills / Bioethics	
lecture / seminar	5
3 + 2 hours weekly	credite
contact time	
Seminars / Journal Club	
seminar	3
3 hours weekly contact	credite
time	

Student Presentation	
seminar	2
Student Presentation seminar 2 hours weekly contact time	credit
time	



		4	from 25	modules			
Analysis of snRNP assembly Practical exercise, 40 hours weekly contact time	5 credits	Optogenetics Practical exercise, 40 hours weekly contact time	5 credits	Molecular Biology of the Cell Practical exercise, 40 hours weekly contact time	5 credits	Mechanical Stress Protection Practical exercise, 40 hours weekly contact time	5 credits
Neuronal Cell Biology Practical exercise, 40 hours weekly contact time	5 credits	Transportphysiology Practical exercise, 40 hours weekly contact time	5 credits	Pharmacology & Metabolism Practical exercise, 40 hours weekly contact time	5 credits	Plant Transformation Practical exercise, 40 hours weekly contact time	5 credits
Quantitative Fluorescence Microscopy Practical exercise, 40 hours weekly contact time	5 credits	Biochemistry and Bioanalytics Practical exercise, 40 hours weekly contact time	5 credits	Molecular Membrane Biology Practical exercise, 40 hours weekly contact time	5 credits	Bioinformatics Lab Course Practical exercise, 40 hours weekly contact time	5 credits
Embryo Biotechnology Practical exercise, 40 hours weekly contact time	5 credits	Drugs from Plants and Microorganisms Practical exercise, 40 hours weekly contact time	5 credits	Biosyntheses of Natural Products Practical exercise, 40 hours weekly contact time	5 credits	Proteomics Practical exercise, 40 hours weekly contact time	5 credits
Preventive, Predictive and Personalised Medicine Practical exercise, 40 hours weekly contact time	5 credits	Cell Mechanics Practical exercise, 40 hours weekly contact time	5 credits	Biochemical Engineering Practical exercise, 40 hours weekly contact time	5 credits	Fluorescent Protein- based Biosensors Practical exercise, 40 hours weekly contact time	5 credits
Genome Stability Practical exercise, 40 hours weekly contact time	5 credits	Reconstructive Neurobiology Practical exercise, 40 hours weekly contact time	5 credits	Applications of CrispR/Cas to study neuronal function Practical exercise, 40 hours weekly contact time	5 credits	Methods in Developmental- and Tumorpathology Practical exercise, 40 hours weekly contact time	5 credits

Molecular Haematology Practical exercise, 5 40 hours weekly contact credits time



Internship	
Project/Exchange Individual laboratory practical, 40 hours weekly contact time	12 credit

						UNIVE	RSIT	ÂT BONN		
nded	learning ou	tcomes								
	Energy meta	bolism pat	thway	rs, enzym	les, enzyme rea	ctions and	coenzy	mes.		
		sttranslational modifications as regulatory principle, analytical techniques								
						f the cell, p	oroperti	es and		
	-	s of protei	ns, nu	cleic acio	ls and lipids.					
rning	methods									
	Type of	т	onic		Language of	Group		· workload		
	instruction	I	opic		instruction	size		i lhl		
-	lecture	Bioch	hemis	try	English	25				
_	seminar				English	25	20 h	40		
		Bioch	hemis	try						
the m	nodule									
alloca	ation					1				
		Stud	y pro	gram		-	ory/	Semester		
F	M	olecular C	Bic Ric	ology (M	Sc)			1		
_	111			JIOGY (141.	50.7	compu	301 y	Ŧ		
r the a	award of cro	edits (EC	ΓS)			1		6. Credits		
ts								4 ECTS		
	written exam	nination in	Engli	sh						
2				0 \	Markland		0 Du	ation		
	\\/:uton and a		1	٥. ١		2 ana dit				
		summer			120 N	5 creat	nours p	ei week (SWS)		
	Semester									
	Drof Dr Dot	or Dörman	n Dre	of Dr Ar	dross Mover					
1										
1										
	rning the n alloca ts r the a ts	Energy meta Posttranslati Deeper under biosyntheses rning methods Type of instruction lecture seminar the module allocation f the award of cross written exant written exant Prof. Dr. Peto Prof. Dr. Peto Prof. Dr. Peto Prof. Dr. Peto Prof. Dr. Peto	Posttranslational modi Deeper understanding biosyntheses of protein rning methods Type of instruction lecture Biocl seminar Tute allocation Molecular C r the award of credits (ECT) ts written examination in written ad summer semester On Prof. Dr. Peter Dörman Prof. Dr. Peter Dörman IMBIO (Biology)	Energy metabolism pathway Posttranslational modification Deeper understanding of bio biosyntheses of proteins, nur rning methods Type of instruction Topic lecture Biochemiss seminar Tutorials Biochemiss the module allocation Study proposed Molecular Cell Bio r the award of credits (ECTS) ts written examination in Engliss written examination in Engliss Winter and summer Semester Prof. Dr. Peter Dörmann, Proposed Prof. Dr. Peter Dörmann IMBIO (Biology)	Energy metabolism pathways, enzym Posttranslational modifications as reg Deeper understanding of biochemical biosyntheses of proteins, nucleic acid rning methods Type of instruction Topic lecture Biochemistry seminar Tutorials in Biochemistry the module allocation Molecular Cell Biology (M. r the award of credits (ECTS) ts written examination in English written examination in English Winter and summer semester Prof. Dr. Peter Dörmann, Prof. Dr. An Prof. Dr. Peter Dörmann IMBIO (Biology)	Energy metabolism pathways, enzymes, enzyme rea Posttranslational modifications as regulatory princip Deeper understanding of biochemical foundations o biosyntheses of proteins, nucleic acids and lipids. rning methods Type of instruction Iecture Biochemistry English seminar Tutorials in English seminar Tutorials in English Biochemistry the module Molecular Cell Biology (M.Sc.) r the award of credits (ECTS) ts written examination in English written examination in English Prof. Dr. Peter Dörmann, Prof. Dr. Andreas Meyer Prof. Dr. Peter Dörmann IMBIO (Biology)	Inded learning outcomes Energy metabolism pathways, enzymes, enzyme reactions and Posttranslational modifications as regulatory principle, analytic Deeper understanding of biochemical foundations of the cell, p biosyntheses of proteins, nucleic acids and lipids. rning methods Type of instruction Topic Language of instruction Group size lecture Biochemistry English 25 seminar Tutorials in Biochemistry English 25 allocation Study program compulse elective Molecular Cell Biology (M.Sc.) compulse r the award of credits (ECTS) semination in English 3 credit written examination in English 120 h 3 credit written examination in English Prof. Dr. Peter Dörmann, Prof. Dr. Andreas Meyer Prof. Dr. Peter Dörmann IMBIO (Biology) HMBIO (Biology) HMBIO (Biology) HMBIO (Biology)	Energy metabolism pathways, enzymes, enzyme reactions and coenzy Posttranslational modifications as regulatory principle, analytical techn Deeper understanding of biochemical foundations of the cell, properti biosyntheses of proteins, nucleic acids and lipids. rning methods Type of instruction Topic Language of instruction Size Topic English 25 10 h seminar Tutorials in English 25 20 h Biochemistry English 25 20 h the module Allocation Study program compulsory/ elective Molecular Cell Biology (M.Sc.) compulsory/ elective ts written examination in English written examination in English Prof. Dr. Peter Dörmann, Prof. Dr. Andreas Meyer Prof. Dr. Peter Dörmann IMBIO (Biology)		

Module Title:										
Molecular Genetic	S									
Module ID/Code:							DOLT	ä-		
MCB-P2						UNIVE	:RSII	AI	BONN	
1. Content and intended	l learning ou	itcomes				-				
Content	Translation of	of the gene	etic in	formatio	n, regulation of	the gene e	expressi	on,	translatory	
				-	ale mechanism					
			-		ucleid acids, ger		-			
	-	-	-	-	Work with geno ntibody product					
	applications	-	lo reg	aru on a			buy pro	uuc	uon anu	
Learning outcomes	Understanding of the principles of the gene regulation and the methods of molecular									
	genetics.	0 1-								
2. Teaching and learning	g methods									
	Type of				Language of	Group	Week	ly	Workload	
	instruction	Т	opic		instruction	size	conta	ct	[h]	
							time			
		ecture Molecular Ge			English	25	10 h		80	
	seminar Tutorials in M Genet				English	25	20 h		40	
3. Prerequisites for the	module									
compulsory										
recommended										
4. Degree program alloc	ation									
		Stud	y pro	gram		compulso	ory/		Semester	
					C - \	elective			4	
	IV	lolecular C	en Bio	biogy (IVI	.5C.)	compul	sory		1	
5. Requirements for the	award of cr	edits (ECT	rs)					(6. Credits	
Required achievements		.	-					4 E	CTS	
Assessment (incl.	Written exar	nination ir	n Engli	ish						
weighting) and										
examination language										
7. Frequency			1	8. \	Workload		9. Dur			
Winter semester	Winter and s semester	summer			120 h	3 credit	hours p	er v	week (SWS)	
Module coordination						L				
Teacher	Prof. Dr. Wa	lter Witke								
Module coordinator	Prof. Dr. Wa	lter Witke								
Institute/Department	Genetics (Bio	ology)								
Further information										
(Reading lists,										
information links etc.)										

Module Title: Developmenta Module ID/Code: MCB-P3	l Bio	ology and	Physiol	ogy			UNIVE	RSIT	ÄT	BONN
1. Content and intended learning outcomes										
Content Knowledge of the methodology for the analysis of multicellularity and General principles of development; Signalling pathways and decision n the cell differentiation, cell division: mitosis, meiosis, nuclei; understar principles of development in animals and plants; pattern formation, tis differentiation, organ development; tissue homeostasis and stem cells reproductive medicine.									nech ndin ssue	nanisms of g of the
Learning outcomes	Learning outcomesUnderstanding of the cellular and molecular biological prerequisites of and for the organismisc events during the development.									
2. Teaching and lea	arnin	g methods								
		Type of instruction	Т	Горіс		Language of instruction	Group size	Weel conta time	ict	Workload [h]
		lecture	Phy	ogy ai vsiolog	nd SY	English	25	10 ł	ו	80
		seminar	Devel Biol	orials opme ogy aı vsiolog	ntal 1d	English	25	20 ł	I	40
3. Prerequisites for	r the	module								
compulsory										
recommended										
4. Degree program	allo	ation								
				y pro	-		compulso elective	ory/ S		Semester
		M	olecular C	ell Bio	ology (M.	.Sc.)	compul	sory		1
5. Requirements for	or the	award of cr	edits (EC	ΓS)					(5. Credits
Required achievement Assessment (incl. weighting) and examination languag		written exan	nination in	Engli	sh					СТЅ
7. Frequency					8. \	Workload		9. Du	ratio	on
Winter semester Summer semester		Winter and s semester	summer			120 h	3 credit	hours	oer v	veek (SWS)
Module coordinati	on									
Teacher		Prof. Dr. Oliv Prof. Dr. Ber	-	mann	(Physiol	ogy / Life & Brai	n, Medicin	e)		
Module coordinator		Prof. Dr. Oliv	er Gruß							
Institute/Department	t	Genetics (Bio	ology)							
Further informatio	n									
(Reading lists, information links etc.	.)									

