

<b>Module Name</b> Functional Genomics						
<b>Identification Number</b>	<b>Workload</b>	<b>Credit Points</b>	<b>Term</b>	<b>Offered Every</b>	<b>Start</b>	<b>Duration</b>
MN-BC-GSM03	360 h	12 CP	1 <sup>st</sup> or 2 <sup>nd</sup> term of studying	Summer term	summer term only	7 weeks
<b>1</b>	<b>Course Types</b>		<b>Contact Time</b>	<b>Private Study</b>	<b>Planned Group Size*</b>	
	a) Lectures		26 h	50 h	max. 12	
	b) Practical/Lab		150 h	100 h	max. 2	
	c) Seminar		4 h	30 h	max. 2	
<b>2</b>	<b>Module Objectives and Skills to be Acquired</b>					
	Students who successfully completed this module					
	<ul style="list-style-type: none"> <li>• have learned mechanisms of genome regulation in physiology and disease.</li> <li>• have acquired experimental skills in state-of-the art methods in genomics and epigenomics, transcriptomics and proteomics and can independently carry out small scientific projects related to the topic of the module.</li> <li>• have learned how to present research results in oral and written form and to critically discuss scientific publications related to the topic of the module on a professional level.</li> <li>• are able to transfer skills acquired in this module to other fields of biology.</li> </ul>					
<b>3</b>	<b>Module Content</b>					
	Using real-life examples from the fields of chromatin biology, epigenetics, gene regulation, DNA repair, protein homeostasis, circadian rhythms and neuronal circuits of obesity, the students get introduced to the following omics methodologies:					
	<ul style="list-style-type: none"> <li>• bisulfite sequencing, HiC, transcriptomics/ exome sequencing</li> <li>• ChIP, CLIP, polysome profiling</li> <li>• Illumina Sequencing, Nanopore sequencing, Sanger sequencing</li> <li>• DNA microarray</li> <li>• Genome editing and genetic engineering in different model systems, CRISPR-Cas9</li> <li>• Genetic screening approaches</li> <li>• Molecular Cloning</li> <li>• Proteomics methods</li> <li>• Machine learning, predictive modelling, multi-omics data integration</li> </ul>					
<b>4</b>	<b>Teaching Methods</b>					
	Lectures; Practical/Lab (Project work); Seminar; Guidance to independent research; Training on presentation techniques in oral and written form					
<b>5</b>	<b>Prerequisites (for the Module)</b>					
	Enrollment in the Master´s degree course “Biological Sciences” or in the Master´s degree course “Biochemistry and Molecular Medicine”.					
	<b>Additional academic requirements</b>					
	For Students of Master “Biological Sciences”: Previous attendance of the lecture module “Principles of Molecular Genetics, Development and Aging (A/D/G)”.					

Functional Genomics (MN-BC-GSM03) continued

6	<p><b>Type of Examination</b></p> <p>The final examination consists of two parts (Type BC1):</p> <p>Type 1: written examination on topics of lectures, seminars and the practical/lab part (1 hour; 50 % of the total module mark), oral presentation (20-30 min; 50 % of the total module mark)</p>
7	<p><b>Credits Awarded</b></p> <p>Regular and active participation; Passed seminar paper; Each examination part at least "sufficient" (see appendix of the examination regulations for details)</p>
8	<p><b>Compatibility with other Curricula*</b></p> <p>Biological subject module in the Master's degree course "Biological Sciences"</p>
9	<p><b>Proportion of Final Grade</b></p> <p>In the Master's degree course "Biochemistry and Molecular Medicine": 10 % of the overall grade (see also appendix of the examination regulations)</p>
10	<p><b>Module Coordinator</b></p> <p>Dr. Stephanie Panier, phone: +49 (0)221 379 70 591, e-mail: <a href="mailto:panier@age.mpg.de">panier@age.mpg.de</a></p>
11	<p><b>Further Information</b></p> <p><b>Participating faculty:</b> Dr. S. Panier, Dr. S. Steculorum, Dr. I. Huppertz, Dr. V. Piano, Dr. J. Reznick, Dr. A. Stangherlin, Dr. P. Antczak, Dr. S. Pöpsel, Dr. D. Trentini Schmidt, Dr. Z. Frentz, Dr. H. Oda, Dr. A. Annibaldi, Dr. O. Leidecker</p> <p><b>Literature:</b> Information about textbooks and other reading material will be given on the ILIAS representation of the course (<a href="https://www.ilias.uni-koeln.de/ilias/goto_uk_cat_2815610.html">https://www.ilias.uni-koeln.de/ilias/goto_uk_cat_2815610.html</a>)</p> <p><b>General time schedule:</b> Week 1 (Mon.-Fri.): Introduction to Functional Genomics (lectures), safety lecture and lab projects; Week 2-6 (Mon.-Fri.): Lectures, seminars and lab projects; Week 7 (Mon.-Fri.): Preparation for the written examination</p> <p><b>Note:</b> The module contains hand-on laboratory work conducted individually and is taught in research laboratories. The module does not contain computer-based practicals/research as a main component.</p>

\* 10 students from the Master's degree course "Biological Sciences" and 2 students from the Master's degree course "Biochemistry and Molecular Medicine".