This syllabus is subject to change. Changes will be announced in class and by email.

**COURSE DESCRIPTION**
This course will introduce students to computational neuroscience at the level of populations of neurons, behavior, and networks. Specific topics: the brain in numbers, receptive fields, tuning curves, linear-nonlinear models, neural variability, choice probability, signal detection theory, population codes, correlations, neural decoding, brain-machine interfaces, neural networks, and artificial intelligence. Programming will be done in Matlab; no familiarity is assumed. In terms of math, a good grasp of Calculus 1 is sufficient.

**LOGISTICS AND POLICIES**
Prerequisites: Intro to Neural Science

Office Hours: TBD. You can also make an appointment. Besides the class, I’m happy to meet about broader academic issues, such as an interest in research that you might have, your next career steps, or concerns that you have.

**Grading**
The total grade will be calculated as follows:
- Homework 60%
- Final project presentation 10%
- Final project paper 20%
- Participation 10%

Missed homeworks will count as a grade of 0. You can drop the lowest three homework grades.

Your numerical grade will be rounded to the nearest integer and turned into a letter grade as follows:
- 93-100 A
- 90-92 A-
- 87-89 B+
- 82-86 B
- 79-81 B-
- 76-78 C+
- 71-75 C
- 68-70 C-
- 65-67 D+
- 60-64 D
- 0-59 F.

**Academic conduct**
Students are expected to adhere to the University’s standard of academic ethics. Students caught cheating or plagiarizing will be subject to forfeiting their exams, a failing grade for the exam and/or the course, and notification of the Dean’s office. NYU’s Academic Integrity policies
Cell phones and electronics
Please only use electronics when relevant for the class. Please be considerate to your fellow students and keep distractions to a minimum. Recording of the lectures in any format is not permitted without first speaking with me.

Assignments
- Homework will generally be once a week. It is due at the start of the Tuesday lecture
- Information regarding homework assignments will be posted on NYU Classes. All homework and the final paper must be uploaded to NYU Classes.
- We will not use a textbook. We will use lecture slides, lecture notes and supplementary readings, which will be posted to NYU Classes.
- The final project will consist of a small research project on a topic related to class.
- Possible topics will be announced later. You will give a brief presentation and write a report.

Participation
Attendance is mandatory. If you cannot attend, please email Weiji in advance. You will be responsible for material that you missed, but you can ask Weiji if anything is unclear.
In class, active participation means not being distracted, engaging with questions posed, engaging with in-class activities, and asking your own questions.

Disability Disclosure Statement
Academic accommodations are available for students with disabilities. The Moses Center website is www.nyu.edu/csd. Please contact the Moses Center for Students with Disabilities (212-998-4980 or mosescsd@nyu.edu) for further information. Students who are requesting academic accommodations are advised to reach out to the Moses Center as early as possible in the semester for assistance.

OVERVIEW
Date: Topic (What Assignment Due)
Class 1: Introduction / The brain in numbers: size and weight
Class 2: Matlab tutorial
Class 3: The brain in numbers: energy consumption, wiring length
Class 4: Matlab tutorial
Class 5: From voltage-based to rate-based neuron models (HW1)
Class 6: Computer lab
Class 7: From retina to V1: linear receptive fields (HW2)
Class 8: Computer lab
Class 9: Tuning curves, population codes. (HW3)
Class 10: Computer lab
Class 11: Models of neural variability (HW4)
Class 12: Computer lab
Class 13: Decoding and estimation (HW5)
Class 14: Computer lab
Class 15: Choice probability. Brain-machine interfaces. (HW6)
Class 16: Computer lab
Class 17: Doing tasks with neural populations (HW7)
Class 18: Computer lab
Class 19: Neural networks 1: feedforward networks (HW8)
Class 20: Computer lab
Class 21: Neural networks 2: recurrent networks (HW9)
Class 22: Computer lab
Class 23: Computational neuroscience, computational cognitive science, and AI (HW10)
Class 24: Work on project
Class 25: Work on project
Class 26: Student presentations presentation
Class 27: Student presentations presentation
Final paper