Module Title:												
Molecular Cell	Biol	ogv										
Module ID/Code:		-01										
MCB-P4							UNIVE	ERSIT	AT BONN			
1. Content and inte	endeo	d learning ou	tcomes									
Content		Organelles a	nd compar	tmen	ts and th	eir function. Cy	toskeleton	and cel	lular motors as			
		-				ansport and ger						
		canals. Prote	in sorting a	and p	roteosta	sis, apoptosis.						
Learning outcomes		Deeper unde	per understanding of cell organisation and cellular processes.									
2. Teaching and lea	arning	g methods										
		Type of	т	onio		Language of	Group	Weekl	. Workload			
		instruction	1	opic		instruction	size	contac time	[h]			
		lecture	Moleo Bio	cular ology	Cell	English	25	10 h	80			
		seminar	Tutorials in Mo Cell Biolo			English	25	20 h	40			
3. Prerequisites fo	r the	module										
compulsory												
recommended												
4. Degree program	n alloc	ation										
			Study	y proį	gram		compulso elective	ory/	Semester			
		M	lolecular Ce	ell Bic	ology (M.	Sc.)	compul	sory	1			
5. Requirements fo	or the	award of cr	edits (ECT	S)					6. Credits			
Required achieveme	nts								4 ECTS			
Assessment (incl. weighting) and		written exan	nination in	Engli	sh							
examination languag 7. Frequency	je				8. \	Norkload		9. Dura	ation			
Winter semester		Winter and s	summer			120 h	3 credit		er week (SWS)			
Summer semester		semester					o orean	nouro p				
Module coordinati	ion											
Teacher		Prof. Dr. Diet	ter Fürst, P	rof. D	r. Albert	Haas, Prof. Dr.	Jörg Höhfe	eld				
Module coordinator		Prof. Dr. Diet	ter Fürst									
Institute/Departmen	t	Cell Biology	(Biology)									
Further informatio		0,										
(Reading lists, information links etc	.)											

Module Title:											
Biophysics and	Sta	tistics									
Module ID/Code: MCB-P5							UNIVE	ERSIT	ÄT BONI	N	
1. Content and inte	endeo	d learning ou	tcomes								
Content		microscopy, methods of r	ntroduction to biophysical and chemical calculations, biophysical bases of optics and nicroscopy, enzyme kinetics, spectroscopic methods in molecular biology, theory and nethods of molecule interactions, methods for separation of macromolecules, pplication of statistical methods on experimental data sets.								
Learning outcomes		Insight into b experiments	th into biophysical methods and introduction to the statistical evaluation of eriments.								
2. Teaching and lea	arnin	g methods									
		Type of instruction	Т	opic		Language of instruction	Group size	Weel conta time	ict [h]		
		lecture	Bioph Sta	iysics atistic		English	25	10	n 80)	
		seminar	Bioph	orials lysics atistic	and	English	25	20	ו 40)	
3. Prerequisites for	r the	module					•				
compulsory											
recommended											
4. Degree program	alloc	ation					T		1		
			Stud	y pro	gram		compulsory/ elective		Semest	er	
		M	olecular C	ell Bio	ology (M.	Sc.)	compul	sory	1		
5. Requirements for	or the	award of cr	edits (EC	rs)			•		6. Cred	its	
Required achieveme	nts								4 ECTS		
Assessment (incl. weighting) and examination languag	e	written exam	nination in	Engli							
7. Frequency					8. \	Norkload		9. Du	ration		
Winter semester Summer semester		Winter and s semester	summer			120 h	3 credit	hours	per week (S	WS)	
Module coordinati	on										
Teacher		Dr. Pietro Pil	o Boyl								
Module coordinator		Dr. Pietro Pil	o Boyl								
Institute/Departmen	t	Genetics (Biology)									
Further informatio	n										
(Reading lists, information links etc	.)										

Module Title:										/	
Mandatory Bas	sic C	ourse									
Module ID/Code:											
MCB-MBC							UNIVE	RSIT	ÄT <mark>BON</mark>	IN	
1. Content and inte	ended	d learning ou	tcomes								
Content				, met	hods of a	cell fractionation	n, isolation	of nucl	eid acids a	nd	
						es of protein bi					
		antibodies, h	ntibodies, histology and microscopic methods. Proof and quantification of gene								
		expression.									
Learning outcomes					•.	shall be learned				tly in	
		-	ne practice. The course shall put the bases for subsequent 'Elective								
		Contents are	:								
2. Teaching and lea	arning	g methods				1	[
		Type of	-			Language of	Group	Week	wor	kload	
		instruction Top				instruction	size	conta time		h]	
		Practical	Manda	tory	Rasic	English	25	40 h		0 h	
		exercise	Labora			Linghish	25	40 11	27	011	
3. Prerequisites for	the			<u> </u>			1				
compulsory											
recommended											
4. Degree program	alloc	ation									
			Stud	y pro	gram		compulso	ory/	Semes	ster	
							elective				
		M	olecular C	ell Bio	ology (M	.Sc.)	compul	sory			
			11. /=								
5. Requirements fo		•	-						6. Cre	dits	
Required achievemen	nts	Regular parti			oractical	exercise			8 ECTS		
Assessment (incl. weighting) and		Practical repo	ort in Engi	ISN							
examination languag	P										
7. Frequency	•	L			8. \	Workload		9. Dur	ation		
Winter semester		Winter and s	ummer			240 h	8 credit	hours p	er week (SWS)	
Summer semester		semester						•			
Module coordinati	on										
		Prof. Dr. Hub	ert Schorl	e, Pro	f. Dr. Jö	rg Höhfeld, Prof	. Dr. Diet	er Fürst			
Teacher						r Witke, Prof. D			,		
Module coordinator		Prof. Dr. Wal	ter Witke								
Institute/Departmen	t	Genetics (Bio	 Biology)								
Further informatio	n										
(Reading lists,											
information links etc.)										

Module Title:										
Examination M	1odu	ıle								
Module ID/Code:										
MCB-XM							UNIVE	RSIT	AT	BONN
1. Content and int	endeo	l learning ou	tcomes							
Content		Proof of mee	eting quali	ficatio	n aims o	of the compulso	ry modules	MCB-F	۶1 tc	MCB-P5
Learning outcomes			• •			•	•			
2. Teaching and lea	arnin	g methods								
		Type of instruction	7	Горіс		Language of instruction	Group size	Week conta time	ct	Workload [h]
		self study	getting the ex			English	25			59 h
			exar	ninati	on	English	25			1 h
3. Prerequisites fo	r the	module								
compulsory		MCB-P1, MC	B-P2, MC	3-P3, I	ИСВ-Р4,	MCB-P5				
recommended										
4. Degree program	alloc	ation							1	
			Stud	ly pro	gram		compulso elective	compulsory/ elective		Semester
		M	lolecular C	ell Bio	ology (M.	.Sc.)	compul	compulsory		1
5. Requirements for		award of cr	edits (EC	TS)						6. Credits
Required achieveme	nts								2 E	CTS
Assessment (incl. weighting) and examination languag	je	oral examina	ition in En	glish						
7. Frequency					8. \	Workload		9. Du	ratio	on
Winter semester Summer semester		Winter and s semester	summer			60 h				
Module coordinati	ion									
Teacher (examiners)		Coordinators	s of Modu	les M	СВ-Р1, -Р	2, -P3, -P4, -P5				
, Module coordinator		Prof. Dr. Wa								
Institute/Departmen	t	Genetics (Bio								
Further informatio			0,7							
(Reading lists, information links etc										

Module Title:									
Teacher Semin	ar S	eries							
Module ID/Code:									
MCB-TSS							UNIVE	RSITA	T BONN
1. Content and inte	endeo	l learning ou	tcomes				-		
Content					n molecı	ılar biology and	current re	serch res	ults are
		presented by					h :		
Learning outcomes			rn about n	nost r	ecent top	pics and researc	n in molec	ular cell t	biology
2. Teaching and lea	arninį	g methods				Γ			
		Type of instruction	Т	opic		Language of instruction	Group size	Weekly contact time	Workload
		Seminar	Curren molecula	-		English	25	2	60
3. Prerequisites for	r the	module							
compulsory									
recommended									
4. Degree program	alloc	ation							
		Study program compulsory/ elective							Semester
		M	olecular C	ell Bio	ology (M.	.Sc.)	compul	sory	1
5. Requirements fo	or the	award of cr	edits (EC	rs)					6. Credits
Required achieveme	nts	Participation						2	2 ECTS
Assessment (incl.		Proof of part	icipation						
weighting) and									
examination languag	e								
7. Frequency					8. ۱	Norkload		9. Dura	tion
Winter semester		Winter and s	summer		6	0 hours	1 credit	hour pe	r week (SWS)
Summer semester		semester							
Module coordinati	on								
Teacher		Docents of t	ne Master	s Pro	gram (P a	and EM module	s]		
Module coordinator		Prof. Dr. Oliv	er Gruß						
Institute/Departmen	t	Genetics (Bio	ology)						
Further informatio	n								
(Reading lists, information links etc	.)								

Module Title:									
Soft Skills / Bio	oethi	CS							
Module ID/Code: MCB-SSC							UNIVE	ERSIT	ÄT <mark>BONN</mark>
1. Content and inte	ended	l learning ou	tcomes						
Content		Current Topi							
				•		formatting and	•	• •	
						ation, literature			-
			-	-	-	rams, image pro ew of free and	-		-
		-	-			student about a	-		
			ar biotech		-				
		 writing a 	a scientific	pape	r about t	he topic.			
			-			technological pr	rocesses in	food p	roduction,
		agriculture, a							
Learning outcomes						rocessing and v nd presentatior		h, litera	ture research
		-			-	-		d to ma	ke the students
									fic research and
						motivated to re			
		dimension o	f their owi	n biote	echnolog	ical fields of wo	ork and acti	vities.	The aim of the
					percieve	ethical reflection	on as an in	tegral e	element of their
	•	education ar	nd future v	work.					
2. Teaching and lea	arning	g methods							
		Type of	-			Language of	Group	Week	Workload
		instruction		Горіс		instruction	size	conta time	l lhl
		Lecture	So	ft Skill	s	English	25	3 h	
		Seminar		oethic		English	25	Bloc	
3. Prerequisites for	r the	module						•	
compulsory									
recommended									
4. Degree program	alloc	ation							
			Stud	ly pro	gram		compulso	ory/	Semester
							elective		
		M	lolecular C	Cell Bio	ology (M.	Sc.)	compul	sory	
			11. (= 0	>					
5. Requirements for			-	15)					6. Credits
Required achievemen	ITS	Participation							5 ECTS
Assessment (incl. weighting) and		Proof of part	เติมส์เป็น						
examination language	e								
7. Frequency					8. \	Norkload		9. Du	ration
Winter semester Summer semester		Winter and s semester	summer			150 h	5 credit	hours	per week (SWS)
Module coordinati							I		
Teacher		Dr. Karl Poto	r Linscheid	d Priv	-Doz Dr	. Sebastian Kne	ll (IW/F Phi	losonh	(V)
Module coordinator		Dr. Karl Pete			. 502. 51	. sebastian kne		1000001	11
Institute/Department	t				logy and	l Biotechnology	of Plants (Biology)
Further informatio		institute of N	noieculal	1 119510	nogy and	Diotechnology		DIDIOBY	1
(Reading lists,									
information links etc.)								
	.,								

Module Title:										
Seminars / Jou	Irnal	Club								
Module ID/Code:										
MCB-SJC							UNIVE	ERSIT	AT	BONN
1. Content and inte	endeo	d learning ou	itcomes							
Content		Attendance	of semina	's and	journal	clubs				
Learning outcomes		Awareness t	owards cu	rrent	research	in molecular ce	ell biology			
2. Teaching and lea	arnin	g methods								
		Type of instruction	٦	Горіс		Language of instruction	Group size	Week conta	•	Workload [h]
		mstruction					3120	time	-	
		seminar		cular iology		English	25	3 h		90 h
3. Prerequisites fo	r the	module								
compulsory										
recommended										
4. Degree program	allo	ation								
			Study program							Semester
		N	Iolecular C	ell Bio	ology (M.	.Sc.)	compulsory			2
5. Requirements for	or the	award of cr	edits (EC	ΓS)						6. Credits
Required achieveme	nts	Participation							3 8	ECTS
Assessment (incl.		Proof of par	ticipation							
weighting) and										
examination languag 7. Frequency	e				81	Norkload		9. Du	rati	on
Winter semester		Winter and	ummer		0.1	90 h	1 credit			veek (SWS)
Summer semester		semester	Summer			5011	Teredit			veek (5005)
Module coordinati	ion									
Teacher										
Module coordinator		Dr. Karl Pete	r Linscheid	ł						
Institute/Departmen	t	Molecular P	nysiology a	and Bi	otechno	logy of Plants (B	iology)			
Further informatio	n									
(Reading lists, information links etc										

