

<b>Course Title: Data Analysis in the Life Science</b>				
<b>Module identification no.</b>	<b>Workload</b>	<b>Credit points</b>	<b>Frequency of occurrence</b>	<b>Duration</b>
AM 07 a-d	180 hours	6	Winter term, 2 <sup>nd</sup> half	3 weeks
1	<b>Type of lessons</b> a) Lectures b) Practical/Lab	<b>Contact times</b> a) 22 hours b) 72 hours	<b>Self-study times</b> 86 hours	<b>Intended group size</b> 24 <small>including 8 from <i>Experimental and Clinical Neurosciences</i></small>
2	<b>Aims of the module and acquired skills</b> Students who successfully completed this module ... <ul style="list-style-type: none"> <li>• know basic principles of scientific computing and software engineering;</li> <li>• can write basic scientific programs in the high-level language Python;</li> <li>• can use a computer to statistically analyse complex or large experimental data sets;</li> <li>• can write computational implementations of simple mathematical models, in particular null models;</li> <li>• can efficiently communicate data-analysis and modelling results, in particular using appropriate plots;</li> <li>• can critically discuss the data analyses of others on a professional level;</li> <li>• are able to transfer the skills acquired in this module in biology and neuroscience.</li> </ul>			
3	<b>Contents of the module</b> <ul style="list-style-type: none"> <li>• programming in the high-level language Python, a powerful and flexible tool for data analysis;</li> <li>• analysis of different experimental data sets from systems biology and neuroscience;</li> <li>• numerical solutions of simple mathematical models of biological phenomena;</li> <li>• statistical techniques including statistical testing, null models, regression, bootstrapping;</li> <li>• visualization of data and quantitative results in publication-quality figures;</li> <li>• best practices for programming and structuring code and data;</li> <li>• reading scientific papers in preparations for the projects and data sets of the practical part of the course</li> </ul>			
4	<b>Teaching/learning methods</b> <ul style="list-style-type: none"> <li>• lectures; practical course (exercises and project work); computer modeling; guidance to independent research</li> </ul>			
5	<b>Requirements for participation</b> <ul style="list-style-type: none"> <li>• enrollment in a master's degree course at the University of Cologne</li> <li>• previous programming skills are not required</li> </ul>			
6	<b>Type of module examinations</b> Oral exam about the practical part of the course based on the student's analysis methods and results of one selected project.			
7	<b>Requisites for the allocation of credits</b> Regular and active participation; passed oral exam.			
8	<b>Compatibility with other curricula</b> Elective module in the master's degree course <i>Biological Sciences</i>			
9	<b>Significance of the module mark for the overall grade</b> 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	<b>Module coordinator:</b> Prof. Dr. Tobias Bollenbach, t.bollenbach@uni-koeln.de <b>Participating faculty:</b> Dr. Gerrit Ansmann, gansmann@uni-koeln.de			

11	<p><b>Additional information</b></p> <p><b>Subject module</b> of the master's degree course <i>Biological Sciences</i></p> <p><b>Focus of research:</b> (N) Neurobiology</p> <p><b>Literature:</b> will be delivered during the course.</p> <p><b>General time schedule:</b> 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><b>Note:</b> The module contains computer-based practical research as a main component.</p>
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