Psych 50

Neurobiology of Learning & Memory

Course Syllabus – Winter 2015

Instructor
Professor Jeffrey Taube
Office: 265 Moore
Office Hours: Friday 10:30-11:30, or by appointment.

General Information
This course will explore the neurobiology of learning and memory from cognitive, behavioral, and cellular neuroscience perspectives. The goal of the course is to better understand the neurobiological mechanisms and brain systems that underlie learning and memory processes – both at the cellular and systems level. We will focus on studies in mammals – primarily non-human animals, but landmark studies in humans will also be covered when relevant. This approach is necessary because many of the manipulations and experiments conducted to study mechanisms of learning/memory are not possible to perform in humans. The first half of the course will focus on cellular and molecular mechanisms of long-term potentiation (LTP), while the second half will focus on neural basis of memory at the systems level.

Background
Some knowledge of neuroscience will be assumed (level of Psych 6, 45, 46, Bio 34). In particular, **a fundamental understanding of membrane and synaptic potentials is strongly recommended**. However, for those individuals lacking such background or need some refresher, you can obtain this knowledge with a little extra reading from materials that I can suggest if you let me know.

Class Time (10A)
Lectures: T, Th 10-11:50 Room 110 Moore
X-hour: Wed. 3:00-4:00

Books
The Neurobiology of Learning and Memory, 2nd Edition by Jerry Rudy, 2014, Sinauer Publishers. A few readings will be selected from other sources and this material will be available through Canvas.

Slides Shown in Class
Lectures will be posted on Canvas prior to class.

Evaluations
Your grade will be determined on the following basis:
30% : Mid-term exam
35% : Final exam
30% : Journal & Debate Reports
5% : Class attendance and participation

1) Tests
There are two scheduled tests (Mid-term and Final). Questions will be short essays. Questions will be passed out in class or posted on Canvas occasionally throughout the term. The exams will be

composed of a selection of these questions. I have chosen this format because I want to emphasize concepts and understanding more than memorization. However, because you will know all possible questions ahead of time, I will hold your answers to high standards. The best way to prepare for the exam is to write out an outline of an answer for each question beforehand. You can use material from class or the assigned readings to answer these questions. The Final exam is not cumulative.

2) Journal & Debate Reports

Assignments will vary depending on topic and class size and will be announced as we proceed through the term. In general, for each report there will be 1-2 journal articles assigned. For the debates the class will be divided into 4 groups. Two groups will be assigned to either 'Pro' or 'Con' in regards to the issue. The remaining two groups will be responsible for asking questions of the panel based on the article(s). For the second debate, the groups will be switched around in terms of the Pro vs. Con panel and the Questioneers.

The journal reports will be worth 10% each.
The debate reports will be worth 5% each.

Attendance

Timely attendance at all classes is expected. I will not take attendance, but excessive absences without prior arrangements ahead of time will be noticed and lead to a reduction in your final grade. Note that class attendance and participation form 5% of your grade.

Honor Principle

I expect all members of the class to abide by the Dartmouth Honor Principle and that any violations will be reported to the instructor. In terms of the journal and debate papers, you are welcome to discuss them with fellow classmates, but each student is required to write their own summary.

Final Notes:

Students requiring disability-related accommodations must register with the Student Accessibility Service office. Once SAS has authorized accommodations, students must show the originally signed SAS Accommodations/Consent Form and/or a letter on SAS letterhead to me. As a first step, if students have questions about whether they qualify to receive accommodations, they should contact the SAS office. All inquiries and discussions about accommodations will remain confidential.

I realize that some students may wish to take part in religious observances that fall during this academic term. Should you have a religious observance that conflicts with your participation in the course, please come speak with me before the end of the second week of the term to discuss appropriate accommodations.

Class Schedule

Time	Topic	Chapter Readings
Jan 6	Organization	
Jan 8	Memory – The Issues & Historical Perspectives	1
Jan 13	Quick tour of the Brain – Micro & Macro levels; Techniques	TBA
Jan 15	Simple Learning: Non-associative Mechanisms	TBA
Jan 20	Neural Plasticity; LTP I	2, 3
Jan 22	LTP II	4, 5
	Journal Article #1 – Memory enhancement: Is it good or bad?	
Jan 27	LTP III	6, 7, 8
Jan 29	Behavior & LTP	9
Feb 3	Extras	
Feb 5	**Mid-term Exam**	
Feb 10	Memory Formation & Consolidation	10, 11
Feb 12	Maintenance & Forgetting; Modulation	12, 13
Feb 17	Fate of Retrieved Memories – Reconsolidation	14
	Journal Article #2 – Consolidation: Strategies for Purposefully Forgetting	
Feb 19	Memory Systems & the Hippocampus	15
Feb 24	Episodic Memory I: Animal Studies	16
Feb 26	Episodic Memory II: Primate & Human Studies	17
	Journal Article #3 – Medial Temporal Lobe: Memory or Space Debate	
Mar 3	Spatial Memory	TBA
Mar 5	Cortex & Working Memory; Functional Imaging studies	TBA
Mar 10	Extras	
	Journal Article #4 – Spatial – Virtual Reality Debate	
Mar 14	**Final Exam (11:30 am - 2:30 pm)**	