Module Title:									
Student Preser	ntati	on							
Module ID/Code:									×-
MCB-SP							UNIVE	RSIT	ÄT <mark>BONN</mark>
1. Content and inte	endeo	d learning ou	tcomes						
Content		Students pre	sent their	own	work in r	otations and Pro	oject/Excha	ange	
Learning outcomes		Awareness t	owards cu	rrent	research	in molecular ce	ll biology f	or stud	ents attending,
		-	t of preser	ntatio	n skills of	f students prese	nting		
2. Teaching and lea	arnin	g methods							
		Type of instruction	T	opic		Language of instruction	Group size time		ct Workload
		seminar	Mole Bi	cular ology		English	25	2 h	90
3. Prerequisites for	r the	module							
compulsory		Participation	in rotatio	ns an	d Project	/Exchange			
recommended									
4. Degree program	alloc	ation							
		Study program compulsory/ elective							Semester
		M	olecular C	ell Bio	ology (M.	Sc.)	compul	sory	3
5. Requirements fo	or the	award of cr	edits (EC	rs)					6. Credits
Required achieveme	nts	Participation		-					2 ECTS
Assessment (incl. weighting) and	_	Proof of part	icipation						
examination languag 7. Frequency	e				8. \	Norkload		9. Dur	ation
Winter semester Summer semester									er week (SWS)
Module coordinati	-	Semester		I					
Teacher									
Module coordinator		Dr. Karl Pete	rlincchoir	1					
Institute/Departmen	+				otechnol	ogy of Plants (B	iology)		
Further informatio			iysiology a		otechnol		1010671		
(Reading lists, information links etc.									

Module Title: Analysis of snR Module ID/Code: MCB-EM1		-					UNIVE	ERSITÄ	AT BONN			
1. Content and inte	endeo	d learning ou	tcomes									
Content		 Cell Live Inte inhi Pro Indi 	 e following contents will be covered by the practical: Cell culture techniques for different cell lines Live imaging of cells Interfering with protein function inside cells: RNAi, Gene ko, small molecule inhibitors Protein detection after knock-down or knock-out, quantification Indirect immunofluorescence and light microscopy Image quantification 									
Learning outcomes		biology. The performing e	students s	hould	l learn m	ethods and gair						
2. Teaching and lea	arnin	g methods										
		Type of instruction	Т	opic		Language of instruction	Group size	Weekly contac time	Workload			
		PracticalAnalysis of snRNPEnglish6exerciseassembly							150			
3. Prerequisites for	r the	module										
compulsory recommended	alla	Participation in basic modules MCB-P1 - MCB-P5 (min. 3 out of 5 successfully/pass), successful praticipation (pass) in MCB-MBC, and successful (pass) MCB-XM										
4. Degree program	alloc	ation										
				y pro			compulso elective	ory/	Semester			
		M	olecular C	ell Bio	ology (M.	Sc.)	electi	ve	2 (1 st time frame)			
5. Requirements fo	or the	award of cr	edits (ECT	rs)			I		6. Credits			
Required achievemen		Regular part			practical	exercise			5 ECTS			
Assessment (incl. weighting) and examination languag	e	Graded prac	tical report	t in Er	nglish							
7. Frequency					8. \	Norkload		9. Dura	ation			
Winter semester Summer semester		Winter and s semester	summer			150 h	3 credit	hours pe	er week (SWS)			
Module coordinati	on											
Teacher		Prof. Dr. Oliv	er Gruß									
Module coordinator		Prof. Dr. Oliv	er Gruß									
Institute/Departmen	t	Genetics (Bio	ology)									
Further informatio												
(Reading lists, information links etc.)											

Module Title:												
Optogenetics												
Module ID/Code:								DOLT				
MCB-EM2							UNIVE	:RSII/	AT BONN			
1. Content and inten	nded	l learning ou	tcomes									
Content		The following	g contents	will k	be covere	ed by the practic	al:					
		 Nuc 	leic Acid P	urific	ation							
		• Cell	Culture Te	echnio	ques							
		• Cell	Transfecti	on								
		• Gen	ie Expressi	on St	udies							
		• Mic	roscopic Ir	nagin	g Techni	ques						
		• Fluc	prescence-	based	d imaging	5						
		 Opt 	ogenetics									
Learning outcomes				•	-	ghts into how to		-				
						ethods and gain	experienc	e in plai	nning and			
0 T 	performing experiments independently.											
2. Teaching and learning methods												
		Type of	т	opic		Language of	Group	Weekl contac	Workload			
		instruction	I	opic		instruction	size	time	l lhi			
	Practical Optogenetics English								150			
		exercise		0		0 -		_				
3. Prerequisites for t	the i	module							•			
compulsory		Participation	in basic m	nodule	es MCB-F	21 - MCB-P5 (mi	n. 3 out of	5 succe	ssfully/pass),			
		successful pr	aticipation	n (pas	s) in MCI	B-MBC, and succ	cessful (pas	ss) MCB	-XM			
recommended												
4. Degree program a	lloc	ation										
			Stud	y pro	gram		compulso	ory/	Semester			
							elective		a ust u			
		IVI	lolecular C	ell Bio	ology (IVI.	.SC.)	electi	ve	2 (1 st time			
									frame)			
5. Requirements for	tho	award of cr	odits (FCT	[5]					6. Credits			
Required achievements		Regular parti			practical	exercise			5 ECTS			
Assessment (incl.	5	Graded pract	-			excitoise			5 2010			
weighting) and					0							
examination language												
7. Frequency			ation									
Winter semester		Winter and s		3 credit	hours p	er week (SWS)						
Summer semester		semester										
Module coordination	n											
Teacher		Prof. Dr. Dag	mar Wach	ten								
Module coordinator		Prof. Dr. Dag	mar Wach	ten								
Institute/Department		Innate Immu										
Further information				,								
(Reading lists, information links etc.)												

Module Title:		of the Col										
Molecular Biol Module ID/Code: MCB-EM3	ogy	of the Cel	I				UNIVE	RSIT	ÄT <mark>BONN</mark>			
1. Content and inte	endeo	learning ou	tcomes									
Content	chact			will h		ed by the praction	- اد					
content			culture te			the process						
				-		ation of culture	d colls					
1			transfecti		-		u cens					
			ckdown o									
						imaging of fluo	rescent nr	ntoins ii	n cells			
		-			-		-					
Learning outcomes	Analysis of protein localization, interactions and dynamics in living cells The practical course will provide insights into advanced techniques used in molecular											
Learning outcomes	cell biology. The students should learn methods and gain experience in planning and											
	performing experiments independently.											
2. Teaching and learning methods												
								Week	ly			
		Type of instructionTopicLanguage of instructionGroup sizeWorkload (ontact										
		Instruction	time									
		Practical exercise										
3. Prerequisites for	r the	module						<u> </u>				
compulsory			in basic n	nodule	es MCB-P	91 - MCB-P5 (mi	n. 3 out of	5 succe	ssfully/pass),			
		-				B-MBC, and suce						
recommended												
4. Degree program	alloc	ation										
			Stud	ly pro	gram		compulso elective	ory/	Semester			
		M	lolecular C	ell Bio	ology (M.	Sc.)	electi	ve	2 (3 rd time			
									frame)			
5. Requirements for	or the	award of cr	edits (EC	TS)					6. Credits			
Required achievement	nts	Regular part				exercise			5 ECTS			
Assessment (incl.		Graded prac	tical repor	t in Er	nglish							
weighting) and												
examination languag	e											
7. Frequency	1		8. Workload 9. Duration									
Winter semester		Winter and s	summer			150 h	3 credit	hours p	er week (SWS)			
Summer semester		semester										
Module coordinati	on											
Teacher		Prof. Dr. Diet	ter O. Fürs	st								
Module coordinator		Prof. Dr. Diet	ter O. Fürs	st								
Institute/Departmen	t	Cell Biology	(Biology)									
Further informatio	n											
(Reading lists,	-											
information links etc.	.)											

Module Title:												
Mechanical Str	ress	Protection	า									
Module ID/Code:												
MCB-EM4							UNIVE	:RSII/	AT BONN			
1. Content and inte	endeo	l learning ou	tcomes									
Content		The following	g contents	will b	e covere	ed by the practic	al:					
		• Cell	Culture Te	chnic	ques							
		-	ression of R			Proteins						
			tein Purifica									
			erentiation									
						as an Exercise M						
						east-2-Hybrid Sy	stem					
	 Microscopic Imaging Techniques Analysis of Protein Degradation Pathways 											
Learning outcomes			-		_	onstantly subjec	ted to stre	ss resul	ting from			
			-			ach advanced bi			-			
						anisms that pro			-			
						s are fundamen						
2 T a b b b b b b b b b b	•		d for the m	ainte	enance o	f tissues such as	skeletal m	nuscle a	nd heart.			
2. Teaching and lea	arning	g methods						Maak				
	Type of Language of Group Weekly contact Workload											
		instruction		pic		instruction	size	time	i ihi			
		Practical	Meth	nods	in	English	20	35 h	90 h			
		exercise	Mechan	ical S	Stress							
			Prot									
		Seminar	Mechan Prot			English	20	10 h	60 h			
3. Prerequisites for	r tha	modulo	PIOL	ectio	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,							
compulsory			in hasic m	odule	es MCB-F	21 - MCB-P5 (mii	n 3 out of	5 succe	ssfully/nass)			
compulsory		-				B-MBC, and succ						
recommended		·	•		•		••					
4. Degree program	alloc	ation										
			Study	' proį	gram		compulso elective	ory/	Semester			
		M	olecular Ce	ell Bio	ology (M.	Sc.)	electi	ve	2 (3 rd time			
									frame)			
5. Requirements fo	ar the	award of ar	odite (ECT	5)					6. Credits			
Required achievements		Regular parti	•		nractical	exercise			5 ECTS			
Assessment (incl.		Graded pract	•									
weighting) and			-1		5 -							
examination languag	e											
7. Frequency	-				8. \	Norkload		9. Dur				
Winter semester		Winter and s	summer			150 h	3 credit	hours p	er week (SWS)			
Summer semester		semester		_								
Module coordinati	on											
Teacher		Prof. Dr. Jörg										
Module coordinator		Prof. Dr. Jörg										
Institute/Department Cell Biology (Biology)												

Module Title: Mechanical Stress Module ID/Code: MCB-EM4	Protection	UNIVERSITÄT BONN
Further information		
(Reading lists, information links etc.)		

