

<b>Title of the module</b>	<b>Bacterial genomics and biodiversity</b>		
<b>Term/semester</b>	Summer term / 2		
<b>VAK-Number</b>	Will be assigned centrally		
<b>Credit points</b>	6 ECTS		
<b>Compulsory/ elective course</b>	Elective course		
<b>Teaching methods</b>	<b>Method</b>	<b>SWS</b>	<b>CP</b>
	Lecture	1 (14 h)	1.5
	Seminar	2 (28 h)	1.1
	Practical course	4 (56 h)	2
<b>Self study</b>	protocols	20 h	
	preparation of the talk	30 h	
	learning for the exam	32 h	
<b>Module representative</b>	Prof. B. Reinhold-Hurek		
<b>Instructor</b>	Prof. B. Reinhold-Hurek, Dr. A. Krause		
<b>Examiner</b>	Prof. B. Reinhold-Hurek		
<b>Objectives</b>	Increase theoretical knowledge on bacterial signal transduction cascades. Increase knowledge on bacterial genetics and bioinformatic genome analysis, learn strategies for high-throughput directional mutagenesis and reporter gene studies, learn strategies for overexpression of recombinant proteins and mass-spectrometric protein identification. Increase skills in enrichment and identification of diverse bacteria.		
<b>Content of teaching</b>	The course is research-oriented, each student will work on his own construct / gene/ bacterium. Bacterial signal transduction cascades, genome analysis, biological nitrogen fixation and principles of mutational analysis will be covered theoretically. <i>Experiments include:</i> <ul style="list-style-type: none"> <li>• Mutational analysis: Gene inactivation by insertional mutagenesis in <i>Azoarcus</i> sp. (PCR, cloning, conjugation), analysis of the mutation (Southern blot analysis), expression analysis using transcriptional reporter gene studies (fluorescence microscopy).</li> <li>• Protein identification: Overexpression of recombinant proteins in <i>E. coli</i> and purification (SDS-PAGE, affinity chromatography), protein-protein-interaction assays, identification of proteins (MALDI-TOF analysis).</li> <li>• Biodiversity: Enrichment and isolation of pure cultures of selected bacterial groups starting already in previous course (Environmental and applied microbiology), identification by 16S rDNA sequence analysis (preparation of genomic DNA, PCR, Sanger sequencing, bioinformatic analysis).</li> </ul>		
<b>Educational objectives</b>	<ul style="list-style-type: none"> <li>• Ability to deeply understand the contents of the topics above</li> <li>• Ability to design and to carry out above-mentioned experimental strategies with appropriate controls.</li> </ul>		
<b>Evaluation of learning progress</b>	Seminars and protocols		
<b>Assessment</b>	Seminar talk (30%); protocol (20%); oral examination (50%)		
<b>Frequency</b>	Every summer term		
<b>Usage in other degree programmes</b>	The module is suitable for all master students in the BMB-program, eligible for the specialization "Microbial Systems" and also suitable for diploma students.		
<b>Requirements</b>	Successful participation in the modules A and B		