

Module Title: Sleep and clinical neuroscience				
Identification number	Workload	Credit points	Frequency of occurrence	Duration
M-Neuro-AM11 a-e	180h	6	WS	One Semester
1	Type of lessons a) Lectures b) Practical c) Seminars	Contact times a) 12 b) 40 c) 6	Self-study times 122 (Preparation of seminar and post-processing of lectures)	Intended group size 12
2	Aims of the module and acquired skills <ul style="list-style-type: none"> • In the lectures, the students will get an overview of the neurobiology of sleep, how to assess sleep/wake patterns, the pathophysiology of common sleep disorders, and the interplay between sleep disturbance and neuropsychiatric disorders. Moreover, various treatment approaches for sleep disorders will be discussed. • In the seminars, each student should present a pre-defined scientific sleep paper on a hot topic in sleep medicine and will present its strengths and limitations. • In the practical week, acquiring and analyzing polysomnography and subjective sleep questionnaires will be introduced on the first two days, then students will learn the basics of "Brain and behavior associations using multivariate statistics and machine learning in sleep research and measurement of the glymphatic system using MRI data" 			
3	Contents of the module - Lectures (6 days, 12 sessions, 45 min per session) <ol style="list-style-type: none"> 1. Neuroanatomy of sleep 2. Neurochemistry of sleep 3. Subjective and objective sleep assessment tools 4. Circadian rhythm 5. Sleep deprivation 6. Sleeping brain and dreaming 7. Sleep disorders I (insomnia and narcolepsy) 8. Sleep disorders II (sleep apnea, PLM, night terror, etc.) 9. Pharmacological treatments for sleep disorders 10. Non-pharmacological treatments for sleep disorders 11. Sleep and psychiatric disorders 12. Sleep and neurodegeneration <p>- Seminar at the end of each lecture session</p> <p>- Practical/Lab (5 days in INM7/INM2, Jülich Research Center) Performance tests, Wake EEG, Sleep EEG, Actigraphy, Sleep questionnaires, Neuroimaging meta-analysis in sleep disorders, Brain-behaviour association and machine learning approaches in sleep research, and measuring glymphatic system using MRI data</p>			
4	Teaching/Learning Methods Lectures, practical week, and seminar presentation by students			
5	Requirements for participation Enrollment in the Master's degree course "Experimental and Clinical Neurosciences" at the University of Cologne Basic knowledge in neuroanatomy and neurophysiology, statistics, neuroimaging and neuroimaging data analysis using Python (or Matlab/ R) is helpful.			
6	Type of module examination Critical presentation of scientific papers in seminar section			

7	Requirement for the allocation of credits Regular participation in lectures and practical course, successful presentation in seminar
8	Compatibility with other Curricula none
9	Significance of the module mark for the overall grade In the Master's degree course "Experimental and Clinical Neurosciences": 6 % of the overall grade
10	Module coordinator Prof. David Elmenhorst, E-Mail: d.elmenhorst@fz-juelich.de Dr. Masoud Tahmasian, E-Mail: m.tahmasian@fz-juelich.de
11	Additional information Literature: Relevant Peer-Review Literature, which will be announced in class