Module Title:									
Neuronal Cell I	Biolo	ogv							
Module ID/Code:		07							
MCB-EM5							UNIVE	ERSITA	T BONN
1. Content and inte	endeo	l learning ou	Itcomes						
Content				will k	be covere	ed by the praction	cal:		
			uronal cell			, ,			
			nsfection o						
			nunocytoc						
			prescent N		•				
			e Cell Micro						
			ole Tissue	-	-	iaues			
Learning outcomes						ghts into advance	ed technic	ques use	d in neuronal
-				-	-	n methods and		-	
		performing e	experimen	ts ind	ependen	itly.			
2. Teaching and lea	arning	g methods							
		Type of				Language of	Group	Weekl	y Workload
		instruction	Т	opic		instruction	size	contac	t [h]
							6 40 h		
	Practical Neuronal Cell Biology English								150
		exercise							
3. Prerequisites for	rtne							F	()
compulsory		•				P1 - MCB-P5 (mi B-MBC, and suce			1.1 1.
recommended		successiul pi	анстранот	i (pas		D-IVIDC, allu suci	Lessiui (pa	SS) IVICD-	-7141
4. Degree program	alloc	ation							
- Degree program	anoc		Stud	y pro	gram		compulso	orv/	Semester
			5100	y pro	Brann		elective	,, y,	Jemester
		N	Iolecular C	ell Bio	ology (M.	.Sc.)	electi	ve	2
					07 (/		_	
5. Requirements for	or the	award of cr	edits (EC	ΓS)					6. Credits
Required achievemen	nts	Regular part	icipation ir	n the	practical	exercise			5 ECTS
Assessment (incl.		Graded prac	tical repor	t (50 s	%) and o	ral examination	(50 %)		
weighting) and		in English							
examination languag	e				1				
7. Frequency					8. \	Workload		9. Dura	
Winter semester		Winter and s	summer			150 h	3 credit	hours p	er week (SWS)
Summer semester		semester							
Module coordinati	on								
Teacher		Prof. Dr. Wa	lter Witke,	Prof.	Dr. Fran	k Bradke (DZNE)		
Module coordinator		Prof. Dr. Wa	lter Witke						
Institute/Departmen	t	Genetics (Bio	ology)						
Further informatio	n								
(Reading lists,									
information links etc.	.)								

Module Title:									
Transportphys	iolo	gy							
Module ID/Code:									
MCB-EM6							UNIVE	RSIIA	T BONN
1. Content and inte	endeo	d learning ou	tcomes						
Content					-	of plant environ			
			-			be studied. Exp			
						on plants, plan nental approach	-		
					-	measurement			
						nalysis of gene			
						vill be conducte	-	-	
Learning outcomes					-	hts into moder	-		
					-	idents should le			
				nd gai	n experie	ence in planning	g and perfo	orming ex	periments
2 Teeshing and les		independent	ily.						
2. Teaching and lea	arning	g methods						Maakk	
		Type of	т	opic		Language of	Group	Weekly contact	Workload
		instruction		opic		instruction	size	time	[h]
		Practical	Transpo	rtphys	siology	English	2	40 h	150
		exercise	-			_			
3. Prerequisites for	r the	module							
compulsory		Participation	in basic m	nodule	es MCB-P	1 - MCB-P5 (mi	n. 3 out of	5 succes	sfully/pass),
		successful pr	aticipation	n (pas	s) in MCE	B-MBC, and suc	cessful (pa	ss) MCB-2	KM
recommended									
4. Degree program	alloc	ation					1.		_
			Stud	y pro	gram		compulso	ory/	Semester
		N	olecular C		Nony (M	Sc)	elective electi	10	
		IV	Plant Sc			30.)	electi	ve	2 (3 rd time
					(M.Sc.)				frame)
5. Requirements for	or the	award of cr			(6. Credits
Required achieveme		Regular part		-	oractical	exercise			5 ECTS
Assessment (incl.		Graded writt							
weighting) and									
examination languag	e								
7. Frequency	1				8. \	Vorkload		9. Dura	
Winter semester		Winter and s	summer			150 h	3 credit	hours pe	r week (SWS)
Summer semester		semester							
Module coordinati	on								
Teacher		Prof. Dr. Luk							
Module coordinator		Prof. Dr. Luk							
Institute/Departmen		Cellular and	Molecular	Botar	າy (Biolo	gy)			
Further informatio	n					-			
(Reading lists, information links etc	.)					logy. Sinauer As nstein K. Plant E			

Module Title:										
Pharmacology	& N	letabolisn	ו							
Module ID/Code: MCB-EM7							UNIVE	RSIT	ÄT <mark>BONN</mark>	
1. Content and inte	nder	l learning ou	tromes							
Content	mact			will h	ne covere	d by the practic	al.			
content			-			olation and cult				
			nan adipod	-			are			
1			-	-		n of experiment	tal model s	vstem		
			 Ex vivo and in vitro metabolic measurements (including oxygen consumptio 							
		ene	rgy expend	diture	e, lipolysis	s, mitochondrial				
Learning outcomes		Data collection, analysis and interpretation This module is dedicated to understanding and investigating how small molecular							l molecular	
		modulators can be used to specifically target prominent metabolic pathways using								
		the mouse as an experimental animal model. Attendees will be introduced to murine								
		animal handling, murine primary adipocyte isolation and <i>in vivo, ex vivo</i> and <i>in vitro</i>								
		pharmacological experimentation with the model system. The practical work will be								
		supported by seminars covering, among other, signal transduction, metabolism and								
2. Teaching and lea	orning	-	pharmacology.							
		Type of Language of Group Weekly Workload								
		instruction							ct [h]	
		Practical exercise	Molecu	lar Bi	ology	English	6	40 h	150	
3. Prerequisites for	r the	module								
compulsory		-				21 - MCB-P5 (mi B-MBC, and succ				
recommended			·		•		••	<u>.</u>		
4. Degree program	alloc	ation								
			Stud	y pro	gram		compulso elective	ory/	Semester	
		Μ	olecular C	ell Bio	ology (M.	Sc.)	electi	ve	2	
5. Requirements for									6. Credits	
Required achievemer	nts	Regular parti	-			exercise			5 ECTS	
Assessment (incl. weighting) and	_	Graded prac	tical report	t in Er	nglisn					
examination language	e				0 1	Norkland		9. Dur	ation	
7. Frequency		Minton and			ō. V	Norkload	2 and 11			
Winter semester Summer semester		Winter and s semester	unner			150 h	5 creait	noursp	er week (SWS)	
Module coordinati		Jennester		[
Teacher		Prof. Dr. Alex	ander Pfe	ifer						
Module coordinator		Prof. Dr. Alex								
Institute/Department	t	Pharmacolog			w (Madic	rine)				
Further informatio					sy (ivieulo					
(Reading lists, information links etc.	,									

Module Title:										
Plant Transforma	tion									
Module ID/Code:										
MCB-EM8						UNIVE	ERSITA	T BONN		
1. Content and intend	ed learning ou	utcomes								
Content	The practica	l lab exerc	ise on	plant ex	pression system	ns will focu	s on techi	niques of		
	-			-	ploying differen					
			-		ces involve diffe					
		ransformation protocols. The most relevant techniques will be prese								
		ab course. Laboratory techniques in modern cell biology, microscopy and								
		visualization. Skills for documentation and presentation of scientific experime								
1		data. Dislictio transformation of plants (loof diago) with reporter constructs. As								
Learning outcomes		Biolistic transformation of plants (leaf discs) with reporter constructs, Agrobac								
		mediated transformation, cloning in Escherichia coli and <i>Agrobacterium tumefaciens</i> screening of transgenic lines, detection of transgenes by PCR, histochemical and								
	biochemical methods.									
2. Teaching and learni		incentous.								
0 0							Weekly			
	Type of	r l	Горіс		Language of	Group size	contact	Workload		
	instruction	instruction instruction						[h]		
	Practical	Plant tra	nsfor	mation	English		40 h	150		
	exercise									
3. Prerequisites for the	e module									
compulsory					P1 - MCB-P5 (mi					
	successful p	raticipatio	n (pas	s) in MC	B-MBC, and suce	cessful (pa	ss) MCB-X	M		
recommended										
4. Degree program allo	ocation									
		Stud	y pro	gram		compulso	ory/	Semester		
						elective				
	N	1olecular C	ell Bio	ology (M	.Sc.)	electi	ve	2		
5. Requirements for th	e award of cr	odits (FC)	LC)					6. Credits		
Required achievements		euits (LC	13)					5 ECTS		
Assessment (incl.	Graded prac	tical renor	t in Fr	nglish				5 2015		
weighting) and				101101						
examination language										
7. Frequency				8. \	Workload		9. Durat	ion		
Winter semester	Winter and	summer			150 h	3 credit	hours per	week (SWS)		
Summer semester	semester						-			
Module coordination										
Teacher	Prof. Dr. Pet	er Dörmar	n							
Module coordinator	Prof. Dr. Pet	er Dörman	n							
Institute/Department	Molecular P	hysiology a	and Bi	otechno	logy of Plants (B	iology)				
Further information										
(Reading lists,										
information links etc.)										

Module Title:		_									
Quantitative F	luor	escence N	licrosco	ру							
Module ID/Code:							UNIVE	UNIVERSITÄT BONN			
MCB-EM9											
1. Content and inte	endeo	-									
Content			-			ed by the practio					
					•	sion of fluoresce	ent protein	IS			
			SNAP-, Halo, Clip-tag labelling								
		-	Super resolution confocal laser scanning microscopy								
			Fluorescence recovery after photobleaching (FRAP)								
			Analysis of intracellular protein mobility								
		Förster resonance energy transfer (FRET) measurements									
		Quantitative image analysis									
			3D image reconstruction								
Learning outcomes		The practical course will provide insights into advanced light microscopy techniques									
	used in molecular cell biology. The students should learn methods and gain experience in planning and performing experiments independently.										
2 Tooching and los	ornin	-	n planning	and	bertormi	ng experiments	independe	entiy.			
2. Teaching and lea	arrint	smethous						Mash			
		Type of	-	onic		Language of	Group	Week conta	· Workload		
		instruction	instruction Topic instruction						l lhl		
		Lecture	Lecture Microscopy and English					time 6 h	30		
		Image Processing					6				
		Practical		ntitat		English	3x2	34 h	120		
		exercise	Fluo	rescei	nce						
			Mic	rosco	ру						
3. Prerequisites for	r the	module									
compulsory		-				P1 - MCB-P5 (mi					
		successful pr	aticipatio	ו (pas	s) in MC	B-MBC, and suce	cessful (pa	ss) MCB	-XM		
recommended											
4. Degree program	alloc	ation						- 1			
			Stud	y pro	gram		compulso elective	ory/	Semester		
		N	olecular C	ell Bio	ology (M	.Sc.)	electi	ve			
5. Requirements for		award of cr	edits (EC	ΓS)					6. Credits		
Required achievement	nts								5 ECTS		
Assessment (incl.		Graded prac	tical repor	t in Ei	nglish						
weighting) and	0										
examination languag 7. Frequency	,c				0 1	Workload		9. Dur	ation		
Winter semester		Winter and	ummer		0.	150 h	2 are dit				
Summer semester		Winter and s semester	unnier			130 11	5 creat	nours p	er week (SWS)		
Module coordinati		Semester		I							
Teacher		Prof. Dr. Ulri	ch Kubitca	hock							
Module coordinator		Prof. Dr. Ulri				Changi ta à					
Institute/Departmen		Physical and	Iheoretic	al Che	emistry ((Lnemistry)					
Further informatio	on						- nd				
(Reading lists, information links etc	.)	Fluorescence U. Kubitsche		py: Fi	rom Prin	ciples to Applica	ition, 2 [™] e	dition, V	Wiley-VCH, ed.		

