

NEUR 461/BENG 499 – Neuroinformatics Methods
Spring 2025; Section 001
In-Person

Instructor: Dr. Sarojini M. Attili

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Meeting time: Thursdays 10:30 am-1:10 pm

Meeting location: IN 203 computer lab

Office Hours: Tuesdays 11:45 am to 1 pm at Krasnow Building, Room 254 or by appointment

Course Overview: Neuroinformatics Methods combines neuroscience with data science, teaching students how to use computational tools to analyze various types of neural data, including neuron morphology, electrophysiology, and others. The curriculum emphasizes hands-on analysis skills across various brain data types. Students develop foundational Python programming skills and learn to use both coding and non-coding methods to analyze real datasets. The course culminates in a team project where these skills are applied to real-world neuroscience data.

Materials needed: No textbook is required. Open educational resources will be provided from various sources.

Technological Requirements: Access to Canvas, email and an internet browser.

Grading Scale:

A+ 97-100%	B+ 87-89%	C+ 77-79%	D 60-69%	F 0-59%
A 93-96%	B 83-86%	C 73-76%		
A- 90-92%	B- 80-82%	C- 70-72%		

Grading:

5 homework assignments (20 points each)	100 points
Midterm	75 points
Project – (team, outline, written report) (5+10+45 = 60 points)	60 points
Project presentation	15 points
Attendance	10 points
Total	260 points

Homework assignments: There will be a total of six homework assignments following each topic presented in class. The assignment with the lowest grade will be dropped. It is important to attend classes in order to do well on the assignments.

Midterm: There will be one take-home midterm exam after the first seven lectures. The exam will consist of hands-on activities, analysis-based tasks, and free-response questions.

Project: The course will culminate in a group project where students will apply the skills they have learned throughout the course.

Attendance: There are a total of 12 lectures in the semester. You will receive 1 point for attending each lecture on time (by 10:30 am). You can earn up to 10 attendance points (which means you will be excused for being absent for two lectures). You will not receive points if you are late to class.

Tentative Course Calendar

Week	Topic	Assignments
1/23/25	Introduction to Neuroinformatics	Journal article 1
1/30/25	Python basics and examples	Homework 1 Journal article 2
2/6/25	Allen Institute and Flywire – understanding brain maps, cell classification, transcriptomic data and cell explorer	Homework 2 Journal article 3
2/13/25	Morphological data - Allen Institute, Neuromorpho.org	Homework 3 Journal article 4
2/20/25		
2/27/25	Electrophysiological data - Allen Institute, Hippocampome.org and other sources	Homework 4 Journal article 5
3/6/25		
3/13/25	Spring Recess	
3/20/25	Take Home Midterm	
3/27/25	Introduction to NEURON software for constructing neuron models and neuronal networks and the database MODELDB	Homework 5 Journal article 6
4/3/25		
4/10/25	Introduction to imaging data, sources and analysis; Project overview	Homework 6
4/17/25	Project rubric, expectations, project ideas and examples	Team information & project outline
4/24/25	More on resources and databases, Students continue working on projects	
5/1/25	Submit and deliver presentations	Written report due, Presentation Due (For teams that are presenting this week)
5/8/25	Submit and deliver presentations	Presentations Due (For teams that are presenting this week)

Student responsibilities:

- Attend all classes on time & participate in activities/discussions.
- Complete all work by the due dates.
- Be respectful to others, limit distractions in class including side conversations, usage of devices, and don't interrupt.
- Seek help if you are struggling.

Mandatory Attendance: Students are expected to attend class on time and participate in all discussions and activities for the whole duration of each lecture. **There will be no make-up exams.**

Late Work: Unless prior arrangements are made, late work will incur a deduction of 20% and will not be accepted more than two weeks after the due date. No late work will be accepted after May 4th. Late exams and exam extensions are not accepted except in cases of emergency or illness. It is imperative that you contact me as soon as possible regarding any issues that may affect your ability to complete assignments.

Class communication: If you need to contact me, please do so using e-mail from your university account only and include the course name in the subject line and include your name in the e-mail. Check your e-mail and course Canvas account daily and before each class meeting. The instructor reserves the right to make any changes in the course she determines academically advisable. I will use e-mail and Canvas to communicate with you regarding changes related to the course, syllabus, and other essential information. You are responsible for all announcements posted and sent via Canvas and e-mail, in addition to announcements made in class.

Writing Center: George Mason University provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) for supporting students as they work to construct and share knowledge through writing. See writingcenter.gmu.edu

Academic Integrity: George Mason has an honor code with clear guidelines for academic integrity. Honesty, expectation and requirement are taken very seriously, and breaches of this trust are treated gravely. Students must be responsible for their own work. When in doubt (of any kind) please ask for guidance and clarification. Cheating of any form is not tolerated. Students and faculty must take on the responsibility of dealing explicitly with violations.

Professional disposition: Students are expected to exhibit professional behavior at all times.

Disability Accommodations: If you have a documented learning disability or other condition that may affect academic performance you should: 1) make sure this documentation is on file with Office of Disability Services (SUB I, Rm. 4205; 993-2474; ods.gmu.edu) to determine the accommodations you need; and 2) talk with me to discuss your accommodation needs. (Please talk to the Disability Services office first; they will meet with you and help you with your

individual needs. We can only activate your accommodation after you talk with Disability Services. Then talk to the instructor.)

Counseling and Psychological Services: George Mason University has a staff of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops, and outreach programs) to enhance students' personal experience and academic performance. See caps.gmu.edu

COVID Policies: All students, instructors, and TAs are required to follow the university's public health and safety precautions and procedures outlined on the university Safe Return to Campus webpage (<https://www2.gmu.edu/safe-return-campus>). Similarly, all students, instructors, and TAs in face-to-face and hybrid courses must also complete the Mason COVID Health Check daily, seven days a week. The COVID Health Check system uses a color code system and students will receive either a Green, Yellow, or Red email response. Only students, instructors, and TAs who receive a "green" notification are permitted to attend courses with a face-to-face component. If you suspect that you are sick or have been directed to self-isolate, please quarantine or get testing. Faculty are allowed to ask you to show them that you have received a Green email and are thereby permitted to be in class.

Mason Diversity Statement*

George Mason University promotes a living and learning environment for outstanding growth and productivity among its students, faculty and staff. Through its curriculum, programs, policies, procedures, services and resources, Mason strives to maintain a quality environment for work, study and personal growth. An emphasis upon diversity and inclusion throughout the campus community is essential to achieve these goals. Diversity is broadly defined to include such characteristics as, but not limited to, race, ethnicity, gender, religion, age, disability, and sexual orientation. Diversity also entails different viewpoints, philosophies, and perspectives. Attention to these aspects of diversity will help promote a culture of inclusion and belonging, and an environment where diverse opinions, backgrounds and practices have the opportunity to be voiced, heard and respected.

* This is an abbreviated statement; full statement is available at <http://ctfe.gmu.edu/professional-development/mason-diversity-statement/>