Neuroscience of Behavior

Prerequisites: NEUR 2000 or NEUR 2001 or NEUR 2010, Principles of Neuroscience
Recommended Conceptual Knowledge:

- Neurochemical processes such as neurotransmission and neurohormones, homeostasis and behaviors that maintain life, motivated behaviors & emotion, learning & memory, and attention & higher cognition
- Genetic, neurodevelopmental, and neurochemical processes; brain regions and circuits

Recommended Skills:

- Applications of conceptual neuroscience knowledge
- Analysis of primary and review journal articles
- Knowledge and critique of experimental methods and statistical processes

INSTRUCTOR INFO

Professor: Jasmine Hope, PhD
Please call me: Dr./Prof Hope
Ask me about: Anything related to class, getting involved in research (as an undergraduate or for a career), graduate school, other careers in neuroscience and related career paths for neuroscience majors.
Email: jasmine.hope@gatech.edu (please use NEUR 3003 in the subject line).

COURSE DESCRIPTION

How does our nervous system control our behavior?

Why do we make different decisions when faced with the same choices?

What happens when things go awry in the nervous system?

How can I apply neuroscience in my own life?

The nervous system receives information about the environment and coordinates the actions of an animal in response to this information, and as such, it controls everything we think, do, and feel. We will explore the neural underpinnings of complex behaviors such as the behaviors required to maintain life, emotions and motivated behaviors, memory and learned behaviors, and cognition and consciousness. We will also examine how cognition and behavior are influenced by factors such as age, sex, and trauma or pathology. In addition, we will discover the methods by which behavioral and cognitive neuroscientists examine the relevant neural functions.

"Nothing in neurobiology makes sense except in the light of behavior." – Gorden Shepherd (1988), *Neurobiology* (2nd Ed), pp 6 – 7

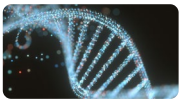
The general goal of this course is to help you develop the ability to think like a behavioral and/or cognitive neuroscientist. To accomplish this goal, we will use pre-class readings, in-class learning activities (e.g.,

case studies, data analysis, discussions, and group work), and reflections. We will also continue to develop skills critical for success in neuroscience or any science course: reading graphs and figures, understanding scientific literature, and writing scientifically. By the end of this course, you should be able to identify an interesting scientific question, determine how it could be studied, and critically evaluate the existing evidence to answer it.

LEARNING OBJECTIVES

The goal of this course is for students to be able to **think like a behavioral and/or cognitive neuroscientist**; however other skills are necessary in order to achieve this goal. Therefore, this course has several related learning objectives. After successfully completing this course, students should be able to:

Identify in context**, describe,** and **explain** key concepts in behavioral and cognitive neuroscience (e.g., the foundations of behavioral and cognitive neuroscience; behaviors that maintain life; motivated behaviors & emotion; learning & memory; and attention & higher cognition)



Explain, illustrate, and predict how genetic, neurodevelopmental, and neurochemical processes; brain regions and circuits; and environment and experience affect cognition and behavior

Analyze and **interpret** behavioral and cognitive neuroscientific data and graphical representation of these data in context

Evaluate neuroscientific information and data in both popular media representations of neuroscience and in neuroscience research papers

Effectively **communicate** neuroscience information using written text and graphical representations of neuroscientific concepts and data

Apply knowledge of cognitive and behavioral neuroscience concepts to explain their own experience.

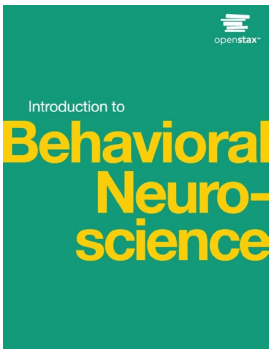
COURSE MATERIALS AND RESOURCES

Required Readings

All the required pre-class readings will be posted on Perusall

Recommended Supplemental Text

Introduction to Behavioral Neuroscience
Elizabeth D. Kirby et al. 2024
ISBN: 978-1-961584-57-0
Click here to access the open-source online text



Please bring your laptop, phone, iPad, or other electronic devices to class as we will be using these devices during our learning activities and during the quizzes. Your device will need to support word processing (e.g., Word or Google doc exported as a pdf); this is necessary as there are writing assignments in this course. It is your responsibility that all work is readable by the instructor and/or TAs.