Module Title:	nd (Dioonaluti									
Biochemistry a		bioanaiyu	LS .								
Module ID/Code: MCB-EM10							UNIVE	ERSITÄ	T BONN		
1. Content and inte	andor	learning ou	tromes								
Content	inact			ofa	nalytical	biochemistry w	ith focus o	n nrotein	hiochemistry		
content						of protein-prote					
		bioactivity as			,		, 0				
		• Exp	ression of r	econ	nbinant j	proteins in E. co.	li				
		Prot	 Protein purification and analysis (MALDI-TOF, SDS-PAGE) 								
		• Bind	 Binding studies (e.g. UV/Vis, MST, ITC, BLITZ) 								
		 Acti 	 Activity studies (chromogenic/fluorogenic assays) 								
		• Enzy	Enzyme kinetics and enzyme/protein regulation								
Learning outcomes			he students will develop in-depth knowledge and practical exercise regardin								
			modern techniques and methods in biochemistry and bioanalytics, gain experien planning and performing experiments, and evaluate original literature independe								
A T I II	•		performin	g exp	periment	s, and evaluate	original lite	erature ir	dependently.		
2. Teaching and lea	arning	g methods				[
		Type of	т	onic		Language of	Group	Weekly	Workload		
		instruction	instruction Topic instruction					contact time	[h]		
		Practical	Biochemistry and						130		
		Seminar	exercise Bioanalytics English					4 h	20		
		Seminar						411	20		
3. Prerequisites for	r the	module									
compulsory			in hasic m	odule	s MCB-F	P1 - MCB-P5 (mi	n 3 out of	5 succes	sfully/nass)		
company						B-MBC, and suce					
recommended		·			,	·					
4. Degree program	alloc	ation									
			Study	/ pro	gram		compulso elective	ory/	Semester		
		M	olecular Ce	ell Bio	logy (M	.Sc.)	electi	ve			
5. Requirements for	or the	award of cr	edits (ECT	S)					6. Credits		
Required achievement	nts								5 ECTS		
Assessment (incl.			ical report	(70 9	%) and se	eminar presenta	ition (30 %)			
weighting) and	_	in English									
examination languag	e				0 1	Markland		0. Dura	tion		
7. Frequency		8. Workload 9. Duration									
Winter semester Summer semester		Winter and summer150 h3 credit hours per week (SWsemester							r week (SWS)		
		Semester									
Module coordinati	011	Drof Dr. Di	n Inchaf D		ni Kölet						
Teacher		Prof. Dr. Diar		vr. 10	ni kuni						
Module coordinator		Prof. Dr. Diar	na imnof								
Institute/Departmen		Pharmacy									
Further informatio	n										
(Reading lists, information links etc.	.)										

Module Title:											
Molecular Me	mbra	ane Biolog	SY								
Module ID/Code:											
MCB-EM11							UNIVE	RSII	AT BONN		
1. Content and inte	endeo	d learning ou	Itcomes				•				
Content		The followin	g contents	are t	ypically o	covered by the p	oractical:				
		Cell	culture wi	th ma	acrophag	ses and epithelia	al cells				
		 Sub 	cellular fra	ction	ation and	d biochemical a	nalysis of f	ractions			
		• Me	Membrane purification								
		• Me	 Membrane fusion with purified components 								
			Gene expression knock-down with siRNA								
			 Fluorescence microscopy 								
			 Computer-assisted image analysis 								
Learning outcomes			The practical course will provide insights into advanced techniques used in molecu								
U			cell biology. The students should learn current methods and gain experience in								
	planning and performing experiments.										
2. Teaching and lea	arnin	g methods									
		Type of				Language of	Group	Weekl	y Workload		
		instruction	Т	opic		instruction	Group size	contac			
		mstruction						time			
		Practical	Molecula			English	6	60 h	100		
		exercise	Bi	ology							
		Seminar						20 h	50		
		and lectures									
3. Prerequisites fo	r tha							l			
compulsory	i the		in hasic m	odula	SE MCB-D	91 - MCB-P5 (mi	in 3 out of	5 50000	sefully/pass)		
compulsory		-				B-MBC, and such					
recommended		successiaipt		1 (pus	<i>sj</i> in me.			557 1102			
4. Degree program	alloc	ation									
			Stud	y pro	gram		compulso	orv/	Semester		
				1 10.00	5		elective	. ,,			
		N	Iolecular C	ell Bio	ology (M.	.Sc.)	electi	ve	2		
5. Requirements for	or the	award of cr	edits (ECT	S)					6. Credits		
Required achieveme	nts								5 ECTS		
Assessment (incl.				•		l grade) and gra	ded semin	ar			
weighting) and		presentation	1 (30% of fi	nal gr	ade) in E	nglish					
examination languag	je						1				
7. Frequency		r			8. ۱	Norkload		9. Dur	ation		
Winter semester		Winter and s	summer			150 h	3 credit	hours p	er week (SWS)		
Summer semester		semester									
Module coordinati	ion										
Teacher		Prof. Dr. Alb	ert Haas								
Module coordinator		Prof. Dr. Alb	ert Haas								
Institute/Departmen	t	Cell Biology	Institute (B	liolog	y)						
Further informatio	n										
(Reading lists,											
information links etc	.)										

Module Title:									
Bioinformatics	Lab	Course							
Module ID/Code:									
MCB-EM12							UNIVE	ERSIT/	AT BONN
1. Content and inte	endeo	d learning ou	tcomes						
Content		Practical intr	oduction t	o alg	orithmics	, bio-databases	, modelling	g, progra	amming
Learning outcomes		Application of	priented ba	asic k	nowledge	e of bioinformat	ic method:	s	
2. Teaching and lea	arning	g methods							
		Type of instruction	Т	opic		Language of instruction	Group size	Week contac time	t Workload
		Practical Bioinformatics English exercise					40 h	150	
3. Prerequisites for	r the	module							
compulsory			in basic m	nodul	es MCB-F	91 - MCB-P5 (mi	n. 3 out of	5 succe	ssfully/pass),
		successful pr	aticipation	n (pas	s) in MCI	B-MBC, and suce	cessful (pas	ss) MCB	-XM
recommended									
4. Degree program	alloc	ation							
			Stud	y pro	gram		compulso elective	ory/	Semester
		M	olecular C	ell Bio	ology (M.	Sc.)	electi	ve	2
5. Requirements for	or the	award of cr	edits (EC	rs)					6. Credits
Required achievement	nts								5 ECTS
Assessment (incl. weighting) and		Graded prac	tical repor	t in Ei	nglish				
examination languag	e								
7. Frequency					8. ۱	Norkload		9. Dur	ation
Winter semester Summer semester		Winter and s semester	summer			150 h	3 credit	hours p	er week (SWS)
Module coordinati	on								
Teacher		Prof. Dr. Ma	rtin Hofma	inn-A	oitius				
Module coordinator		Prof. Dr. Ma							
Institute/Departmen	t	B-IT-Center (Informatics)							
Further informatio				,					
(Reading lists, information links etc.									

Module Title:									
Embryo Biotechno	ology								
Module ID/Code:	07								
MCB-EM13						UNIVE	ERSITA	T BONN	
1. Content and intende	ed learning ou	Itcomes							
Content	 gene trar 	nsfer techn	iques	- mamm	nalian and bird e	embryos, fi	sh, inver	ebrates,	
	-	stem, soma	-						
					d culture of emb		omanipu	lation,	
	-				clei, microinject	-			
		-		-	on, expression a		-		
		etic proper		s - gene i	unction, animal	models, re	Compine	int proteins,	
Learning outcomes				ansgenig	c animals; insigh	t into use	of transg	enic animals	
				-	ogical applicatio				
2. Teaching and learning	-				<u> </u>				
					leneur	Charles	Weekly		
	Type of	Type of Topic Language of instruction				Group size	contact	Workload [h]	
						3120	time	[11]	
		Practical Embryo English					40 h	150	
	exercise	Bioteo	chnol	ogy					
3. Prerequisites for the			<u> </u>				_	<u></u>	
compulsory					P1 - MCB-P5 (mi				
recommended	successful pr	aticipation	i (pas	s) in MC	B-MBC, and suce	cessful (pas	SS) IVICB-	XIVI	
4. Degree program allo	cation								
		Stud	y pro	gram		compulso	orv/	Semester	
		otaa	1 0.02	5.4		elective	.,,	Jennester	
	N	Iolecular Ce	ell Bic	ology (M.	.Sc.)	electi	ve	2	
				• • •	·				
5. Requirements for th	e award of cr	edits (ECT	'S)					6. Credits	
Required achievements								5 ECTS	
Assessment (incl.	Graded prac	tical report	t in Er	nglish					
weighting) and									
				0 1			0 Dura	tion	
examination language			8. Workload 9. Dur						
7. Frequency	Winter and	ummor		0.1		2 crodit			
7. Frequency Winter semester	Winter and s	summer		0. 1	Norkload 150 h	3 credit			
7. Frequency Winter semester Summer semester	Winter and s semester	summer		0.1		3 credit			
7. Frequency Winter semester □ Summer semester ☑ Module coordination	semester					3 credit			
7. Frequency Winter semester Summer semester Module coordination Teacher	semester PrivDoz. Dr	. Michael F	Hölkei	r		3 credit			
7. Frequency Winter semester □ Summer semester ☑ Module coordination Teacher Module coordinator	semester PrivDoz. Dr PrivDoz. Dr	. Michael F . Michael F	Hölkei	r		3 credit			
7. Frequency Winter semester Summer semester Module coordination Teacher Module coordinator Institute/Department	semester PrivDoz. Dr	. Michael F . Michael F	Hölkei	r		3 credit			
7. Frequency Winter semester □ Summer semester ☑ Module coordination Teacher Module coordinator	semester PrivDoz. Dr PrivDoz. Dr	. Michael F . Michael F	Hölkei	r		3 credit		r week (SWS)	

Module Title:										
Drugs from Pla	nts	and Micro	organisn	ns						
Module ID/Code:			- 0							
MCB-EM14						UNIVE	ERSITA	T BONN		
1. Content and inte	endeo	d learning ou	tcomes							
Content				of physiol	ogically active na	tural produ	ucts: isola	ation and		
					s (HPLC, TLC, GC					
		antibiotics, d	etection of g	genes for bi	osynthetic pathy	vays, recor	nbinant	drugs,		
		production a	nd mode of	action of cl	nemotherapeutic	s.				
Learning outcomes		The students	s get an over	view of stru	ictures and biosy	nthesis of	natural p	products, the		
			ourse provides knowledge of molecular biological analysis and identification of							
		biosynthesis	genes, enzy	mes and pr	oteins.					
2. Teaching and lea	arning	g methods								
		Type of			Language of	Group	Weekly	Workload		
		instruction	Тор	pic	instruction	size	contact	[h]		
					time					
		Practical	Drugs fro		English		36 h	120		
		exercise and Microorga		organisms						
	-		Seminar				4 h	30		
3. Prerequisites for	r the									
compulsory		-			P1 - MCB-P5 (mi					
		successful pr	aticipation (pass) in MC	B-MBC, and succ	cessful (pas	ss) MCB-2	M		
recommended										
4. Degree program	alloc	cation				F	,	_		
			Study	orogram		compulso	ory/	Semester		
				Diele en (N		elective		2		
		IVI	olecular Cell	BIOIOGY (IV	I.SC.)	elective		3		
C. Doquiromonto fo			adite (FCTC	1				6 Cradita		
5. Requirements for		award of cr	ealts (ECTS)					6. Credits		
Required achievement	nts	Cradad prad	tical roport (24.0/)	en examination	(22.0/) com	ninor	5 ECTS		
Assessment (incl. weighting) and		presentation		•	en examination	(33 %), sen	ninar			
examination languag	þ	presentation	(55 /0) III EII	Ignsn						
7. Frequency				8.	Workload		9. Dura	tion		
Winter semester		Winter and s	summer .		150 h	3 credit	hours pe	r week (SWS)		
Summer semester		semester					•	. ,		
Module coordinati	on									
Teacher		Dr. Stefan Ke	hraus							
Module coordinator		Dr. Stefan Ke	hraus							
Institute/Departmen	t	Pharmaceuti		Pharmacv)						
Further informatio										
(Reading lists,										
information links etc										

