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| **Module Title: Neural Basis of Complex Behavior** |
| **Identification-Nr.**M-MN-N-NeuroM04 | **Workload**360h | **Credit Points**12CP | **Frequency of Occurence**Summer term, 2nd half | **Duration**7 weeks |
| 1 | **Type of lessons**1. Lectures
2. Practical/Lab
3. Seminar
 | **Contact times**1. 10 h
2. 164 h
3. 10 h
 | **Self-study times**1. 20 h
2. 132 h
3. 24 h
 | **Intended group size\***1. max. 8
2. max. 4
3. max. 2
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| 2 | **Aims of the module and aquired skills**Students who succesfully completed this module ...* have acquired detailed knowledge about current concepts and experimental models in systems neurobiology.
* are trained in behavioral analysis as well as functional neuroanatomy.
* are able to apply different electrophysiological recording techniques such as whole-cell patch-clamp recordings, sharp electrode recordings as well as extracellular recordings in semi-intact brain preparations and are able to independently design and perform small scientific projects related to topics of the module..
* 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.
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| 3 | **Contents of the module*** Behavioral and neuronal analysis of acoustic communication in vertebrates
* Behavioral and neuronal analysis of visual guided behavior in vertebrates
* Structure and function of the auditory and visual system in vertebrates
* Structure and function of respiratory and vocal pathways in vertebrates
* Structure and function of basal ganglia and limbic system
* Neuroanatomical techniques (i.e. tract tracing, immunohistochemistry, 3D-reconstruction)
* Techniques in stimulating sensory systems
* Techniques in extra- and intracellular recording of neuronal activity during respiration and vocalization
* Computer based analysis of behavioral and physiological data
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| 4 | **Teaching/Learning methods*** Lectures; Practical/Lab (Project work); Seminar; Guidance to independent research; Training on presentation techniques in oral and written form
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| 5 | **Requirements for participation**Enrollment in the Master´s degree course “Biological Sciences” or in the Master´s degree course “Klinische und Experimentelle Neurowissenschaften”**Additionally recommended:** A strong interest and basic knowledge in neurobiology is required. Participation in module MN-B-SM (N 2) (1st half of the summer term) is advantageous. |
| 6 | **Type of module examinations**The final examination consists of three parts: 30 min oral examination about topics of the lectures and the practical/lab part (50 % of the total module mark), oral presentation (25 % of the total module mark) and seminar paper (25 % of the total module mark) |
| 7 | **Requisites for the allocation of credits**Regular and active participation;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 “Klinische und Experimentelle Neurowissenschaften” |
| 9 | **Significance of the module mark for the overall grade**In the Master´s degree course “Experimental and Clinical Neuroscience”: 12 % of the overall grade (see also appendix of the examination regulations) |
| 10 | **Module coordinator:** Prof. Dr. Wolfgang Walkowiak, phone 470-3119, w.walkowiak@uni-koeln.de **Participating faculty:** Dr. A. von Twickel, Prof. Dr. W. Walkowiak |
|  11 | **Additional information****Subject module** of the Master´s degree course “Biological Sciences”,**Focus of research:** (N) Neurobiology**Literature:** * Kandel, E.R., Schwartz, J.H., Jessell, T. (2000) Principles of Neural Science. 4th edition, NcGraw-Hill. Chapters 1, 19, 29, 32
* Purves, D., Augustine, G.J., Fitzpatrick, D., Hall. C.W. et al. (2007) Neuroscience. 4th edition, Palgrave Macmillan. Chapters 12, 13, 27
* Further original publications will be handed out during the first week of the module

**General time schedule:** Week 1 (Mon.-Fri.): Lectures and preparation for the seminar talk (held at the end of week 1); Week 2-5 (Mon.-Fri.): Lectures and practical/lab; Week 6 (Mon.-Fri): Data evaluation and writing seminar paper; Week 7 (Mon.-Fri): Preparation for the oral examination**Note:** The module contains hand-on laboratory work conducted by small groups of students and is taught in research laboratories. The module does not contain computer-based practicals/research as a main component.**Introduction to the module:** June 12, 2017 at 9:00 a.m., Cologne Biocenter, room 1.007 (first floor) **Oral** **examination:** July 28, 2017; more details will be given at the beginning of the module |

**\*** Gemäß Studienverlaufsplan (s. Anlage 1 der Prüfungsordnung)