NEUR4001 Syllabus

Neuroscience Research Project – A/A1 - 4cr

Summer 2026

Instructor Information

Instructor: Dr. Ian Krout, PhD

Email: ikrout3@gatech.edu

General Course Information

Description

The purpose of this course is to familiarize you to the methods and processes used by neuroscientists to generate scientific research. Over the course of the semester, you will gain an understanding of the process of research – from generating research questions, developing a testable hypothesis, evaluating the existing literature, data collection and analysis, interpretation of results, and communicating findings to others in oral and written form. **Our main objective is to increase your confidence in scientific literacy to help you as the recipient and generator of knowledge in life and in your future profession.**

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

- Articulate strengths and limitations of various research designs
- Locate and utilize primary literature to identify experimental designs and essential background information
- Formulate testable research hypotheses and generate tests or experiments based on operational definitions of variables
- Follow the APA Code of Ethics in the treatment of human and nonhuman participants in the design, data collection, interpretation, and reporting of neuroscientific research and follow proper biosafety procedures
- Evaluate the appropriateness of conclusions derived from research outcomes
- Identify when and where to use specific statistical tests and interpret basic statistical results
- Communicate scientific knowledge in written, graphical, and oral format and recognize importance of accurate reporting of methods and data for

replication studies
- Work collaboratively toward shared research goals while critically evaluating research design and presentations.

Required Course Materials

Readings

There is no textbook for this course. The syllabus is required reading. Other readings throughout the semester will be chosen by students based on topic of interest and timeliness of the publication (new primary literature articles primarily). Readings will be posted on Canvas and should be read before class so you are prepared to contribute to the classroom discussion.

Computer and Internet

A computer and stable internet connection are required to be able to access course materials and submit assignments. Please contact us if you need any assistance in accessing the course. Additionally, Microsoft office applications may be used over the course of the semester. 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

Canvas

The course will utilize Canvas, a virtual learning management system (LMS). Canvas is compatible with all browsers and works with a smartphone. You may consider downloading the app for your phone to receive notifications and alerts for your courses. All assignments will be submitted via this platform for assessment. Verify your email settings are set to forward 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

Communication:

This class will communicate via Canvas and through your Georgia Tech email address. Please check your GT email address regularly so you do not miss any updates and announcements. **If not emailing directly via Canvas, please indicate your course and section number in the subject line.** The instructor and/or TA will do their 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, instructor, and TA early and often.

Grading Policy:
Science is collaborative, innovative, and also kind of hard sometimes! Experiments do not always go as planned, and we should never set out to "prove" our hypotheses. Negative data, confusing data, no data – these are all possible (if not, probable) outcomes for some of our experiments this semester. Your success in this class will not be judged by the outcome of your experiments, but by your 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 research and work in collaboration with your partners.

Assignment		**Points**
Research Project – Written (375 pts) (37.5%)	Topic/Hypothesis/Predictions	25
	Annotated Bibliography	50
	Draft: Intro and Methods	50
	Draft: Results and Figures	50
	Final Research Paper	200
Research Project – Oral Presentation (275 pts) (27.5%)	Proposal Presentation	100
	Response to Peer Feedback	25
	Final Presentation	150
Journal Club Presentation (75 pts) (7.5%)	Presentation	50
	Written analysis	25
Recent Advances in Gut-Brain-Axis Research Report (75 pts) (7.5%)	Presentation	50
	Written analysis	25
Guest Research Lecture Reflection (2.5%)		25
Course Reflections (2.5%)		25
Participation (15%) (150 pts)	In-class participation/practicums/trainings	150
TOTAL		**1000**

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

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

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 without Dean of Students documentation. For extensive illnesses and emergencies, contact the Office of the Vice President and Dean of Students who can inform and work with your instructors. https://studentlife.gatech.edu/request-assistance

Extra Credit

If an extra credit opportunity arises, we will inform you. **To be fair to all students, we cannot offer extra credit to an individual student that has not been offered to the entire class.**

Proposed Schedule is posted on Canvas and is subject to change; any changes will be posted on Canvas and announced in class. **All deadlines are 3:15pm Eastern on Canvas unless otherwise noted.**

Description of Graded Components

Research Project: Throughout the semester, you will work on a neuroscience research project related to the overall theme of the course. You will be working as part of a team of 2-3 students to gain realistic research experience. As a group, you will decide on a topic, propose your topic, collect data, analyze it using the correct statistical analyses, and present your findings in oral and written form. You will submit drafts of specific sections of the project throughout the semester and receive feedback from your instructor, TA, and peers. As a group, you will present your proposal and final presentation to the class to gain experience presenting to a scientific audience. Finally, individually you will turn in a full APA-style manuscript of your research findings.