Module Title:										
Biosyntheses of	of Na	atural Proc	lucts							
Module ID/Code:										
MCB-EM15							UNIVERSITÄT BONN			
1. Content and inte	ende	d learning ou	tcomes							
Content				ure an	d biosyn	thesis of natura	al products	, analysis	and	
						tic pathways, en				
		molecular m	ethods (P C	CR, ele	ctropho	resis, blotting te	echniques).			
Learning outcomes			-			ctures and biosy				
						ular biological a	nalysis and	l identific	ation of	
		biosynthesis	genes, en	zymes	and pro	oteins.				
2. Teaching and lea	arnin	g methods				I				
		Type of	_			Language of	Group	Weekly	WORKIOAD	
		instruction	Т	opic		instruction	size	contact	[h]	
		Due etient	D:		(En allah		time		
		Practical exercise	Biosyr Natura			English		36 h	120	
		Seminar		iucis		4 h		30		
		Jerninar						411	50	
3. Prerequisites fo	r the	module						I		
compulsory			in basic m	nodule	es MCB-F	P1 - MCB-P5 (mi	n. 3 out of	5 success	sfully/pass),	
		successful pr	aticipatior	n (pas	s) in MCI	B-MBC, and suce	cessful (pas	ss) MCB->	M	
recommended										
4. Degree program	allo	cation								
			Stud	y prog	gram		compulso	ory/	Semester	
							elective	elective		
		M	olecular C	ell Bic	ology (M.	.Sc.)	electi	elective		
5. Requirements for		e award of cro	award of crodits (ECTS)							
Required achieveme									6. Credits	
•	nts		-						6. Credits 5 ECTS	
Assessment (incl.	nts		ical repor	t (34 %		en examination	(33 %), ser	ninar		
Assessment (incl. weighting) and		Graded pract presentation	ical repor	t (34 %		en examination	(33 %), ser	ninar		
Assessment (incl. weighting) and examination languag			ical repor	t (34 %	h		(33 %), sen		5 ECTS	
Assessment (incl. weighting) and examination languag 7. Frequency	e	presentation	ical repor (33 %) in	t (34 %	h	Workload		9. Dura	5 ECTS	
Assessment (incl. weighting) and examination languag 7. Frequency Winter semester	e V	presentation Winter and s	ical repor (33 %) in	t (34 %	h			9. Dura	5 ECTS	
Assessment (incl. weighting) and examination languag 7. Frequency Winter semester Summer semester	e V	presentation	ical repor (33 %) in	t (34 9 Englis	h	Workload		9. Dura	5 ECTS	
Assessment (incl. weighting) and examination languag 7. Frequency Winter semester Summer semester Module coordinati	e V	presentation Winter and s semester	ical repor (33 %) in ummer	t (34 9 Englis	h	Workload		9. Dura	5 ECTS	
Assessment (incl. weighting) and examination languag 7. Frequency Winter semester Summer semester Module coordinati Teacher	e V	presentation Winter and s semester Dr. Stefan Ke	ical repor (33 %) in ummer hraus	t (34 9 Englis	h	Workload		9. Dura	5 ECTS	
Assessment (incl. weighting) and examination languag 7. Frequency Winter semester Summer semester Module coordinati Teacher Module coordinator	e 2 on	Winter and s semester Dr. Stefan Ke Dr. Stefan Ke	ical repor (33 %) in ummer hraus hraus	t (34 9 Englis	6 8. \	Workload		9. Dura	5 ECTS	
Assessment (incl. weighting) and examination languag 7. Frequency Winter semester Summer semester Module coordinati Teacher	e D ion t	presentation Winter and s semester Dr. Stefan Ke	ical repor (33 %) in ummer hraus hraus	t (34 9 Englis	6 8. \	Workload		9. Dura	5 ECTS	
Assessment (incl. weighting) and examination languag 7. Frequency Winter semester Summer semester Module coordinati Teacher Module coordinator Institute/Departmen	e D ion t	Winter and s semester Dr. Stefan Ke Dr. Stefan Ke	ical repor (33 %) in ummer hraus hraus	t (34 9 Englis	6 8. \	Workload		9. Dura	5 ECTS	

Module Title:								
Proteomics								
Module ID/Code:								
MCB-EM16						UNIVE	ERSIT	ÄT BONN
1. Content and intended	d learning ou	tcomes						
Content			harac	torisation	n using mass spe	octrometry	Analys	is of post-
content	translational					cuomeny	. Anarys	
Learning outcomes					d characterise p	roteins fro	m tissue	es of
-			-		del organisms.			
2. Teaching and learning	g methods							
	Type of				Language of	Group	Week	y Workload
	instruction	Г	Горіс		instruction	size	conta time	fh]
	Drastical	Dractical English						
	exercise	Practical English						150
	CACILISE							
3. Prerequisites for the	module						1	
compulsory		in basic m	nodule	es MCB-P	21 - MCB-P5 (mi	n. 3 out of	5 succe	ssfully/pass),
. ,					B-MBC, and succ			
recommended								
4. Degree program allo	ation							
		Stud	ly pro	gram		compulso elective	ory/	Semester
	M	lolecular C	ell Bio	ology (M.	Sc.)	electi	ve	3
5. Requirements for the	e award of cr	edits (EC	TS)					6. Credits
Required achievements								5 ECTS
Assessment (incl. weighting) and	Graded prac	tical repor	t in Er	nglisn				
examination language								
7. Frequency				8. \	Norkload		9. Dur	ation
Winter semester	Winter and s	summer			150 h	3 credit	hours p	er week (SWS)
Summer semester	semester							
Module coordination								
Teacher	PrivDoz. Dr	. Simone D	Dieste	l, Dr. Ma	rc Sylvester (Mc	lecular Bic	ology, M	edicine)
Module coordinator	PrivDoz. Dr	. Simone D	Dieste	I				
Institute/Department	Human Nutr	ition and F	ood S	cience (A	Agriculture)			
Further information								

Module Title: Preventive, Pred Module ID/Code:	lictive and P	cine							
MCB-EM17					UNIVE	ERSITAT	BONN		
1. Content and inten	ded learning ou	utcomes							
Content	diseases, applications introduct	on of modern b	oiotechnol ular and n	ive diagnostics i ogies in medica ninimally invasiv ic biomarkers.	l diagnosti	cs,			
Learning outcomes	complica metaboli metaboli examples stress an role and zymogra patholog real-time analysis o written s	 complications secondary to Diabetes mellitus type II, metabolic pathways affected in pathomechanisms of neurodegenerative diseases, metabolic pathways affected in pathomechanisms of selected tumors, using the examples of glioblastoma and breast cancer, stress and repair mechanisms (comet assay technology), role and evaluation of tissue remodelling-protein complexes (technology of zymography), pathology specific expression patterns (technologies of clinical proteomics and real-time PCR), 							
2. Teaching and learn	ning methods	•							
	Type of instruction	Торіс	:	Language of instruction	Group size	Weekly contact time	Workload [h]		
	Practical exercise Seminar	Preventive, Pr and Person Medicir	alised	English	8	36 h 4 h	120 30		
3. Prerequisites for t									
compulsory				P1 - MCB-P5 (mi B-MBC, and suce					
recommended									
4. Degree program al	liocation	C			a province of the		Comenter:		
		Study pro			compulso elective		Semester		
	N	1olecular Cell B	iology (M.	.Sc.)	electi	ve	2		
5. Requirements for t	the award of cr	edits (ECTS)					6. Credits		
Required achievements							5 ECTS		
Assessment (incl. weighting) and examination language		ctical report (60 n (20 %) in Engli	-	en examination	(20 %), ser	minar			
7. Frequency	·		8. \	Norkload		9. Durat	ion		
	Winter and semester	summer 🗌		150 h	3 credit	hours per	week (SWS)		
Module coordination			1		I				
Teacher		a Golubnitscha	ja						
	8								
Module coordinator	Prof. Dr. Olg	a Golubnitscha	ia						

Module Title: Preventive, Predict Module ID/Code: MCB-EM17	ive and Personalised Medicine	UNIVERSITÄT BONN
Further information		
(Reading lists, information links etc.)		

Module Title:										
Cell Mechanics										
Module ID/Code: MCB-EM18				UNIVE	RSITÄT	BONN				
1. Content and intend	ded learning ou	tcomes								
Content	substrate condition Mechanic elasticity differentia the influe analysis o Mechanic cellular be	 Mechanical functions of the cell: live cell imaging and immunocyt substrate deformation and cellular force analysis of animal cells u conditions and at different stages of cellular differentiation; Mechanical properties of the cell: atomic force microscopy (AFM) elasticity of cells under various conditions and at different stages differentiation, high-resolution visualization of cytoskeletal struct the influence of selective mechanical stimuli on the induction of c analysis of cellular viscoelasticity in the context of molecular mob Mechanical signals recognized by the cell: evaluation of parameter cellular behavior and differentiation – substrate stiffness, substrat topography – including morphological and functional tests. 								
Learning outcomes	well as receiv pivotal role b cell migration differentiation signals within mechanosen experimental of chemical a cellular force adhesion and the cell itself, tissue. These cellular differ through the p Since virtually the evaluatio	are continuously in cont ve signals. In addition to by regulating a plethora of a adhesion, formation of on. The aim of this modu a animal organisms in or sitive processes. This co- l setups, which are design and mechanical signals in s required for the function a migration, are analyzed , animal cells also react of signals may induce min rentiation or vectored mis parameters substrate ela y every mechanical ever in of these parameters co	chemical signal of essential cellu of multicellular s ile is to exactly a rder to elucidate ncept will help t gned close to th nust be used. To ion of each individ. In addition to to mechanical s or adaptations and are asticity, topogra- thas an impact	s, mechani ular functio tructures, analyze the the functi co understa e in vivo sit o characteri vidual cell i the mecha ignals from as well as n e more clos aphy, and e t on cell vis	cal signals ins like em morpholog diverse m oning of w and that in uation, a d ize cellular n processe unical force the surro najor proc sely invest nvironmel cosity and	a play a hbryogenesis, gy, and hechanical videspread combination r mechanics, es of es induced by unding esses of igated ntal stretch. l elasticity,				
	Type of instruction	Торіс	Language of instruction	Group size	Weekly contact time	Workload [h]				
	Practical exercise		English		40 h	150				
3. Prerequisites for th	ne module		l	l						
compulsory	Participation	in basic modules MCB-F aticipation (pass) in MCI	•							
recommended										
4. Degree program al	location									
		Study program		compulso elective	ory/	Semester				
	M	olecular Cell Biology (M.	.Sc.)	electi	ve	3				
	he every of the					C Cualita				
5. Requirements for t Required achievements		ealts (ECIS)				6. Credits 5 ECTS				
Assessment (incl.		ical report in English				J ECI 3				
					I					

Module Title:				
Cell Mechanics				
Module ID/Code:				UNIVERSITÄT BONN
MCB-EM18				UNIVERSITAT BUNN
weighting) and				
examination language				
7. Frequency			8. Workload	9. Duration
Winter semester	Winter and summer		150 h	3 credit hours per week (SWS)
Summer semester 🛛 🔽	semester			
Module coordination				
Teacher	PrivDoz. Dr. Bernd Hof	ffmar	าท	
Module coordinator	PrivDoz. Dr. Bernd Hof	ffmar	าท	
Institute/Department	Complex Sytems (FZ Jüli	ich)		
Further information				
(Reading lists,				
information links etc.)				

