Eligibility

The course is open to graduate students in the Department of Psychology, Program in Neuroscience, and related programs, as well as to undergraduates who are working on their senior thesis in neuroscience. Because of the workshop style of this course, enrollment will be limited to a small number of students. Graduate students who already have their own data and a concrete project idea will be prioritized.

Prerequisites

Students do not need to have taken a computational neuroscience course, although that is useful. Students do need to be comfortable with numerical programming and elementary math.

Course Requirements

Grading will be based on the following elements:

(1) Final paper (25%): an 8-12 page research paper is due on the first day of the exam period (December 11).

(2) Final presentation (25%): a short presentation on your research project at the end of the course.

(2) Class participation (50%): students are expected to participate in each class.

Grading Rubric

94-100 A 90-93 A- 87-89 B+ 83-86 B

80-82 B- 77-79 C+ 73-76 C 70-72 C-

67-69 D+â€¨ 63-66 Dâ€¨ 60-62 D- Below 60 E (fail)

Academic Honor

You are expected to submit your own, original work for the exam and the final paper. Any misconduct will be reported, as is required by the college. Discussing your ideas with others and getting feedback on your work is encouraged, but you are required to cite any and all ideas that are not your own, and ensure that any assignments you turn in are your own writing and the result of your own research.

Accessibility

Any student needing academic adjustments or accommodations is requested to present their letter from the Accessible Education Office (AEO) and speak with the professor by the end of the second week of the term, (specific date). Failure to do so may result in the Course Headâ€™s inability to respond in a timely manner. All discussions will remain confidential, although AEO may be consulted to discuss appropriate implementation.

Class 1 (9/6): Theoretical foundations (lecture)

Readings:

Gershman, S.J. (2021). Just looking: the innocent eye in neuroscience. *Neuron, 109*, 2220-2223.

Jonas, E., & Kording, K.P. (2017). Could a neuroscientist understand a microprocessor? *PLoS Computational Biology, 13*, e1005268.

Class 2 (9/13): Practical foundations (lecture)

This lecture will introduce practical aspects of applied computational neuroscience: data organization, probabilistic programming languages, visualization, model checking, and more.

Readings:

Gelman, A., Vehtari, A., Simpson, D., Margossian, C. C., Carpenter, B., Yao, Y., ... & ModrÃ¡k, M. (2020). Bayesian workflow. arXiv preprint arXiv:2011.01808.

Class 3 (9/20): Student presentations introducing research projects + brainstorming

Class 4 (9/27): Student presentations introducing research projects + brainstorming

Class 5 (10/4): Student presentations introducing research projects + brainstorming

Class 6 (10/11): Project-related teaching

Lecture slides

Class 7 (10/18): Project-related teaching

Class 8 (10/25): Project-related teaching

Class 9 (11/1): Project-related teaching

Class 10 (11/8): Final project presentations

Class 11 (11/15): Final project presentations

Class 12 (11/29): Final project presentations