Overview:

This course will review the neural mechanisms of learning and memory. Readings will include both seminal and cutting-edge papers on topics ranging from perceptual memory to higher order functions, including working memory, declarative memory, implicit memory, skill learning, and semantic memory. Within each topic we will attempt to integrate the results of different neuroscience approaches, including the study of human neurological patients, lesion studies and single unit recordings in animals, neural network modeling, event-related potentials, and functional imaging techniques.

Each topic will begin with an introductory overview lecture with an associated background reading. The subsequent classes for each topic will consist of student-led discussions of readings in the area. Grades in the course will reflect participation in these discussions as well as performance on other written assignments (see Course Requirements).

Required Reading:

The primary readings are either in the course bulk pack, available from Campus Copy Center or in pdf format on the course web site: http://psych.upenn.edu/courses/psych630/psych630.html. A list of readings for each day is included in the syllabus. Note that each day has one review article and several empirical papers assigned; the review article is included to provide adequate background information, but the focus of the discussions will be on the empirical papers.

Basic background material can be found in:


Neuroscience: Exploring the brain, MF Bear, BW Connors, MA Paradiso, 1996.

Course requirements:

Discussion leader: You will be required to lead the discussion of assigned readings several times throughout the semester. You will be graded on your understanding of the material, your presentation style, and your ability to generate an interesting discussion. In addition, you will be required to submit a short paper (1000 word limit) that summarizes the collection of empirical papers presented on that day. (60% of grade)

Review: You will play the role of “peer-reviewer” and submit a critical review of one of the empirical articles discussed in the course (1500 word limit, due April 2). Your review should address weaknesses in the study, including relevant areas of the literature that were overlooked or that are inconsistent with the reported findings; methodological or data analysis flaws; alternate interpretations of the data, etc. (20% of grade)

Group project: Together with a group of other students, you will be required to develop a research proposal in some area of cognitive neuroscience. This will require a written proposal (2500 word limit) and an oral presentation, due the last week of class. (20% of grade)
Schedule

Jan 8  Introduction
Jan 10  Neuroanatomy: Lecture (Alan Rosenquist)
Jan 15  Neuroanatomy: Dissection
Jan 17  Working memory: Lecture (Amishi Jha)
Jan 22  Working memory: Components of working memory
Jan 24  Working memory: Subsidiary systems and their organization
Jan 29  Working memory: The central executive
Jan 31  Episodic memory: Lecture (Sharon Thompson-Schill)

Feb 5  Declarative memory: Encoding
Feb 7  Declarative memory: Consolidation
Feb 12  Declarative memory: Retrieval
Feb 14  Declarative memory: Frontal lobes
Feb 19  Declarative memory: Spatial memory
Feb 21  Declarative memory: Spatial memory

Feb 26  Non-declarative memory: Skill learning
Feb 28  Non-declarative memory: Repetition priming

Mar 5  Non-declarative memory: Repetition priming
Mar 7  Episodic memory: Recap

Mar 12  No class – Spring Break
Mar 14  No class – Spring Break

Mar 19  Semantic Memory: Lecture (Sharon Thompson-Schill)
Mar 21  Semantic Memory

Mar 26  Semantic Memory: Category-specificity
Mar 28  Semantic Memory: Domain-specificity

Apr 2  Special Topics
Apr 4  Special Topics

Apr 9  Project presentations
Apr 11  Project presentations
Reading List

Note: Readings preceded by • can be downloaded from the web site.

Jan 8      Introduction


Jan 10     Neuroanatomy: Lecture (Alan Rosenquist)


Jan 15     Neuroanatomy: Dissection

No assigned readings

Jan 17     Working memory: Lecture(Amishi Jha)


Jan 22 Components of working memory


Jan 24 Subsidiary systems and their organization


Jan 29 The central executive


**Jan 31** Episodic Memory: Lecture (Sharon Thompson-Schill)


**Feb 5** Declarative memory: Encoding


**Feb 7** Declarative memory: Consolidation


**Feb 12 Declarative memory: Retrieval**


**Feb 14 Declarative memory: Frontal lobes**


Feb 19  Declarative memory: Spatial memory


Feb 21  Declarative memory: Spatial memory


Feb 26  Non-declarative memory: Skill learning


Feb 28  Non-declarative memory: Repetition priming


Mar 5  Non-declarative memory: Repetition priming


Mar 7 Episodic memory - recap


Mar 12 No class – Spring Break
Mar 14 No class – Spring Break

Mar 19 Semantic Memory: Lecture (Sharon Thompson-Schill)

Mar 21  Semantic Memory


Mar 26  Semantic Memory: Category-specificity


Mar 28  Semantic Memory: Domain-specificity


