PSYCH 891 – Cognitive Neuroscience of High-Level Vision and Memory
Fall 2016

Instructor: Rosie Cowell
Office: Tobin Hall 431
Email: rcowell@psych.umass.edu
Lecture times: Mondays 4 – 6.30 pm
Location: Tobin Hall 504
Moodle Page: https://moodle.umass.edu/course/view.php?id=32814
(please check Moodle Regularly)

Course Description and Objectives

This course will examine the neural mechanisms of higher-order vision and memory, and how they are studied using the methods of cognitive neuroscience. Topics will include object recognition, face processing, perceptual learning and expertise, mechanisms of declarative memory in the medial temporal lobe, and non-mnemonic functions of the hippocampus and medial temporal lobe. We will examine these topics by reading primary research articles employing a range of methods, including neuroimaging, formal models and neuropsychology (i.e., lesion studies). The objectives are:

- *To provide an in-depth introduction to the research literature on the brain mechanisms of object recognition and declarative memory.*
- *To develop critical analytical skills for evaluating primary research articles*
- *To provide a thorough grounding in cognitive neuroscience methods, including (1) neuroimaging and recent techniques for analyzing neuroimaging data, (2) formal process models for building brain-based theories of cognition, and (3) the intersection of modeling with neuroimaging and other methods (e.g., neuropsychology, electrophysiology) to build concrete theories that account for convergent evidence from multiple methods and make testable predictions.*
- *To develop oral presentation skills and academic writing skills*

Course Requirements

Class Participation (30%)
This class is heavily discussion based. Each week we will read and discuss approximately 2 primary research articles (depending on length). Students are expected to contribute to the discussion in every class, with oral contributions reflecting that you have read the papers closely.

Weekly Written Comments or Summaries (20%)
There is a discussion forum on the Moodle page. By 10pm on the day before (Sunday), students should post either (1) a summary of each article (200-300 words), or (2) a comment/question relating to each article. Your comment could be a question asking for clarification on something you didn't understand, or a criticism (a problem with the method, or an alternative explanation for the results), or a suggestion about the relationship of the article to other research. Your comment could also be a response to someone else's question. The only stipulation is that your comments should demonstrate that you have read the papers closely. *If you choose to write summaries, you may send them to me by email* instead of posting on the forum, if you prefer.

In-Class Presentation (20%)
Each student will be required to present a primary research article in one class. Dates and articles will be assigned at the start of the semester. You may prepare a powerpoint presentation or use other visual aids. You should prepare a handout describing critical details of the article, and bring copies for all the class members, and me. The presentation should last about 20-30 minutes and include a summary of the motivation, methods and results of the paper, and a critical discussion/appraisal of the authors' interpretations. Your presentation may address questions posted by others on the Moodle page the night before, but you are not obliged to cover them all.

Final Paper (30%)
Students will write a final term paper on a topic that relates to material we have covered in class. The paper may take the form of a literature review, a plan for a novel experiment, or a grant proposal. Further details TBA. Papers are due on **Friday December 16th**, at 5pm, to be submitted electronically via Moodle.

Attendance Policy

Please do not text, surf the web, check email or work on other projects during class. I plan to keep the workload reasonable and the grading fair. I hope very much that the class will be interesting and useful to you. Respecting the class by not texting/web-surfing etc. is **the most important thing that you can do** to help me achieve this goal! No phones in the classroom, please.

If you know you are going to miss a class, please tell me in advance. Sometimes people get sick or have other emergencies, and if this happens once during the semester that's fine. However, more than one absence (unless you have good reason for your absences) will affect your participation grade. We have only 12 meetings.

If you miss a day when you were supposed to lead the discussion, this will result in a grade of zero for that presentation, unless you provide a university-sanctioned excuse.

Obtaining Reading Material

The articles for the class will be posted electronically on Moodle for you to download. Please have a copy of the articles available during class discussions, whether this means printing them out or bringing a laptop to class. Readings will be available a week ahead of time. Some material is listed as TBA on the syllabus; this will be filled in as the semester progresses. Some readings listed currently on the schedule may change. Moodle will have the finalized reading assignments for each day of class – please check it regularly.

Academic Honesty

All students are expected to adhere scrupulously to the University policy concerning academic honesty, found here: http://www.umass.edu/honesty/. Pay special attention to plagiarism. Many students do not understand the extent to which 'paraphrasing' the text in another author's work is **unacceptable** in academic assignments. This website from Indiana University explains plagiarism and how to avoid it: http://www.indiana.edu/~wts/pamphlets/plagiarism.shtml.

Tentative Schedule

Exact dates for specific topics may change.
Please ***check Moodle regularly*** for updates or changes, and to download the readings.

Class	Date	Topic	Reading
1	Mon 12 Sep	Representation of Object Form in Visual Cortex	Malach et al. (1995) Edelman et al. (1998)
2	Mon 19 Sep	Decoding the Contents of Visual Cortex	Haxby, Gobbini et al. (2001) Kay and Gallant (2008)
3	Mon 26 Sep	Object Recognition: Categories and Semantics	Haxby, Guntupalli et al. (2011) Warrington and Shallice (1984)
4	Mon 03 Oct	Face Processing: Mechanisms and Modules	Kanwisher et al. (1997) Spiridon & Kanwisher (2002)
	Mon 10 Oct	**Columbus Day Holiday - NO CLASS**	
5	**Tue** 11 Oct *UMass Mon*	Perceptual Learning and Expertise	Gauthier Tanaka
6	Mon 17 Oct	Models of Object Recognition	Riesenhuber and Poggio (1999) (2000) Guclu and Van Gerven (2015)
7	Mon 24 Oct	Memory and the Medial Temporal Lobe	Scoville and Milner (1957)
8	Mon 31 Oct	The Brain-basis of Dual Process Memory Theories	Yonelinas

9	Mon 07 Nov	Models of Memory: Complementary Learning Systems	Norman and O'Reilly (2003) Bogacz et al. (2001)
10	Mon 14 Nov	Models of Memory: Single-System Accounts	Cowell et al. (2006) Greve et al. (2010)
	Mon 21 Nov	**Thanksgiving Holiday - NO CLASS**	
	Mon 28 Nov	**NO CLASS**	
11	Mon 5 Dec	The Medial Temporal Lobe and Perception	Suzuki/Baxter Bussey/Saksida Lee/Barense
12	Mon 12 Dec	Non-Mnemonic Functions of the Hippocampus	Turk-Browne, Shohamy, Maguire