

[E1.16]	Molecular Biosciences	Compulsory elective module	6 CP (total) = 180 h				4 SWS
			Contact hours 4 SWS / 60 h		Independent study 120 h		
Content							
<p>In this module, four lectures from the field of molecular biosciences must be taken. The lectures deal with different molecular aspects of biology.</p> <p>The following eight lectures can be attended:</p> <p><u>Genome Function & Gene Regulation:</u> Molecular genetics and molecular biology of archaeal and bacterial model species. Genome and regulation of gene expression at different levels, metabolic regulation. Modern methods of molecular genetics, molecular biology, biochemistry, microbiology and cell biology.</p> <p><u>Molecular & Applied Microbiology:</u> The focus is on teaching the molecular basis of the adaptation of microbes to their environment, signal recognition and signal transmission through to the regulation of transcription and enzyme activity</p> <p><u>Plant Biochemistry:</u> The lecture deals with the biochemistry of the chloroplasts, metabolic flows and their regulation, as well as the bioenergetics of photosynthetic organisms.</p> <p><u>RNA Biology:</u> Contents of this lecture include chemical structure and conformation of RNA building blocks, secondary and tertiary structure of RNA, regulatory RNA elements in prokaryotes, RNA-based mechanisms in eukaryotes, structure and function of RNA-based molecular machines using the example of the ribosome and spliceosome.</p> <p><u>Biosynthesis of Natural Substances:</u> In this module, the students receive a functional overview of secondary substances. One focus is on the biosynthetic pathways that lead to polyketides and peptides, but also to other classes of natural products (alkaloids, terpenes, phenylpropanoids). Typical reaction processes are discussed as examples. Additional content includes gene cloning and genetic metabolic modifications in various organisms.</p> <p><u>Molecular Cell Biology and Biochemistry of Eukaryotic Systems:</u> The course include the cell biology of higher eukaryotes with a focus on the topics of intracellular mass transport and membrane biology, as well as the cellular biochemistry of eukaryotes using mammalian cells, yeasts and plants as examples. Special focus areas are signal transport and its specificities in the various systems, protein transport in cells from synthesis to degradation, material fluxes in the cell and across the membrane, and organelle and protein complex dynamics.</p> <p><i>Four lectures must be chosen.</i></p>							
Learning outcomes and skills							
Upon completion of this module, students will have an overview of a spectrum of specific aspects of plant biochemistry, microbiology and molecular biology. This special knowledge helps the students in the preparation of seminar papers and in the search for a research field.							
Admissions requirements/Conditions for participation in the module/courses							
None							
Recommended prior knowledge							
None							
Organizational details							
Partial import module of the master's degree in biosciences. The registration and cancellation deadlines of the regulations for the Bachelor's degree in Biochemistry apply.							
Module allocation (degree programme/faculty)			Master Molecular Biosciences / FB15				
Eligibility of the module for other courses			Master Biochemistry / FB14				
Module offered			summer semester				
Duration			1 semester				
Module coordinator			Prof. Büchel				
Course requirements for credits							
Participation record							
Coursework			Exam for each lecture (30 min. each)				
Forms of teaching / learning			lecture				
Language teaching and instruction			English				
Module assessment			Form / duration / content, if applicable				
Final module assessment			None				
Cumulative module assessment consisting of							
Composition of the module grade for cumulative module assessment							
		Mode of teaching / study	Semester hours per week	Semester CP			
				1	2	3	4
		Genome function & gene regulation	L	1	1.5		
		Molecular and applied microbiology	L	1	1.5		
		Plant biochemistry	L	1	1.5		
		RNA biology	L	1	1.5		
		Biosynthesis of natural products	L	1	1.5		

Molecular cell biology and biochemistry of eukaryotic systems	L	1		1.5		
TOTAL		4		6		