Georgia Institute of Technology
NEUR 4808: Special Topics
Applied Statistics in Neuroscience
Fall 2026

Class times: Monday & Wednesday 8:25-9:15am (CRN: 92588)
Studio time: Thursday 8:25-10:20 (CRN: 92589) OR Friday 8:25-10:20 (CRN: 94253)
Prerequisite: NEUR 2000/2001/2010

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Course Description and Learning Objectives

This course will explore the common statistical analyses performed in neuroscience research. Students will develop a solid foundation in experimental design and will be able to analyze, visualize, and interpret experimental data with keen insights into how popular media presents and interprets statistics.

At the end of the semester, you will be able to:

- **Apply** statistical and analytical methods to analyze data commonly encountered in neuroscience research across multiple domains (e.g., neural recordings, brain imaging, and behavioral data)
- **Assess** neuroscience experimental design by understanding key concepts of hypothesis testing, power analysis, and confounding variables
- Critically **evaluate** the statistical methods used in published neuroscience research and how they are presented in news reports, **identifying** strengths, weaknesses, and potential biases in both forms of scientific reporting
- **Interpret** and **communicate** statistical findings from neuroscience datasets
- **Utilize** statistical software (primarily R) to conduct data analyses, interpret results using neuroscience datasets, and display appropriate visualizations
- **Develop** and **execute** a complete statistical analysis of a neuroscience dataset, including designing the analysis plan, performing statistical computations, and presenting the conclusions

Requirements

Required materials: There is no textbook for this course. This syllabus is required reading. Supplemental readings will be posted on Canvas as a resource for students.

Computer and Internet: A computer and a stable internet connection are required to be able to access course materials and to submit assignments. Please contact us if you need any assistance in accessing the course.

Software: This course will utilize the open-source platform R. You must have access to R on your personal computer or from a computer on loan from the library. You can also take advantage of R Studio to help with R commands and codes.

Communication: This class will communicate via Canvas and through your Georgia Tech email address. Please check your GT email address regularly and check your Canvas notification settings so you do not miss any updates and announcements. **Please email directly from your GT email address and indicate your course and section number in the subject line.** We will do our best to reply to your emails within 24 hours during the school week. **To stay organized, we will not accept assignments via email**. We would like for you to have a support system for this course, so please communicate with your classmates and with us early and often.

Canvas and Student Technology Support: This course utilizes Canvas, a virtual learning management system. Canvas is compatible with all browsers and works with your phone. You may consider downloading the app for your phone to receive notifications and alerts for your courses. Verify your email settings are set to forward to your GT email address, and make sure you are receiving emails from the system.
GT Canvas site: https://canvas.gatech.edu/
GT Canvas app for students: https://community.canvaslms.com/t5/Canvas-Basics-Guide/What-is-the-Canvas-Student-app/ta-p/31

Need Microsoft Office? Get access to the FREE cloud-based version of Office 365 by visiting the GT Office 365 website and using your GT email address.
GT Office 365 Website: http://portal.office.com

Need tech help? Contact the Office of Instructional Technology with any technology questions or connect in the Virtual Help Desk.
Office of Instructional Technology website: https://oit.gatech.edu/
Contact information: https://oit.gatech.edu/contact-us

Course Policies

Attendance Policy: This course is designed for in-class learning and hands-on activities, and therefore active engagement is critical for the success of the course. You are expected to come to class each day prepared to participate and engage with your peers. In-class participation and engagement are calculated into your final grade via in-class activities each week (see grade table below).

Make-up Policy: Late assignments will lose 10% per day off the final grade and will not be accepted after one week past the due date. For extensive illnesses and emergencies, contact the Dean of Students who can inform and work with your instructors. Make-up exams or other assessments will be given only with

advance notice and/or official documentation from the Institute or the Dean of Students. https://studentlife.gatech.edu/request-assistance

Course Engagement: Student engagement in coursework and class activities is essential for learning and student success. In addition, to comply with federal mandates related to financial aid, the university is required to track attendance and engagement in course activities. Meaningful engagement in a course goes beyond logging into Canvas and may include engaging with learning materials, participating in learning activities, completing assessments, and interacting with classmates and/or the instructor. You are expected to be actively engaged in the course activities explained in this syllabus, just as the instructor promises to be actively engaged, as well.

Policy on use of generative AI for class work: AI-based assistance, such as ChatGPT or Copilot, is considered unauthorized collaboration in this course when used in lieu of writing and interpreting in your own words. In your assignments, **avoid anything that was not written directly by you**. Including anything you did not write in your assignment without proper citation will be treated as an **academic misconduct** case and will be reported to the Office of Student Integrity. Use any interaction with an AI assistant as a *tool* to promote your learning experience, with your completed submitted product reflecting your interpretation and understanding of the material. You are allowed to use generative AI to help debug code, but do not use it as a substitute for learning the proper commands in studio. https://www.cc.gatech.edu/news/new-policies-navigate-role-ai-assistants-cs-courses

Academic Honesty and Integrity: Your instructors take academic integrity very seriously. Cheating, in any form, interferes with your success. As science is collaborative by nature, you are absolutely permitted to discuss ideas, results, and work with other people. However, **all work you submit must be your own and in your own words**. If you turn in another's work as your own, **including AI-generated material**, you should expect a failing grade for the course. Work on individual assignments should be done independently. If you have any questions about anything, please do not hesitate to reach out to us. We are here to help!

