Syllabus PSY 610 Advanced Cognitive Neuroscience

Instructors

Dasa Zeithamova, LISB 325, **dasa@uoregon.edu (mailto:dasa@uoregon.edu)**
Ben Hutchinson, LISB 329 **bhutch@uoregon.edu (mailto:bhutch@uoregon.edu)**
For office hours, we are happy to schedule virtual or in-person one-on-one meetings. Just email us as needed.

Time and Location

Mondays and Wednesdays, 10 am - 11:50 am
Lewis Integrative Sciences Building, Room 417 (unless otherwise stated)

Content

Welcome to PSY 610 Advanced Cognitive Neuroscience. The goal of this class is to explore how the brain gives rise to human cognition. While we cannot cover the whole area, we will include a broad survey of the field, including perception, attention, memory, and decision-making. We will put a particular emphasis on understanding the methodological approaches to the study of the brain and cognition and developing transferable skills.

Learning objectives

- Become familiar with the current **methods** and **topics** in cognitive neuroscience so you can become an educated "consumer" of cognitive neuroscience research.

- Become comfortable at reading and discussing **primary research literature** and critically evaluating data and conclusions, including their relevance to your own area of inquiry.

- Become comfortable with **delivering a scientific presentation**.

- Learn to write a **concise and compelling research proposal** that identifies a scientific question, proposes a hypothetical answer to this question, and describes a novel research strategy to test it

- Learn to **clearly and succinctly communicate** scientific work of self and others in oral and written form and provide **constructive feedback** on others' work

Format

Unless otherwise announced, all classes will be in person, **Monday and Wednesday at**

Unless otherwise announced, all classes will be in person, **Monday and Wednesday at 10am.** The class will be dedicated to lectures, Q&A, discussion of the past week's material, interactive presentations by students and instructors, and getting together as a group. The course will combine assigned readings, synchronous (and possibly occasional) asynchronous instruction, student presentations and class discussions though discussion boards. All materials will be provided through Canvas Modules and you will work through them each week mostly at your own pace. There will be weekly assignments to help you learn the material, with a single weekly deadline on **Sunday 11:59pm** to give you a maximum flexibility. As the background knowledge of students entering the class varies widely, please do not hesitate to ask questions of any level throughout the class.

Workload

The UO specifies that for a 4-credit graduate class, your workload should be about 160 hours throughout the 10-week term. You are expected to be highly active in the class. Please take your time reading and thinking about the assigned papers each week. Complete all readings, instruction videos and assignments in a timely manner. Think about how you can relate what you are learning in the class to your own research or to your life. Nurture your curiosity about the mind and brain in one of your last formal class experiences.

Class Activities

The workload for this class will be split across multiple activities that are jointly designed to achieve the course learning objectives. Unless stated otherwise, late assignments will have 5% deducted per day late. Here are the key components and their weight in your final grade:

Weekly assignments and discussions (35%)

Each week's module will contain several components, including readings, videos, and short assignments. Assignments will be due each Sunday by 11:59pm. An important part of each week's module will be **a discussion of the assigned readings through Canvas discussion** and in-class discussion**.** While background knowledge will vary widely in the class, everyone is expected to learn something new and contribute their perspective.

After completing the assigned readings, you should contribute to the discussion on Canvas by playing the role of either Reviewer or Author. Specifically, we ask that for each assigned paper you provide either 1) a critique from the perspective of a Reviewer (e.g., a flawed analysis, misinterpretation of a result, etc.) or 2) a reply to someone else's critique defending the paper from the perspective of an Author (i.e. a rebuttal). Each week, you should make sure to play both the Reviewer and the Author roles (i.e., provide at least one critique and one rebuttal). There will typically be two papers per week (depending on enrollment), in which case you should provide a Reviewer's critique for one and an Author's rebuttal for

another. They do not need to be long (e.g. can be just two or three sentences), but should be thoughtful (e.g., don't just critique their choice of font in the figures). You may want to visit the discussion board more than once to read and/or respond to new contributions.

Research article presentation (20%)

Each week will involve discussion of two or more scientific articles about the week's topic. For each article, one student will be the presenter and is responsible for thoroughly reading the article and doing some *light background reading* to be able to explain the context of the study and the methods and results to the class. You are welcome to consult one of the instructors if you need help and it is also fine if you highlight a challenging aspect of the results that you may not understand, so we can work through it together in class. The presenter will be responsible for giving a presentation during class time on the article. The presentation should be 15-25 minutes long and consist of background, specific question or hypothesis addressed, explanation of core methods, description and interpretation of main results, and conclusions along with your evaluation.

Research Proposal (45%)

We would like you to ponder how cognitive neuroscience tools can help us answer novel questions and give you an opportunity to practice clear and concise formulation of ideas. To this end, you will write a short research proposal for a cognitive neuroscience project of your choice. You should not propose a project that you have already described (e.g., for another class, conference or grant), although a proposal that ties the class material to your own research is acceptable if cleared with the instructors in advance.

The completion of the research proposal is scaffolded through several steps, including two brief presentations:

- Week 5: submit a short "Proposal proposal" including topic, motivation and technique (3-4 sentences + 2 references).
- Week 7: present an Elevator Speech (~2 minutes, no slides) about what you plan to write.
- Week 8: submit a complete draft for the first round of feedback.
- Week 9: comment on two other proposals assigned to you, using the rubric.
- Week 10: presentations and discussions of the proposals.
- Finals Week: submit final paper by Wednesday at midnight.

Detailed instructions for each submission will be available on Canvas.

Tentative class schedule, subject to change.

Week 1	4/3	Overview	
	4/5	Neuroanatomy + Neural Coding	
Week 2	4/10	Neural Coding presentation	
	4/12	Perception + lesion methods	
Week 3	4/17	Perception presentation	
	4/19	Attention + EEG methods	
Week 4	4/24	Attention presentation	
	4/26	Long-term memory + fMRI methods	
Week 5	5/1	LTM presentation	
	5/3	Working memory/Cognitive control + TMS methods	**Proposal proposal due 5/7**
Week 6	5/8	WM/CC presentation	
	5/10	Reinforcement learning/Decision making + model-based methods	
Week 7	5/15	RL/DM presentation	
	5/17	Discovering "Processes": Functional connectivity methods *Project proposal elevator speech*	
Week 8	5/22	Connectivity Presentation	

	5/24	Discovering "Representations": MVPA methods	**First complete draft due 5/28**
Week 9	5/29	Memorial Day	
	5/31	MVPA Presentation	**Peer comments due 6/4**
Week 10	6/5	*Project proposal presentations*	
	6/7	*Project proposal presentations*	
Final	**6/12**		**Final project due 6/12**