Journal Club:): Each group will consult with the instructor to select an original, empirical research paper (not review!) related to their research topic and summarize the main points in a "journal club" style presentation and discussion with their peers (up to 20 minutes duration). To gain competence and practice interacting with Generative AI in an ethical, efficient, and reliable manner, each group will prompt GenAI to summarize their chosen paper. The group will analyze this summary and use visible "track changes" (accessible in Microsoft Word) to correct and improve it. The final submission should be a track-changed document in Microsoft Word (2-page max) outlining the rationale for the study, the hypothesis, the approach and major findings, major conclusions, limitations of the study, and potential logical future experiment(s). The presentation and written analysis are

intended to foster critical analysis of research papers and help prepare for the remaining oral and written assignments.

Recent Advances: Each individual will be responsible for diving into the gut-brain-axis field on their own time outside of the classroom. This can take the form of finding and analyzing a news article related to the gut-brain-axis, attending a seminar on a related topic, summarizing a newly published review article (2025/2026), or another method of consuming cutting-edge research advances. Each student will be responsible for conveying a summary of their chosen recent advances, discussing what makes the paper novel, what flaws exist, and what the next steps for research in this sub-field might look like. Special focus should be allotted to novel techniques and methodologies as well as the application of the findings to neuroscience more broadly.

Guest Lecturer: Halfway through the semester we will have a class period dedicated to a guest lecturer working in the field presenting their research and findings. Students will be asked to actively engage with this speaker during the course period as well as complete a reflection about what they have learned from the speaker and how it connects to their own project.

Course Reflection: Throughout the semester, you will be asked to submit three (3) reflections. The first and last reflections are for you to express what you hope to learn and what youlearned, respectively, in this course. The second reflection should describe what you learned from the Guest Research Lecturer, both during their lecture and during the discussion with your peers and instructors after. All reflections should be approximately 300 words.

Course Policies

Attendance and/or Participation

This course is a hands-on lab course, and students are expected to fully participate and engage each week. In-class participation is calculated as part of your final grade (see grading table above). The instructor will work with students who have obtained Institute Approved Absences (IAAs) or official documentation from the Dean of Students to provide reasonable accommodations for missed work when possible.

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 and TA promise to be actively engaged, as well. To maintain professionalism and ensure positive interactions and continued collaboration within your group, it is critical that you communicate timely with your group members to inform them of any absence or tardiness.

Academic Integrity

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.

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 (unless explicitly stated otherwise)**, 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 the instructor or TA. We are here to help!

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.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

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.

Academic and Personal Support

APA Style resource: http://owl.english.purdue.edu/owl/resource/560/01/
Center for Academic Success: http://success.gatech.edu

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

Student Mental Health and Wellbeing: Georgia Tech is committed to supporting and advancing the mental health and well-being of our students. If you or someone you know has a history of mental health concerns, is having current mental health difficulties, or if you are unsure and would like a consultation, a variety of confidential services are available.

National Suicide Prevention Hotline at 988.

The Office of the Dean of Students: https://studentlife.gatech.edu/dean-students/
Smithgall Student Services Building 2nd floor
Email: studentlife@studentlife.gatech.edu
Phone: 404-894-6367

Counseling Center: http://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**.*

Belonging and Student Support: http://belonging.gatech.edu/studentsupport

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

Veteran's Resource Center: http://veterans.gatech.edu/
Phone: 404-385-2067

Georgia Tech Police: 404-894-2500

Non-Discrimination: Georgia Institute of Technology is committed to equal opportunity, a culture of inclusion, and an environment free from discrimination and harassment in its educational programs and employment.

Equal Opportunity, Compliance, and Conflict Management: https://eoc.gatech.edu/
RBI Paper Tricentennial Building, 4th floor
Phone: 404-894-5698