Module Title:								
Biochemical Er	ngine	eering						
Module ID/Code:	.9							
MCB-EM19						UNIVE	ERSIT	AT BONN
1. Content and inte	endeo	l learning ou	tcomes					
Content		The students	work in a labor	atory en	vironment in th	e scientific	groups	of the
		-	involved in the		-			
Learning outcomes			rimental work i	n the lab	oratory			
2. Teaching and lea	arning	g methods				1		1
		Type of instruction	Торіс		Language of instruction	Group size	Weekl contac time	workload
		Practical exercise				40 h	150	
3. Prerequisites for	r the	module						
compulsory			in basic module aticipation (pas		•			
recommended			i	-			-	
4. Degree program	alloc	ation						
			Study pro	gram		compulso elective	ory/	Semester
		M	olecular Cell Bio	ology (M.	Sc.)	electi	ve	2
5. Requirements for		award of cr	edits (ECTS)					6. Credits
Required achievement	nts	Cradad prac	tical rapart in Fr	alich				5 ECTS
Assessment (incl. weighting) and examination languag	Δ	Graded pract	tical report in Er	IBII2II				
7. Frequency		I		8. \	Vorkload		9. Dura	ation
Winter semester Summer semester		Winter and s semester	summer		150 h	3 credit		er week (SWS)
Module coordinati						1		
Teacher		Prof. Dr. Mai	co Oldiges					
Module coordinator		Prof. Dr. Mai	-					
Institute/Departmen	t		sciences (FZ Jül	ich)				
Further informatio			•					
(Reading lists, information links etc	.)							

Module Title:										
Fluorescent Pr	otei	n-based B	iosenso	ors						
Module ID/Code:								DOLT	ä – 🗖	
MCB-EM20							UNIVE	:RSII	AI <mark>B</mark>	ONN
1. Content and int	ended	d learning ou	tcomes							
Content		Expression o	f recombii	nant p	oroteins i	n <i>E. coli</i> ; spectra	al characte	rization	of pu	rified
				-		nsgenic plants; i			-	
			-	•	-	v cloning; transie				
					sed bios	ensors in tobace	co; membr	ane isol	ation	and
	protein protection assaysrning outcomesGeneration and validation of genetically encoded biosensors; application of GFP-									
Learning outcomes					-	-				
based probes for dynamic in vivo measurements of physiological parameters and for										
the analysis of membrane proteins 2. Teaching and learning methods										
Z. Teaching and lea	arning	g methods				[1	14/	b .	
		Type of	-	-onio		Language of	Group	Week conta		Vorkload
	instruction Topic instruction									[h]
		Practical	Fluoresc	ent P	rotein-	English	4	time 40 h		150 h
		exercise	based			8				20011
3. Prerequisites fo	r the	module					1	1		
compulsory		Participation	in basic m	nodule	es MCB-F	91 - MCB-P5 (mi	n. 3 out of	5 succe	ssfully	r/pass),
		successful pr	aticipatio	n (pas	s) in MCI	B-MBC, and suc	cessful (pa	ss) MCB	S-XM	
recommended										
4. Degree program	alloc	ation								
			Stud	y pro	gram		compulso	ory/	Se	mester
							elective			
		M	lolecular C	ell Bio	ology (M.	.Sc.)	electi	ve		3
5. Requirements fo				rc)					6	Credits
Required achieveme		1	-		ractical	avaraisa				ECTS
Assessment (incl.	nts	regular partie	-			exercise			5	ECIS
weighting) and		graueu pract	lical report		Iglisti					
examination languag	ē									
7. Frequency	-	1			8. \	Norkload		9. Dur	ation	
Winter semester		Winter and s	summer			150 h	3 credit	hours p	er we	ek (SWS)
Summer semester		semester						•		
Module coordinat	on									
Teacher		Prof. Dr. And	lreas Meye	er						
Module coordinator		Prof. Dr. And	lreas Meye	er						
Institute/Departmen	t		-		Conserva	tion (Agricultur	e)			
Further information										
(Reading lists,										
information links etc										

Module Title:												
Genome Stabil	litv											
Module ID/Code:	,											
MCB-EM21			UNIVERSITÄT BONI									
1. Content and inte	endeo	learning ou	arning outcomes									
Content		_		will b	e covere	ed by the praction	al:					
	 Nucleic Acid Purification 											
		 Protein P 	urification									
		 Microsco 	pic Imagin	g Tecl	hniques							
 Southern Blot analysis 												
 Yeast genetics 												
	 Molecular cloning techniques arning outcomes The practical course will provide insights into advanced techniques used in molecular 											
Learning outcomes												
						ology. The stude						
		of the currer			ig experi	ments independ	aentiy and	set them	into context			
2. Teaching and lea	arnin			e								
		- methous						Weekly				
		Type of	т	opic		Language of	Group	contact	Workload			
		instruction	•	opic		instruction	size	time	[h]			
		Practical	Telome	ere Bio	ology	English	4 - 6	40 h				
		exercise										
3. Prerequisites for	r the	module										
compulsory			in basic m	nodule	es MCB-F	91 - MCB-P5 (mi	n. 3 out of	5 success	sfully/pass),			
						B-MBC, and suce						
recommended												
4. Degree program	allo	ation										
			Stud	y pro	gram		compulse	ory/	Semester			
							elective					
		M	lolecular C	ell Bio	ology (M.	.Sc.)	electi	ve	2			
5. Requirements for									6. Credits			
Required achievement	nts	regular parti				exercise			5 ECTS			
Assessment (incl.		graded pract	ical report	: in En	iglish							
weighting) and												
examination languag 7. Frequency	e				8 1	Norkload		9. Dura	tion			
Winter semester		Winter and s	ummor		0.	150 h	2 crodit		r week (SWS)			
Summer semester		semester	summer			130 11	s creat	nours pe	I WEEK (SVVS)			
Module coordinati				1			I					
Teacher		Prof. Dr. Kati	rin Paesch	ke								
Module coordinator		Prof. Dr. Kati	rin Paesch	ke								
Institute/Departmen	t	Haematolog	y/Oncolog	y (Me	dicine)							
Further informatio	n											
(Reading lists,												
information links etc	.)											

Module Title:			_			
Reconstructive N	leurobiolog	y (Molecular tools	s for stem			
and developmen	ital biology)			UNIVE	RSITÄ	BONN
Module ID/Code:						
MCB-EM22						
1. Content and intend	ded learning ou	itcomes				
Content	The followin	g contents will be covere	d by the praction	al:		
		itegies to generate mous		e investiga	tion of	
		rodevelopmental proces				
		lecular mechanisms unde			ination	
		rinsic factor-driven differe	-	-		
		ced expression of transcr ward programming appro	-	na use of s	mail mole	ecules for
		ect conversion of somatic		al stem cel	ls	
		neration of 3D cortical org			15	
		netically engineered repo		ns for ima	ge-based	phenotype
		lysis	0 /		0	. ,.
	• Prin	ciples of primer design a	nd construct er	gineering	for settin	g up
	-	notype-specific reporter	-			
		roscopy of 2D and 3D cul	ltures (light she	et, bright f	ield, high	content and
		prescence)	_			
Learning outcomes		nunofluorescence imagin practical course students		the mole	sular mos	hanisms
		he development of the ce				
		bout tools used in mouse				
	-	ıman stem cell biology. Ir	-		-	-
	generation o	of iPS cells and their gene	tic modification	via genom	ne editing	
		sful participation, attende			-	
		Illy addressing questions		se develop	omental b	iology,
		cell biology and genome ill design gRNAs for CRIS	-	oditing on		we to
		nome editing efficiency. F		-		
	-	ng analysis, perform imm		-		-
	-	ain sections and analyze		-		-
		In addition, students get	-	-		
		g, learn to establish 3D co	-	-		
	-	sed analyses of cellular (p				-
		reporter assays. A particu but also limitations of the			cussion of	the
2. Teaching and learn				iniques.		
2. reaching and learn					Weekly	
	Type of	Торіс	Language of	Group	contact	workload
	instruction	- 1 +	instruction	size	time	[h]
	Practical	Experimental	English	10	40 h	150 h
	exercise	neurobiology and				
		stem cell biology				
3. Prerequisites for th						
compulsory		in basic modules MCB-P				
	successful pr	raticipation (pass) in MCB	B-MBC, and succ	essful (pa	ss) MCB-X	M
recommended	leastier					
4. Degree program al	location	C+		oo maa sa da		Consector
		Study program		compulso elective	ory/	Semester
	Γ.Λ.	lolecular Cell Biology (M.	Sc)	elective	ve	2
		Letter and the property (191.		ciccti		£

Module Title: Reconstructive and developme Module ID/Code: MCB-EM22		urobiology (Mole I biology)	cula	ar tools for stem	UNIVERSIT	ÄT BONN	
5. Requirements fo	or the			6. Credits			
Required achievemer	nts	regular participation in	the p	practical exercise	5 ECTS		
Assessment (incl.		Graded, oral presentat	ion of	f a recent high-impact pu	blication in		
weighting) and		English					
examination language	e						
7. Frequency				8. Workload	9. Du	ration	
Winter semester		Winter and summer		150 h	3 credit hours	per week (SWS)	
Summer semester		semester					
Module coordinati	on						
Teacher		Prof. Dr. Oliver Brüstle	; Prof	. Dr. Sandra Blaess			
Module coordinator							
Institute/Department	t						
Further informatio	n						
(Reading lists,							
information links etc.)						

Module Title:										
Applications of Cr	ispR/Cas to	o study	neu	ronal	function					
Module ID/Code:							RSIT	ÄT BONN		
MCB-EM23										
1. Content and intende										
Content		-			ed by the course	:				
		pr/Cas bac	•	•						
					eurobiological re	•	cture)			
					of viral vectors (lecture)				
					(practical)					
		paration o culture (p			(practical)					
				-	Crispr/Cas (fluo	rescence ir	maging	multi-		
	 Analysis of cells edited with Crispr/Cas (fluorescence imaging, multi- electrode array recordings, time lapse imaging, luciferase) (practical) 									
Learning outcomes		e course will provide an introduction into the usage of Crispr/Cas and the								
		neration of viral vectors in neurobiological research on a theoretical level, on a								
	-				on into data ana			,		
2. Teaching and learni	ng methods									
	Tune of				Language of	Crown	Week	ly Workload		
	Type of instruction	Т	opic		Language of instruction	Group size	conta	t [h]		
	Instruction						time	[11]		
	Practical						36 h	120		
	exercise	Cris	spr/Ca	as	English	4				
	Lectures				U		3 h	15		
	Seminars						1 h	15		
3. Prerequisites for the										
compulsory	-				P1 - MCB-P5 (mi					
	successful pr	aticipation	n (pas	s) in MCI	B-MBC, and succ	cessful (pas	ss) MCB	-XM		
recommended										
4. Degree program allo	Deation	<u> </u>					,			
		Stud	y pro	gram		compulso	ory/	Semester		
		olecular C			Sc)	elective electiv		2		
	10			JOBA (IM	.30.)	electi	ve	Z		
5. Requirements for th	e award of cr	odits (FC1	rs)					6. Credits		
Required achievements	regular parti	-	-	ractical	exercise			5 ECTS		
Assessment (incl.					ind graded semi	nar		5 2015		
weighting) and	presentation				Brace sellin					
examination language		()	0							
7. Frequency				8. \	Workload		9. Dur	ation		
							hours p	er week (SWS)		
Winter semester	Winter and s	summer	Summer semester							
Winter semester		ummer								
Winter semester		summer								
Winter semesterImage: Constraint of the semesterSummer semesterImage: Constraint of the semesterModule coordination	semester									
Winter semesterImage: Summer semesterSummer semesterImage: Semester	semester Prof. Dr. Ina	Vorberg ([DZNE)		(Neuropatholog	y)				
Winter semesterImage: Constraint of the semesterSummer semesterImage: Constraint of the semesterModule coordination	semester Prof. Dr. Ina Prof. Dr. Sus	Vorberg (E anne Scho	DZNE) ch Mo	Govern	(Neuropatholog ne Schoch McGo					
Winter semesterImage: Constraint of the semesterSummer semesterImage: Constraint of the semesterModule coordinationTeacher	semester Prof. Dr. Ina Prof. Dr. Sus	Vorberg (E anne Scho Vorberg, P	DZNE) ch Mo Prof. D	Govern						
Winter semesterImage: Constraint of the semesterSummer semesterImage: Constraint of the semesterModule coordinationTeacherModule coordinatorImage: Constraint of the semester	semester Prof. Dr. Ina Prof. Dr. Sust Prof. Dr. Ina	Vorberg (E anne Scho Vorberg, P	DZNE) ch Mo Prof. D	Govern						
Winter semesterImage: Constraint of the semesterSummer semesterImage: Constraint of the semesterModule coordinatorInstitute/Department	semester Prof. Dr. Ina Prof. Dr. Sust Prof. Dr. Ina	Vorberg (E anne Scho Vorberg, P	DZNE) ch Mo Prof. D	Govern						

