Neural Function II: Neurons, Networks and Behavior					
Identification number	**Workload**	**Credit points**	**Term of studying**	**Frequency of occurence**	**Duration**
M-Neuro-AM4 a-c	360 h	12 CP	1st or 2nd term of studying	Summer term, 2nd half	7 weeks

1	**Type of lessons**		**Contact times**	**Self-study times**	**Intended group size***
	a) Lectures		20 h	40 h	max. 14
	b) Practical/Lab		100 h	160 h	max. 2
	c) Seminar		10 h	30 h	max. 14

2	**Aims of the module and acquired skills**
	Students who successfully completed this module …
	• have acquired detailed knowledge about concepts and experimental approaches in the analysis of neuronal networks
	• are trained in preparations and intracellular and/or extracelluarrecording techniques to study neural network functions, and rhythmic motor behavior in different model systems, from invertebrates to vertebrates (see contents of the module).
	• are able to independently design and perform small scientific projects related to topics of the module.
	• have applied data analyses using the high level programming language Matlab and/or the Spike2 software package.
	• 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.
	• are able to transfer skills acquired in this module to other fields of biology.

3	**Contents of the module**
	• Analysis of rhythmic motor behavior in lamprey, crustaceans (stomatogastric nervous system and swimmeret system), and insects (drosphilaand stick insect)
	• Electrophysiological and pharmacological analysis of neuronal networks
	• Functional properties of neuronal networks and generation of rhythmic activity
	• Different extracellular and intracellular recording techniques of neuronal activity
	• Techniques in recording motor behavior in insects
	• Staining techniques for neurons and microscopy
	• Data analysis with Matlab

4	**Teaching/Learning methods**
	• Lectures; Practical/Lab (Project work); Seminar; Computer modeling; Guidance to independent research; Training on presentation techniques in oral and written form

5	**Requirements for participation**
	Enrollment in the Master´s degree course "Biological Sciences" or in the Master´s degree course "Experimental and Clinical Neurosciences"
	Participation in the Master´s module "*Essentials in Neuroscience – Lectures*" of the MSc Biology program in the winter term. Alternatively, participation in the module *Neural Function I: From Experiments to Analysis* (1st half of the summer term).
6	**Type of module examinations**
	The final examination consists of two parts: 30 min oral examination about topics of the lectures and the practical/lab part (70 % of the total module mark) and oral presentation (30 % of the total module mark)
7	**Requisites for the allocation of credits**
	Regular and active participation; Passed seminar paper; Each examination part at least "sufficient" (see appendix of the examination regulations for details)
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 Neurosciences": 12 % of the overall grade (see also appendix of the examination regulations)
10	**Module coordinator**
	Prof.Dr. Ansgar Büschges, phone 470-2607, e-mail: ansgar.bueschges@uni-koeln.de
11	**Additional information**
	Subject module of the Master´s degree course "Biological Sciences", **Specialization:** (N) Neurobiology: Genes, Circuits, and Behavior
	Participating faculty: Prof. Dr. A. Büschges, Dr. T. Bockemühl, Dr. N. Deisig, Dr. M. Gruhn, Dr. C. Guschlbauer, Dr. G. Lundkvist, Prof. Dr. M. Nawrot, PD Dr. J. Schmidt, Dr. C. Wellmann
	Literature:
	• Information about textbooks and other reading material will be given on the ILIAS representation of the course (https://www.ilias.uni-koeln.de/ilias/goto_uk_cat_2815610.html)
	General time schedule: Week 1-6 (Mon.-Fri.): Lectures, practical/lab, analysis of self-acquired data with Matlab, and preparation of oral project presentation (held at the end of week 6) as well as writing seminar paper; Week 7 (Mon.-Fri): Preparation for the oral examination
	Note: The module contains hands-on laboratory work conducted individually and is taught in research laboratories. The module does not contain computer-based practicals/research as a main component.
	Introduction to the module: June 07, 2021 at 9:00 a.m., Cologne Biocenter, room 1.007 (first floor) or online (in this case, further information/link will be sent to your Smail-Account); for preparation to the module before this introduction see ILIAS link under literature.
	Oral examination: July 23, 2021, second/supplementary examination August 27, 2021; the latter date may vary if students and module coordinator agree. More details will be given at the beginning of the module.

*10 students from the Master´s degree course "Biological Sciences" and 4 students from the Master´s degree course "Experimental and Clinical Neurosciences"

Corona note! Depending on the Corona situation during the summer term, practical work may be skipped either totally or in part. In this case, some or all practical parts will be replaced by adequate alternatives so that (i) the workload and (ii) the principle content of the modules remained unchanged.