

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

5	<p>Prerequisites (for the Module)</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>Additional academic requirements</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>Type of Examination</p> <p>The final examination consists of two parts: Two hours 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>Credits Awarded</p> <p>Regular and active participation; Each examination part at least "sufficient" (see appendix of the examination regulations for details)</p>
8	<p>Compatibility with other Curricula*</p> <p>Optional compulsory module in the Master's degree course "Biochemistry and Molecular Medicine"</p>
9	<p>Proportion of Final Grade</p> <p>12.0 %</p>
10	<p>Module Coordinator</p> <p>Prof. Dr. Andreas Beyer, phone 478 84429, e-mail: andreas.beyer@uni-koeln.de</p>
11	<p>Further Information</p> <p>Participating faculty: Prof. Dr. A. Beyer, Prof. Dr. A. Tresch, Prof. Dr. K. Bozek</p> <p>Literature:</p> <ul style="list-style-type: none"> • Information on recommended textbooks and other reading material will be given on the ILIAS representation of the course (see https://www.ilias.uni-koeln.de/ilias/goto_uk_cat_2815610.html) <p>General time schedule: 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>Note: 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>Introduction to the module: April 13, 2026 at 09:00 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>Written examination: June 05, 2026, second/supplementary examination August 14, 2026; the latter date may vary if students and module coordinator agree. More details will be given at the beginning of the module.</p>