Course Title: Data Analysis with Matlab					
Module Identification-Nr. AM 07 a-d	**Workload** 180 hours	**Credit Points** 6CP	**Frequency of Occurrence** Winter term, 2nd half		**Duration** 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** max. 23*

2	**Aims of the module and acquired skills**
	Students who successfully completed this module …
	• have gained knowledge about basic principles of scientific computing.
	• have acquired basic skills of scientific programming in the high-level language MATLAB (or its free alternative GNU Octave).
	• have acquired hands on experience with the statistical analysis of experimental data sets and with the numerical solution of simple mathematical models.
	• have learned how to address research questions by quantitative analysis and how to present results and to critically discuss scientific publications related to the topic of the module on a professional level.
	• are able to transfer the skills acquired in this module to other fields of biology and neuroscience

3	**Contents of the module**
	• Programming in the high-level language MATLAB, a powerful and flexible tool for data analysis.
	• Analysis of different experimental data sets from systems biology, behavioral data, and the quantitative analysis of fluorescence microscopy images
	• Numerical solution of simple mathematical models of biological phenomena
	• Statistical techniques including principal component analysis, bootstrap analysis and statistical testing
	• Visualization of data and quantitative results in publication-quality figures
	• Reading scientific papers in preparations for the projects and data sets of the practical part of the course

4	**Teaching/Learning methods**
	• Lectures; Practical course (Project work); Computer modeling; Guidance to independent research

5	**Requirements for participation**
	Enrollment in a Master´s degree course at the University of Cologne No previous programming skills are required.

6	**Type of module examinations**
	The final examination consists of an 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 "Biological Sciences"

9	**Significance of the module mark for the overall grade**
	In the Master´s degree course "Experimental and Clinical Neuroscience": 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	**Additional information**
	Subject module of the Master´s degree course "Biological Sciences",
	Focus of research: (N) Neurobiology
	Literature:
	• Literature will be delivered in the course
	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
	Note: The module contains computer-based practical research as a main component. For registration, please contact t.bollenbach@uni-koeln.de.
	Introduction to the module: RRZK (Weyertal 121), Kursraum 1 (ground floor), Computers will be provided

1   *8 students from the Master's degree course "Experimental and Clinical Neurosciences"