



Adam Mickiewicz University in Poznań

Doctoral School of Exact Sciences AMU

Cognitive Neuroscience and EEG

Prof. UAM dr hab. Robert H.J. van der Lubbe

Field of science	Cognitive Neuroscience	
Teaching method	Online lectures and demonstrations, and interactive online question & answer sessions	
Language	English	
Numbers of hours	20 hours online lectures	
Aims of the course	Introducing and deepening the knowledge of Cognitive Neuroscience with special emphasis on the EEG method	
Course contents	<p>In this course, we will focus on crucial developments in the field of cognitive neuroscience that concern the following topics: sensation and perception, object recognition, attention, and action. We will also focus on the history of cognitive neuroscience, relevant information about the structure and function of the nervous system and methods employed in this research area. An important method available within the faculty of physics is the EEG. We will more deeply focus on different methods to analyze the EEG, demonstrate how these analyses can be performed, and will also especially focus on how to interpret specific obtained results and indicate their relevance for the field of cognitive neuroscience.</p>	
Prerequisites and co-requisites	MA degree in related fields such as Biology, Psychology, Physics, Optometry, Computer Science, Medicine, Cognitive Science, Neurolinguistics	
Learning outcomes		
On completion of the course PhD candidates will be able to:		Assessment mode
<p>Know and understand:</p> <ol style="list-style-type: none"> 1) Scientific achievements in the field of cognitive neuroscience, the paradigms and directions of development of this discipline in a way that enables their creative and innovative development and their verification within the framework of research projects undertaken (E_W01) 2) At an advanced level the research methodology appropriate for the discipline of cognitive neuroscience, with special emphasis on the EEG, which allows for the proper selection of research theories and tools and their effective application and modification within the framework of own research (E_W02) 		Multiple-choice / Oral Exam

Literature	<p>[1] Gazzaniga, M. S., Ivry, R. B., & Mangun, G. R. (2014). <i>Cognitive Neuroscience. The biology of the mind.</i></p> <p>[2] Gable, P., Miller, M., & Bernat, E. (Eds.). (2022). <i>The Oxford handbook of EEG frequency.</i> Oxford University Press.</p>
Additional information	<p>The course will consist of 5 online lectures of each 4 * 45 minutes.</p> <ol style="list-style-type: none"> 1. May 6th 2025, 13:00-17:00. History of Cognitive Neuroscience, Structure & Function of the Nervous System, Methods (Chapters 1-3 from [1]) 2. May 13th 2025, 13:00-17:00. Sensation and Perception, Object Recognition (Chapters 5-6 from [1]) 3. May 20th 2025, 13:00-17:00. Attention and Action (Chapters 7-8 from [1]) 4. May 27th 2025, 13:00-17:00. Introducing the EEG, Preprocessing the EEG, the ERP method, and Fourier analyses ([2] and additional materials) 5. June 3rd 2025, 13:00-17:00. Time-frequency analyses, Source analyses, Connectivity analyses ([2] and additional materials)