

<b>Module Name</b> Computational Biology II						
<b>Type of Module</b> ○ Advanced Module				<b>Module Code</b> Computational Biology II		
<b>Identification Number</b> MN-B-SM (C 2)	<b>Workload</b> 360 h	<b>Credit Points</b> 12 CP	<b>Term</b> 2 <sup>nd</sup> term of studying	<b>Offered Every</b> Summer term, 2 <sup>nd</sup> half	<b>Start</b> Summer term only	<b>Duration</b> 7 weeks
<b>1</b>	<b>Course Types</b> a) Lectures b) Practical/Lab c) Seminar		<b>Contact Time</b> 18 h 99 h 12 h		<b>Private Study</b> 36 h 159 h 36 h	
<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 acquired detailed knowledge about the background of advanced methods in Bioinformatics and Computational Biology.</li> <li>• have gained insight into contemporary topics of bioinformatic and biostatistical research and application to high-throughput data analysis.</li> <li>• are able to use the above mentioned systems to analyse genome-scale data, conduct downstream analyses, and to interpret and document their research.</li> <li>• 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 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> <ul style="list-style-type: none"> <li>• Modern bioinformatic methods for genome, transcriptome and proteome data analysis</li> <li>• Multi-variate and high-dimensional data analysis</li> <li>• Advanced regression methods, such as regularized linear models</li> <li>• Application of these methods to molecular biology and for understanding disease mechanisms</li> <li>• Handling of Unix based computer systems</li> <li>• Scientific programming</li> </ul>					
<b>4</b>	<b>Teaching Methods</b> <ul style="list-style-type: none"> <li>• Lectures; Practical/Lab (Project work); Seminar; Guidance to independent research; Training on presentation techniques</li> </ul>					

5	<p><b>Prerequisites (for the Module)</b></p> <p>Enrollment in the Master's of Science degree course "Computational Biology" or in the Master's degree course "Biochemistry and Molecular Medicine"</p> <p><b>Additional academic requirements</b></p> <p>Previous attendance of the lecture module "Computational Biology (C)"; Basic programming skills in "R" are absolutely required for participation in the course. In cases of doubt, please contact the module coordinator (see 10).</p>
6	<p><b>Type of Examination</b></p> <p>The final examination consists of two parts: One hour written examination on topics of lectures, seminars and the practical/lab part (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; 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>Optional compulsory module in the Master's degree course "Biochemistry and Molecular Medicine"</p>
9	<p><b>Proportion of Final Grade</b></p> <p>12.0 %</p>
10	<p><b>Module Coordinator</b></p> <p>Prof. Dr. Andreas Beyer, phone 478 84429, e-mail: andreas.beyer@uni-koeln.de</p>
11	<p><b>Further Information</b></p> <p><b>Participating faculty:</b> Prof. Dr. A. Beyer, Prof. Dr. A. Tresch, Prof. Dr. K. Bozek</p> <p><b>Literature:</b></p> <ul style="list-style-type: none"> <li>• Information on recommended textbooks and other reading material will be given on the ILIAS representation of the course (see <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>)</li> </ul> <p><b>General time schedule:</b> Week 1-6 (Mon.-Fri.): Lectures, practical/lab, preparation for the seminar talk (topic and date will be arranged individually); Week 7 (Mon.-Fri.): Preparation for the written examination</p> <p><b>Note:</b> The module does not contain hands-on laboratory work. The module contains computer-based practicals/research as a main component, using RStudio Server Pro.</p> <p><b>Introduction to the module:</b> June 3, 2024 at 9:15 a.m., Center for Molecular Biosciences (COMB), Computer pool (ground floor); for preparation to the module before this introduction see ILIAS link under literature.</p> <p><b>Oral or written examination:</b> July 19, 2024, second/supplementary examination August 2, 2024; the latter date may vary if students and module coordinator agree. More details will be given at the beginning of the module.</p>