

## **Neurobiology of Human Memory**

### **Instructor information**

Prof. Dr. Bianca Wittmann

Contact: bianca.wittmann@psychol.uni-giessen.de; 0641-99-262160

Office: Phil I, F 21a

### **Prerequisites**

Introductory module in biological psychology or (cognitive) neuroscience

### **Course description**

Memory is essential for cognition and shapes our personal identities. This class will focus on declarative memory. The class will cover memory systems, factors influencing declarative memory, and changes in hippocampal memory in selected psychiatric disorders. In three thematic sections, students will discuss relevant book chapters and review papers.

### **Course goals**

At the end of this course, students will be able to discuss and critically evaluate recent research on declarative memory.

Specifically, they will be able to

- Describe the neural mechanisms underlying declarative memory
- Explain factors that influence declarative memory
- Describe changes in declarative memory in clinical populations
- Summarize and integrate the course topics in a final project

### **Course requirements**

Presence in class is required. Two classes may be missed, but students are responsible for catching up on class content. Students are expected to read all assigned material prior to the scheduled discussion and to contribute to class discussions and group work. There will be short quizzes assessing basic content of the assigned material at the beginning of each section and summary quizzes at the end of each section. Student groups will prepare a creative summary of the course material for the final session.

### **Grading**

Short quizzes - pass requirement: Students must earn at least two-thirds of the total points available across all short quizzes in order to pass

Summary quizzes: 80 % of the overall grade

Summary group work: 20 % of the overall grade

### **Course outline**

Section 1 – Sessions 2-4: Declarative Memory Systems

Section 2 – Sessions 5-7: Interactions and Influences

Section 3 – Sessions 8-10: Clinical Aspects

Final Session – Session 12: Presentation of group work

## **Readings**

Students will work in groups. Each group selects one of the following readings per block for close reading and discussion (subject to minor changes from year to year). All material will be posted on Stud.IP.

### Section 1 (Declarative Memory Systems)

Postle, B. R. (2015). Essentials of cognitive neuroscience. John Wiley & Sons, Incorporated.

- Chapter 10 - Neural Bases of Memory
- Chapter 11 - Declarative Long-Term Memory
- Chapter 12 - Semantic Long-Term Memory

Addis DR, Barense M, Duarte A (2015). The Wiley Handbook on The Cognitive Neuroscience of Memory. Wiley.

- Chapter 4 - The Neural Bases of Conceptual Knowledge
- Chapter 5 - Encoding and Retrieval in Episodic Memory
- Chapter 6 - Medial Temporal Lobe Subregional Function in Human Episodic Memory
- Chapter 7 - Memory Retrieval and the Functional Organization of Frontal Cortex

### Section 2 (Interactions and Influences)

Addis DR, Barense M, Duarte A (2015). The Wiley Handbook on The Cognitive Neuroscience of Memory. Wiley.

- Chapter 8 - Functional Neuroimaging of False Memories
- Chapter 11 - The Memory Function of Sleep
- Chapter 12 - Memory Reconsolidation
- Chapter 16 - The Development of Episodic Memory
- Chapter 17 - Episodic Memory in Healthy Older Adults
- Chapter 19 - Memory for Emotional and Social Information

### Section 3 (Clinical Aspects)

Bartsch, T (2012). The Clinical Neurobiology of the Hippocampus: An integrative view. Oxford University Press.

- Chapter 10 – Neurodevelopmental disorders
- Chapter 14 – The Hippocampus and Post-Traumatic Disorders
- Chapter 15 – The Hippocampus in Major Depression
- Chapter 16 – Schizophrenia

## **Language**

Readings will be in English; in-class discussions and group work will be in German. Foreign exchange students may take the exams in English upon request.