GT Academic Honor Code: Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech's Honor Code and the student Code of Conduct. Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Accommodations for Students with Disabilities

If there are aspects of the instruction or design of this course that result in barriers to your inclusion or accurate assessment of achievement, please notify us as soon as possible so we can resolve the issue. Students with disabilities should also contact the Office of Disability Services (ODS), whose purpose is to collaborate with students, faculty, and staff to create a campus environment that ensures all students

have an equal opportunity to access the Georgia Tech community. ODS can be reached at 404.894.2563, dsinfo@gatech.edu, or https://disabilityservices.gatech.edu. Please contact us ahead of time to discuss any issues related to disabilities. We are happy to work with you.
Office of Disability Services:
Smithgall Student Services Building
Email: dsinfo@gatech.edu
Phone: 404-894-2563
Website: http://disabilityservices.gatech.edu/

Academic and Personal Support

Center for Academic Success: http://success.gatech.edu

- Tutoring: https://www.success.gatech.edu/tutoring/
- 1-to-1 tutoring: https://www.success.gatech.edu/tutoring/1-to-1-tutoring/
- Peer-Led Undergraduate Study (PLUS): https://www.success.gatech.edu/tutoring/plus/
- Academic coaching: https://www.success.gatech.edu/retention/academic-coaching/
- Communication Center: http://www.communicationcenter.gatech.edu
    - Individualized help with writing and multimedia projects

National Suicide Prevention Hotline at 988 and https://988lifeline.org/**.**

Student Mental Health and Wellbeing: At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A comprehensive list of wellness related resources has been compiled and maintained by the Office of the Vice President for Student Engagement and Well-being.
https://studentlife.gatech.edu/services/mental-health-well-being

National Suicide Prevention Hotline at 988.

The Office of the Dean of Students: https://studentlife.gatech.edu/about/dean-students
Smithgall Student Services Building 2nd floor

Center for Mental Health Care and Resources: https://mentalhealth.gatech.edu/
Smithgall Student Services Building 2nd floor
Phone: 404-894-2575

- Services include short-term individual counseling, group counseling, couples counseling, testing and assessment, referral services, and crisis intervention.
- Their website also includes links to state and national resources.
- *Students in crisis may walk in during business hours (8am-5pm, Monday through Friday) or* ***contact the counselor on call after hours at 404-894-2575 or GT PD at 404-894-2500.***

Students' Temporary Assistance and Resources (STAR): https://star.studentlife.gatech.edu/

- Can assist with interview clothing, food, and housing needs

Stamps Health Services: https://health.gatech.edu
740 Ferst Dr NW, Atlanta, GA 30332
Phone: 404-894-1420

- Primary care, pharmacy, women's health, psychiatry, immunization and allergy, health promotion, and nutrition

Belonging and Student Support: https://belonging.gatech.edu/studentsupport
Student Engagement and Well-being: https://students.gatech.edu/
Veteran's Resource Center: http://veterans.gatech.edu/
Georgia Tech Police: 404-894-2500

How to succeed in this class

Science is collaborative, innovative, and also kind of hard sometimes! In this class we will be using the open-source coding platform R to analyze neural datasets. Coding has a reputation of being difficult, frustrating, and downright confusing at times, but you will not be working alone to figure it out. All the code you need will be available to you as R is the tool you will be using and not a metric for assessment. Your success in this class will not be judged by your knowledge of the code, but by your application of statistical concepts, participation, creativity, determination, and communication. We will work together throughout the semester, and your success will depend on your willingness to engage deeply with the data and work in collaboration with your peers.

	Points
Skill Assessments *Collaborative Skill Assessments* *5pts each (applied to final grade: top 7 of 10)* *In-class group activity; short discussion topics based on lecture material* *Individual Skill Assessments* *5pts each (applied to final grade: top 7 of 10)* *Out-of-class individual activity; practice problems based on lecture material* *Applied Practice Problems* *10pts each (applied to final grade: top 5 of 6)* *In-class group activity; worksheets based on lecture material*	120
Paper Analyses *Perusall readings* *10pts each (x5)* *Out-of-class individual activity; read and assess primary research papers on Perusall* *Questionnaires* *20pts each (x5)* *In-class group activity; in-depth analysis of the primary research paper focused on a specific statistics topic*	150
Writing and communication assessments *Reflections* *10pts each (x2)* *Individual activity; personal reflections at the beginning and end of the semester* *Statistics in the News* *60pts*	80

Individual activity w/ group components; individually compare a news article to the primary research and then work with group on studio presentation of articles	
Exams *Unit Exams* *100pts each (x2)* *Individual activity; in-class in Lockdown Browser* *Cumulative Final Exam* *150pts* *Individual activity; in-class in Lockdown Browser*	350
Studio Skill Assessments *Worksheets* *5pts each (applied to final grade: top 6 out of 7)* *In-studio individual activity; applied practice in R of statistical analyses learned in lecture* *Assessments* *R Quiz (50pts); In-studio individual activity; assess basic R knowledge* *Statistics Telephone (20pts); In-studio group activity; practice creating data visualizations in R and interpreting peer's figures*	100
Studio Project *Scaffolded components (individual activity w/group components), 10pts each (x6)* *Peer reviews (individual activity), 20pts each (x2)* *Final Presentation (group activity), 100 pts*	200
All assessments are applied to your final grade unless otherwise noted.	**1000**

Grading Scale

Your final grade will be assigned as a letter grade according to the following point scale:

A	900 - 1000
B	800 - 899
C	700 - 799
D	600 - 699
F	0 - 599