

Module Name Neural Function I: Neural Basis of Motor Behavior in Animals						
Type of Module ○ Advanced Module				Module Code Neural Function I		
Identification Number MN-B-SM (N 1)	Workload 360 h	Credit Points 12 CP	Term 2 nd term of studying	Offered Every Summer term, 1 st half	Start Summer term only	Duration 7 weeks
1	Course Types a) Lectures b) Practical/Lab c) Seminar		Contact Time 20 h 100 h 10 h		Private Study 40 h 160 h 30 h	
2	Module Objectives and Skills to be Acquired Students who successfully completed this module <ul style="list-style-type: none"> • Will be able to explain how the nervous system generates motor behavior and locomotion in vertebrates and invertebrates. • Will be able to explain the role descending signals from the brain play for initiation, maintenance, tuning and stopping of motor activity, especially for locomotion. • Will be able to explain the role intersegmental information exchange between neural networks in the ventral nerve cord (invertebrates) and spinal cord (vertebrates) play for coordinating motor activity. • Will be able to explain the role sensory signals play in shaping motor activity in a task-specific fashion. • Will be able to apply extracellular and intracellular recording techniques used in neurobiology. • Will be able to independently design and perform small scientific projects related to topics of the module. • Will be able to operate instrumentation for electrophysiological recordings, incl. amplification, role of filter settings and AD/DA-conversion • Will have acquired basic programming skills with the high-level programming language Matlab. • Will be able to analyze electrophysiological data using Matlab and the Spike 2 software package. • Will 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. • Will be able to transfer skills acquired in this module to other fields of biology. 					
3	Module Content <ul style="list-style-type: none"> • 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	<p>Module Content (continued)</p> <ul style="list-style-type: none"> • Pharmacological induction of neural network activity • Analysis of electrophysiological data with Spike2, Matlab
4	<p>Teaching Methods</p> <ul style="list-style-type: none"> • 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	<p>Prerequisites (for the Module)</p> <p>Enrollment in the Master of Science degree program “Neuroscience” or in the Master’s degree program “Experimental and Clinical Neuroscience”</p> <p>Additional academic requirements</p> <p>Previous attendance of the lecture module Neuroscience (winter term)</p>
6	<p>Type of Examination</p> <p>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)</p>
7	<p>Credits Awarded</p> <p>Regular and active participation; Each examination part at least “sufficient” (see appendix of the examination regulations for details)</p>
8	<p>Compatibility with other Curricula*</p> <p>Optional compulsory module in the Master degree program “Experimental and Clinical Neuroscience”</p>
9	<p>Proportion of Final Grade</p> <p>12.0 %</p>
10	<p>Module Coordinator</p> <p>Prof. Dr. Ansgar Büschges, phone 470 2607, e-mail: ansgar.bueschges@uni-koeln.de</p>
11	<p>Further Information</p> <p>Participating faculty: Prof. Dr. A. Büschges, Dr. T. Bockemühl, Dr. A. Ruthe, guests</p> <p>Literature:</p> <ul style="list-style-type: none"> • Information about textbooks and other reading material will be given during the course <p>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.</p> <p>Note: The module contains hands-on, individually conducted laboratory work and is taught in course rooms. The module contains computer-based exercises as a complementary component.</p> <p>Introduction to the module: April 13th, 2026 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</p> <p>Oral or written examination: June 03rd, 2026, second/supplementary examination August 14, 2026; the latter date may vary if students and module coordinator agree. More details will be given at the beginning of the module.</p>