2021-2022

**222.4126 – Neural basis of human memory
Semester B**

**Instructor:** Dr. Avi Mendelsohn, **Email:** amendels1@univ.haifa.ac.il

**Office Hours:** Tuesday 12:00-14:00, Room 160, IIPDM, 04-8249054

**Teaching Assistants & Office Hours:**

None

**Course Level:** (MA / PhD)**:**

**Course Type & Format:** Elective,Lecture

**Number of Hours/Credits: 2**

**Prerequisites:** None

**Course Overview (Short Abstract):**

The course covers major topics of memory processes and systems focusing on behavior and neural levels. The course is designed to inform on memory stages, particularly encoding, consolidation, and retrieval mechanisms, the neural basis of reconsolidation, interactions among memory systems, and false memory, among other topics.

**Learning Outcomes (What are the skills, abilities, or major concepts a student is expected to acquire in this course?) – At the end of the course students will be able to:**

1. Be familiar with the fundamental concepts and processes that underlie memory acquisition, consolidation, and retrieval.

2. Understand the neural basis of learning, consolidation, re-consolidation, and retrieval.

3. Be acquainted with contemporary literature on memory related topics, including false memory, reinforcement learning, sleep-related consolidation, and more.

**Assessment (Assessment Method and Grade Composition):**

Homework assignments – 20%

Exam – 80%

**Week-by-Week Content and Assignements :**

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| --- | --- | --- |
| **Week #** | **Topic** | **Assignment**  |
| 1 | Introduction to cognitive neuroscience |  |
| 2 | Memory systems and neuroanatomy of memory |  |
| 3 | Cognitive maps and the hippocampus |  |
| 4 | Memory consolidation | Home assignment – comparison of consolidation models |
| 5 | Sleep and memory |  |
| 6 | Memory re-consolidation |  |
| 7 | Memory recognition and signal detection theory |  |
| 8 | Cued recall and recollection |  |
| 9 | Reinforcement learning |  |
| 10 | Autobiographical memory |  |
| 11 | Interactions among learning and memory systems | Home assignment – design relevant experiment |
| 12 | Hebbian learning and false memory |  |
| 13 | Imaging techniques in memory experiments |  |
| 14 | Recent studies in human memory processes and the brain |  |

**Website:**

**Reading List:**

1. Foundations of Human Memory (Michael Kahana, 2012)
2. The Oxford Handbook of Memory (Eds. Tulving & Craik, 2005)
3. Alvarez, P., & Squire, LR. 1994. Memory consolidation and the medial temporal lobe: A simple network model. *PNAS*, 91, 7041-7045.
4. Moscovitch, M. Rosenbaum, RS, et al… 2005. Functional neuroanatomy of remote episodic, semantic and spatial memory: a unified account based on multiple trace theory. *J. Anat.* 207, 35-66.
5. Diekelman, S. & Born, J. 2010. The memory function of sleep. *Nat. Neuro. Rev.* 11, 114-126.