Module Title:										7	
Methods in De	velo	pmental-	and Tu	moi	rpatho	ology					
Module ID/Code:									ÄT <mark>BO</mark>	MM	
MCB-EM24											
1. Content and inte	endeo										
Content			-			molecules (RNA)					
	reverse transcription PCR, gene specific PCR reactions, quantitative real-time PCR, gel electrophoresis, quantitative real time PCR and end point PCR data analysis,										
		-	-			ybridization (ISI			-		
		sequence da	•			•	<i>i))</i> i ugine	int sequ	61161116)		
Learning outcomes		-	-		-	asic and advance	ed techniq	ues in n	nolecular		
_		biology	-								
2. Teaching and lea	arning	g methods									
		Type of				Language of	Group	Week		rkload	
		instruction	Т	opic		instruction	size	conta	ct	[h]	
				in D			0	time			
		Practical exercise	Methods mental-			English	8	38 h	5	90 h	
		exercise		holog							
		Seminar	Develop			English	8	4 h	6	50 h	
			Tumor			0					
3. Prerequisites fo	r the	module									
compulsory		Participation	in basic m	nodule	es MCB-F	P1 - MCB-P5 (mii	n. 3 out of	5 succe	ssfully/p	ass),	
		successful pr	aticipation	n (pas	s) in MCl	B-MBC, and succ	essful (pa	ss) MCB	-XM		
recommended											
4. Degree program	alloc	ation									
			Stud	y pro	gram		compulso	ory/	Seme	ester	
		N				Sc)	elective				
		IV	lolecular C		ology (IVI.	.3(.)	electi	ve	2		
5. Requirements for	or the	award of cr	edits (EC	rs)					6. Cre	edits	
Required achieveme		regular parti		-	oractical	exercise			5 EC		
Assessment (incl.		graded pract									
weighting) and											
examination languag	e										
7. Frequency					8. \	Workload		9. Dur	ation		
Winter semester		Winter and s	summer			150 h	3 credit	hours p	er week	(SWS)	
Summer semester		semester									
Module coordinati	on										
Teacher		Prof. Dr. Hub	ert Schorl	е							
Module coordinator		Prof. Dr. Hub		e							
Institute/Departmen		Pathology (N	1edicine)								
Further informatio	n										
(Reading lists,											
information links etc	.)										

Module Title: Molecular Hae	ematology							
Module ID/Code: MCB-EM25					UNIVE	ERSITÄT	BONN	
1. Content and inten	ded learning ou	tcomes						
Content	- Identifica	tion of patients	coagulat	ion disorders:				
	a. Coa assa b. DN/ - Investiga character a. Clor mut gen by c b. Rep cell mar	 a. Coagulation assays (e.g. whole blood and plasma-based global coassays, detection of coagulation factor inhibiting antibodies) b. DNA preparation from blood, PCR, Sanger sequencing and analysi Investigation of the identified mutation by several strategies in order to characterize the phenotype: a. Cloning of target cDNA into a vector by restriction-free cloning PC mutagenesis PCR, transfection and expression in mammalian cell genetically modified cell lines (CRISPR/Cas9), analysis of the muta by coagulation based assays (e.g. ELISA) 						
Learning outcomes	The aim of th different me strategies to provides kno DNA analysis	tein modelling c nis module is to thods. The stud investigate spe wledge about c s, cell culture, ce	identify a ents will cific muta current te	and further cha learn how to pl ations on DNA a chniques used	racterize p an a projec and proteir in molecula	ct and deve n level. The ar biology	elop several course	
2. Teaching and lear	ning methods							
	Type of instruction	Торіс		Language of instruction	Group size	Weekly contact time	Workload [h]	
	Practical exercise	From patient t phenotype characterizatic		English	6	40 h	80 h	
3. Prerequisites for t								
compulsory		in basic module aticipation (pas		•				
recommended	llocation							
4. Degree program a		Study pro	gram		compulso elective	ory/	Semester	
	N	lolecular Cell Bio	ology (M.	Sc.)	electi	ve		
5. Requirements for	the award of cr	edits (ECTS)					6. Credits	
Required achievement: Assessment (incl. weighting) and examination language	s regular parti	cipation in the p ical report in Er		exercise			5 ECTS	
7. Frequency			8. V	Vorkload		9. Durat	ion	
	Winter and ssemester	summer		150 h	3 credit	hours per	week (SWS)	

Module Title: Molecular Haem Module ID/Code: MCB-EM25	atology	UNIVERSITÄT BONN
Module coordination		
Teacher	Dr. Katrin Czogalla-Nitsche	
Module coordinator	Prof. Dr. Johannes Oldenburg	
Institute/Department	Experimental Haematology and Transfusion Medicine	(Medicine)
Further information		
(Reading lists, information links etc.)		

Module Title:									
Rotation 1									
Module ID/Code:									
MCB-EM91							UNIVER	rsität	BONN
1. Content and inte	ndeo	l learning ou	itcomes						
Content				n lab	oratory	environment in	the scientifi	groups	of the
Content		departments			-		the selenting	6 8. 0 a p 3	or the
Learning outcomes		Guided expe							
2. Teaching and lea	rning	g methods							
		Type of instruction	Тс	opic		Language of instruction	Group size	Weekly contact time	vvorkioad
	-	Practical exercise	indi	vidua	al	individual	40 h	240	
3. Prerequisites for	the I	module							
compulsory		Participation	in basic m	odul	es MCB-	P1 - MCB-P5 (m	nin. 3 out of !	5 success	fully/pass),
		successful pr	aticipatior	ı (pas	ss) in MO	CB-MBC, and suc	ccessful (pas	s) MCB-X	(M
recommended									
4. Degree program	alloc	ation					1		
			Study	/ pro	gram		compulsory elective	//	Semester
		M	olecular Ce	ell Bio	ology (M	.Sc.)	electiv	e	
5. Requirements for		award of cr	edits (EC	ΓS)					6. Credits
Required achievemen	ts								8 ECTS
Assessment (incl. weighting) and examination language	2								
7. Frequency	Ł				8. \	Workload		9. Durat	ion
Winter semester Summer semester		Winter and s semester	summer			240 h			
Module coordinatio	on		I						
Teacher		Teachers of t	he progra	m					
Module coordinator		Dr. Karl Pete							
Institute/Department		Molecular Physiology and Biotechnology of Plants (Biology)							
Further information			,						
(Reading lists, information links etc.)									

Module Title:											
Rotation 2											
Module ID/Code: MCB-EM92							UNIVE	UNIVERSITÄT BONN			
1. Content and inte	ondo	d learning ou	itcomos								
	enue						the estautifi		af the a		
Content		The students work in an laboratory environment in the scientific groups of the departments involved in the study program.									
Learning outcomes		Guided experimental work in the laboratory									
2. Teaching and lea	arnin		innentar v	VOIRI		Joratory					
	a	_						Weekly			
		Type of Topic		Language of		Group	contact	Workload			
		instruction	Topic			instruction	size	time	[h]		
		Practical	indi	ividua	al	English	individual	40 h	240		
		exercise				0					
3. Prerequisites fo	r the										
compulsory											
successful praticipation (pass) in MCB-MBC, and successful (pass) MCB-XM							M				
recommended											
4. Degree program	allo	cation									
		Study program compulsory/						<i>\</i> /	Semester		
	Molecular Cell Biology (M.Sc.)					elective	-				
	IVI		electiv	e							
5 Requirements fo	or the	award of cr	odits (FC	тс)					6. Credits		
5. Requirements for the award of credits (ECTS) Required achievements								8 ECTS			
Assessment (incl.	1113								0 2015		
weighting) and											
examination languag	e										
7. Frequency					Norkload	9. Duration					
Winter semester		Winter and s	summer								
Summer semester		semester									
Module coordinati	ion										
Teacher	Teachers of the program as teachers and/or examiners										
Module coordinator	Dr. Karl Peter Linscheid										
Institute/Departmen	Molecular Physiology and Biotechnology of Plants (Biology)										
Further informatio		- *									
(Reading lists,											
information links etc	.)										

r							1					
Module Title: Project/Exchange Module ID/Code: MCB-PE								UNIVERSITÄT BONN				
1. Content and int	ende	d learning ou	utcomes									
Content												
Learning outcomes												
2. Teaching and lea	arnin	g methods										
		Type of instruction	Торіс			Language of instruction	Group size	Weekly contact time		Workload [h]		
		Practical	Project ind	/Exch lividua		English	Individual	40		360		
3. Prerequisites fo	r the	module										
compulsory		Successful participation in basic modules MCB-P1 - MCB-P5, MCB-MBC, and MCB-XM; min. 60 credit points accumulated from previous examinations										
recommended												
4. Degree program allocation												
			compulsory/ elective			Semester						
		M	electiv	elective		3						
5. Requirements for		e award of cr	edits (EC	CTS)					(5. Credits		
Required achieveme	nts									12 ECTS		
Assessment (incl. weighting) and examination languag	ge											
7. Frequency						9. Duration						
Winter semester Summer semester		Winter and s semester	summer			360 h						
Module coordinat	ion											
Teacher	Teachers of the program											
Module coordinator		Dr. Karl Peter Linscheid										
Institute/Departmen	Molecular Physiology and Biotechnology of Plants (Biology)											
Further informatio												
(Reading lists, information links etc	.)											

Module Title:										
Master Thesis										
Module ID/Code:										
Module ID/Code: MCB-MT							UNIVERSITÄT BONN			
1. Content and intended	d learning ou	itcomes								
Content			ne fin	al nart o	f the studies. Th	ne students v	vork in	a laboratory		
Content	The Master Thesis is the final part of the studies. The students work in a laboratory environment in the scientific groups of the departments involved in the study									
	program. Their work usually contributes to a project leading to a scientific publication.									
	Towards the end of the semester, the students present their results in a seminar.									
Learning outcomes	The previously acquired knowledge and skills are to be practically applied in the									
	context of a	well-defir	ied sc	ientific p	oroblem.					
2. Teaching and learning	g methods					Γ	· .	-		
	Type of	onia		Language of	Group	Week conta	vvorkioad			
	instruction	Topic instruction		instruction	size	time	ih1			
	Project	Maste	er pro	iect	English	Individual	40	720		
	Thesis			,	211811311	project		150		
	Seminar							30		
3. Prerequisites for the	module									
compulsory recommended	min. 78 cred	-			dules MCB-P1 - rom previous ex					
4. Degree program allo	cation					[. 1			
		Study program com elec						Semester		
		Molecular Cell Biology					compulsory			
5. Requirements for the award of credits (ECTS)								6. Credits		
Required achievements	having submitted the thesis in time and given the presentation 30 ECTS									
Assessment (incl.	Graduation dissertation in English assessed by two referees									
weighting) and										
examination language 7. Frequency				8 1	Norkland		9. Dura	tion		
Winter semester	Winter and summer		8. Workload 900 h							
Summer semester	semester	unner			500 H					
Module coordination	Semester									
Teacher	Postdoctoral	Postdoctoral (habilitated) teachers of the program								
Module coordinator	Prof. Dr. Walter Witke									
Institute/Department	Genetics (Biology)									
Further information										
(Reading lists, information links etc.)	Rogers (2007): Mastering Scientific and Medical Writing. Springer, Berlin, Heidelberg https://rd.springer.com/book/10.1007/978-3-540-34508-4									