

Course Title: Data Analysis in the Life Sciences				
Module identification no.	Workload	Credit points	Frequency of occurrence	Duration
AM 07 a-d	180 hours	6	Winter term, 2 nd half	3 weeks
1	Type of lessons a) Lectures b) Practical/Lab	Contact times a) 22 hours b) 72 hours	Self-study times 86 hours	Intended group size 23 <small>including 8 from <i>Experimental and Clinical Neurosciences</i></small>
2	Aims of the module and acquired skills Students who successfully completed this module ... <ul style="list-style-type: none"> • know basic principles of scientific computing and software engineering; • can write basic scientific programs in the high-level language Python; • can use a computer to statistically analyse complex or large experimental data sets; • can write computational implementations of simple mathematical models, in particular null models; • can efficiently communicate data-analysis and modelling results, in particular using appropriate plots; • can critically discuss the data analyses of others on a professional level; • are able to transfer the skills acquired in this module in biology and neuroscience. 			
3	Contents of the module <ul style="list-style-type: none"> • programming in the high-level language Python, a powerful and flexible tool for data analysis; • analysis of different experimental data sets from systems biology and neuroscience; • numerical solutions of simple mathematical models of biological phenomena; • statistical techniques including statistical testing, null models, regression, bootstrapping; • visualization of data and quantitative results in publication-quality figures; • best practices for programming and structuring code and data; • reading scientific papers in preparations for the projects and data sets of the practical part of the course 			
4	Teaching/learning methods <ul style="list-style-type: none"> • lectures; practical course (exercises and project work); computer modeling; guidance to independent research 			
5	Requirements for participation <ul style="list-style-type: none"> • enrollment in a master's degree course at the University of Cologne • previous programming skills are not required 			
6	Type of module examinations Oral exam about the practical part of the course based on the student's analysis methods and results of one selected project.			
7	Requisites for the allocation of credits Regular and active participation; passed oral exam.			
8	Compatibility with other curricula Elective module in the master's degree course <i>Biological Sciences</i>			
9	Significance of the module mark for the overall grade In the master's degree course <i>Experimental and Clinical Neuroscience</i> : 6 % of the overall grade (see also appendix of the examination regulations)			
10	Module coordinator: Prof. Dr. Tobias Bollenbach, t.bollenbach@uni-koeln.de Participating faculty: Dr. Gerrit Ansmann, gansmann@uni-koeln.de			

11	<p>Additional information</p> <p>Subject module of the master's degree course <i>Biological Sciences</i></p> <p>Focus of research: (N) Neurobiology</p> <p>Literature: will be delivered during the course.</p> <p>General time schedule: Week 1: lectures/programming course; Week 2–3: Practical course/project work ending with an oral exam about one selected project; daily 10:00 – 17:30</p> <p>Note: The module contains computer-based practical research as a main component. For registration, please contact t.bollenbach@uni-koeln.de.</p>
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