

Introduction to Bioinformatics						
Identification number	Workload	Credit points	Term of studying	Frequency of occurrence	Duration	
MN-B-SM (CG 1)	360 h	12 CP	1 <sup>st</sup> or 2 <sup>nd</sup> term of studying	Winter term, 1 <sup>st</sup> half	7 weeks	
1	Type of lessons		Contact times	Self-study times	Intended group size*	
	a) Lectures		45 h	90 h	max. 30	
	b) Practical/Lab		50 h	145 h	max. 30	
	c) Seminar		6 h	24 h	max. 10	
2	Aims of the module and acquired skills					
	Students who successfully completed this module ...					
	<ul style="list-style-type: none"> <li>• have acquired detailed knowledge about the fundamentals of bioinformatics and are able to perform simple bioinformatical analyses and related tasks on personal computers running the Linux operating system.</li> <li>• have become familiar with common bioinformatical algorithms, computational sequence analysis, knowledge extraction from biological databases, and the statistical evaluation of bioinformatical results.</li> <li>• know the kind of biological problems that can be solved with bioinformatical tools, can choose appropriate methods and judge the statistical and biological significance of the results.</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 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>					
3	Contents of the module					
	<ul style="list-style-type: none"> <li>• Computer operating system Linux</li> <li>• Programming with shell scripts and the statistical programming language R</li> <li>• Algorithms in bioinformatics</li> <li>• Sequence comparison and alignment</li> <li>• Biological databases (sequence databases, genome databases, functional databases)</li> <li>• Prediction of protein architecture (structure, domains, motifs, disorder)</li> <li>• Protein sequence analysis, domain detection, motif detection</li> <li>• Bioinformatical prediction of sequence function, localization, interaction, structure, etc.</li> <li>• Gene expression analysis (microarrays, RNA-Seq)</li> </ul>					
4	Teaching/Learning methods					
	<ul style="list-style-type: none"> <li>• Lectures; Practical/Lab (Project work); Seminar; Computer exercises; Guidance to independent research; Training on presentation techniques in oral and written form</li> </ul>					

5	<p><b>Requirements for participation</b></p> <p>Enrollment in the Master´s degree course "Biological Sciences"</p> <p><b>Additionally recommended:</b> Entry-level programming skills are necessary to participate in this module. They have to be proved in suitable form or can be obtained in a three days preparatory class (Tue. 01.10. – Fri. 04.10.19 from 9 a.m. to 1 p.m., seminar room S 234, COPT Building, Luxemburgerstr. 90). In cases of doubt, please contact the module coordinator (see 10) before choosing this subject module.</p>
6	<p><b>Type of module examinations</b></p> <p>The final examination consists of three parts: Two hour written examination about topics of the lectures and the practical/lab part (50 % of the total module mark), oral presentation (25 % of the total module mark) and seminar paper (weekly, aggregate to 25 % of the total module mark)</p>
7	<p><b>Requisites for the allocation of credits</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>Obligatory module in the 4 year´s Bachelor degree course "Quantitative Biologie"</p>
9	<p><b>Significance of the module mark for the overall grade</b></p> <p>In the Master´s degree course "Biological Sciences": 15 % of the overall grade (see also appendix of the examination regulations)</p>
10	<p><b>Module coordinator</b></p> <p>Prof. Dr. Thomas Wiehe, phone 470-1588, e-mail: <a href="mailto:twiehe@uni-koeln.de">twiehe@uni-koeln.de</a></p>
11	<p><b>Additional information</b></p> <p><b>Subject module</b> of the Master´s degree course "Biological Sciences", <b>Focus of research:</b> (C) Computational Biology; (G) Genetics and Cell Biology</p> <p><b>Participating faculty:</b> Prof. Dr. A. Beyer, Prof. Dr. K. Hofmann, Prof. Dr. T. Wiehe</p> <p><b>Literature:</b></p> <ul style="list-style-type: none"> <li>• Reviews and original papers will be handed out during the module</li> </ul> <p><b>General time schedule:</b> Weeks 1-6: Lectures and practical/lab and seminars (Mon., Tue., Wed., Fri. approximately 4 hours per day between 10 a.m. and 3:30 p.m., seminar room S 234, COPT Building, Luxemburgerstr. 90; more detailed information on the time schedule will be given during the introduction to the module) as well as preparation for the seminar talk and writing seminar paper; Week 7 (Mon.-Fri.): Preparation for the written examination</p> <p><b>Note:</b> The module contains hand-on computer work conducted individually and is taught in a computer course room.</p> <p><b>Introduction to the module:</b> October 07, 2019 at 10 a.m., seminar room S 234, COPT Building, Luxemburgerstr. 90 (ground floor).</p> <p><b>Written examination:</b> November 22, 2019, second/supplementary examination February 14, 2020; the latter date may vary if students and module coordinator agree. More details will be given at the beginning of the module.</p>