

NEUR 461/BENG 487 – Neuroinformatics Methods
Spring 2026; Section DL1
Online

Instructor: Dr. Sarojini M. Attili
Email: sattili@gmu.edu
Meeting time: Thursdays 4:30 pm to 7:10 pm
Meeting location: Zoom
Office Hours: Online 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: A functional computer with access to Canvas, email, an internet browser and a webcam. Students will need space on their laptops or external drives or cloud platforms to store downloaded data. Students will also need to be able to download software tools.

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 activities/assignments (30 points each)	150 points
Project – (team, topic/question, outline, written report) (2+8+15+35 = 60 points)	60 points
Project presentation	20 points
Attendance and Participation (Webcam Required)	10 points
Total	250 points

In-class Activities: There will be a total of six activities following each topic presented in class. The activity with the lowest grade will be dropped. Students will start working on the activities in class with the instructor's guidance and can complete and submit the work before next class. Hence it is important to attend and participate in the classroom sessions.

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 4:30 pm) only if your webcam is turned on.** 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
1/22	Introduction to Neuroinformatics	Assigned reading
1/29	Python basics and examples	Activity 1 and assigned reading
2/5	Allen Institute and Flywire – brain maps, cell classification, transcriptomic data and cell explorer	Activity 2 and assigned reading
2/12	Data Analysis & Visualization	Assigned reading
2/19	Morphological data part 1 – analyzing images of stained brain sections, Allen Institute	Activity 3 and assigned reading
2/26	Morphological data part 1 (continued)	
3/5	Morphological data part 2 – analyzing 3d cell structures, neuromorpho.org	
3/12	Spring Recess	
3/19	Morphological data part 2 (continued)	Activity 4 and assigned reading
3/26	Electrophysiological data - Allen Institute, Hippocampome.org and other sources	Activity 5 and assigned reading
4/2	Electrophysiological data (continued) – analyzing spike train data	
4/9	Introduction to computational modeling of neurons using NEURON, Project overview, expectations, resources, and rubric	Activity 6 and assigned reading
4/16	Overview of other data types for analysis, project outline requirements	Team information due
4/23	Students continue working on projects and presentations	Project topic/question due
4/30	Students continue working on projects and presentations	Project outline due
5/7	Submit report and deliver presentations	Written Reports & Presentations Due

Student responsibilities:

- Attend all classes on time & participate in activities/discussions.
- **Webcams must be turned on.**
- 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 April 30th. 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.

AI (Artificial Intelligence) Tools Policy:

AI tools such as ChatGPT, Gemini, or similar platforms may be used to assist with research and editing documents for clarity and language. **However, students must not use these tools to complete assignments or produce work on their behalf. All submitted work must be original and created by the student, with AI tools limited to the specified purposes of research support and language refinement.** Please follow GMU AI guidelines if you choose to use AI tools for support with your coursework.

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 Standards: 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/>