Module Name
Neural Function I: Neural Basis of Motor Behavior in Animals

Type of Module	**Module Code**
o Advanced Module	Neural Function I

Identification Number	**Workload**	**Credit Points**	**Term**	**Offered Every**	**Start**	**Duration**
MN-B-SM (N 1)	360 h	12 CP	2nd term of studying	Summer term, 1st half	Summer term only	7 weeks

1	**Course Types**	**Contact Time**	**Private Study**
	a) Lectures	20 h	40 h
	b) Practical/Lab	100 h	160 h
	c) Seminar	10 h	30 h

2 Module Objectives and Skills to be Acquired

Students who successfully completed this module

- have acquired an understanding of how the nervous system generates motor behavior and locomotion in vertebrates and invertebrates.
- have acquired an understanding about the role descending signals from the brain play for initiation, maintenance, tuning and stopping of motor activity, especially for locomotion.
- have acquired the role intersegmental information exchange between neural networks in the ventral nerve cord (invertebrates) and spinal cord (vertebrates) play for coordinating motor activity.
- have acquired the role sensory signals play in shaping motor activity in a task-specific fashion.
- are able to apply extracellular and intracellular recording techniques used in neurobiology.
- are able to independently design and perform small scientific projects related to topics of the module.
- have acquired knowledge on the operation of instrumentation for electrophysiological recordings, incl. amplification, role of filter settings and AD/DA-conversion
- have acquired basic programming skills with the high level programming language Matlab.
- are able to analyze electrophysiological data using Matlab and the Spike 2 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 Module Content

- Basic properties of neuronal and excitable membranes contributing to rhythmic activity
- Identification of building blocks of neural circuits generating rhythmic or patterned motor output for behavior
- Recording techniques for monitoring motor activity in invertebrates and vertebrates

3	**Module Content** (continued) • Pharmacological induction of neural network activity • Optogenetic activation of neurons • Analysis of electrophysiological data with Spike2, Matlab
4	**Teaching Methods** • Lectures; Practical/Lab (Project work); Seminar; Computer exercises with Spike2, Matlab; Guidance to independent research; Training on presentation techniques in oral and written form
5	**Prerequisites (for the Module)** Enrollment in the Master'S of Science degree course "Neuroscience" or in the Master's degree course "Experimental and Clinical Neuroscience" **Additional academic requirements** Previous attendance of the lecture module Neuroscience
6	**Type of Examination** The final examination consists of two parts: Oral examination (20-30 min; 50 % of the total module mark), written report (50 % of the total module mark)
7	**Credits Awarded** Regular and active participation; Each examination part at least "sufficient" (see appendix of the examination regulations for details)
8	**Compatibility with other Curricula*** Optional compulsory module in the Master'S degree course "Experimental and Clinical Neuroscience"
9	**Proportion of Final Grade** 12.0 %
10	**Module Coordinator** Prof. Dr. Ansgar Büschges, phone 470 2607, e-mail: ansgar.bueschges@uni-koeln.de
11	**Further Information** **Participating faculty:** Prof. Dr. A. Büschges, Dr. T. Bockemühl, Dr. M. Gruhn, guests **Literature:** • Information about textbooks and other reading material will be given during the course **General time schedule:** Week 1-6 (Mon.-Fri.): Lectures, practical/lab and preparation for the seminar talk (held at the end of week 6); Week 7 (Mon.-Fri.): Preparation for the oral examination and completing of the written report. The written report shall be handed in 3 weeks after the end of the module. **Note:** The module contains hands-on laboratory work conducted individually and is taught in course rooms. The module contains computer-based practicals as a complementary component. **Introduction to the module:** April 4, 2023 at 9:00 a.m., Cologne Biocenter, room 1.007 (first floor); for preparation to the module before this introduction see advice(s) under literature **Oral or written examination:** May 31, 2024, second/supplementary examination August 02, 2024; the latter date may vary if students and module coordinator agree. More details will be given at the beginning of the module.