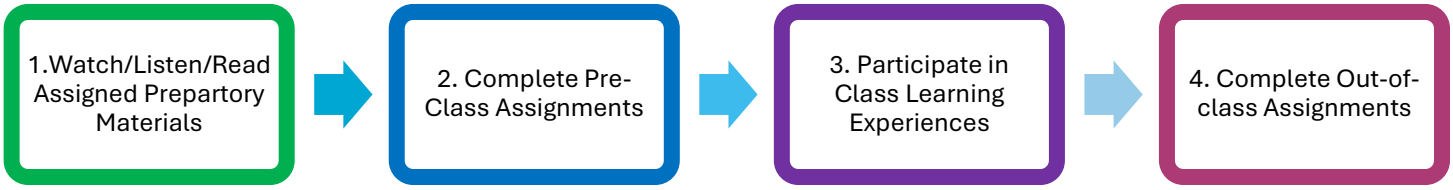
Respondus Lockdown Browser will be used for exams. Please complete the practice quiz on Canvas and complete any updates before exam day.

All other materials (e.g., forms, all assignments, and additional resources) will be made available on Canvas. Please note that all course materials are in the process of being updated for increased accessibility. Please do not hesitate to reach out to the instructional team if you have any issues with accessing course materials.

COURSE FORMAT

This course will be delivered in an in-person manner. Our class meetings will revolve around learning activities such as case studies, figure interpretation, discussions, small-group work, and active demonstrations and experiments. This class set-up is because studies have shown that students do not learn much in classes in which the instructor gives a series of lectures and students sit quietly, taking notes (Hake (1998) American Journal of Physics, Klymkowsky et al. (2003) Cell Biology Education). The out of class work will be i) reading the listed, required pre-class reading, ii) making comments and asking and answering questions, iii) writing short reflections, iv) working on longer written assignments, and v) studying for exams.

What is your role as a student?



The flow chart summarizes your tasks and the order in which you should complete them for each topic area. Most importantly, you'll need to read assigned book pages or articles and complete any pre-class assignments before each class. You should take notes while engaging with these pre-class materials. During class, you can expect to build your understanding through activities and class discussion. This course format will ask you to develop skills in identifying what information you need and learning how to break down a problem into achievable parts.

ASSESSMENT OF YOUR LEARNING

You will be assessed by your performance on writing assignments, pre-class assessments, a research term paper project, post-class reflections, and on three (3) exams. Please note there is no final exam for this course.

Pre-class Reading Assignments: Before each class, you'll read a pre-class assignment, which will consist of reading a scholarly article such as a perspective or a review article. We can understand that reading and comprehending the scientific literature can be challenging, so we will be using Perusall via Canvas to read the articles. In Perusall, students will be able to engage with the article, each other, make comments, and ask and answer questions, etc. The pre-class reading will be scored by the engagement with the articles in Perusall. Please know that only the top twenty (20) scored Perusall assignments will be used to calculate your grade.

In-Class Collaboration (ICC): Active engagement and participation in the learning activities is critical for your success in this course. Therefore, you will be able to earn participation points based upon your active engagement in the learning opportunities.

In-class activities will be administered through Canvas or PointSolutions, and completion of these activities will determine your participation credit for the day.

Written Reflections: Reflection on our learning is a significant part of making learning durable. There are multiple cognitive benefits for reflection including retrieval of recently learned information, connecting new knowledge to what you already know, and rephrasing key ideas in your own words. In addition, reflection can help regulate our own learning; therefore, there will be five (5) written reflection assignments on Canvas. Your response should be **your original works and thoughts, in your own words**. These reflections will be assessed according to the clarity of thought and language, the relevance to the student and the course learning goals, the analysis of how the student has gained some insight, and how this material may relate to other courses or past experiences. Further information is available on Canvas.

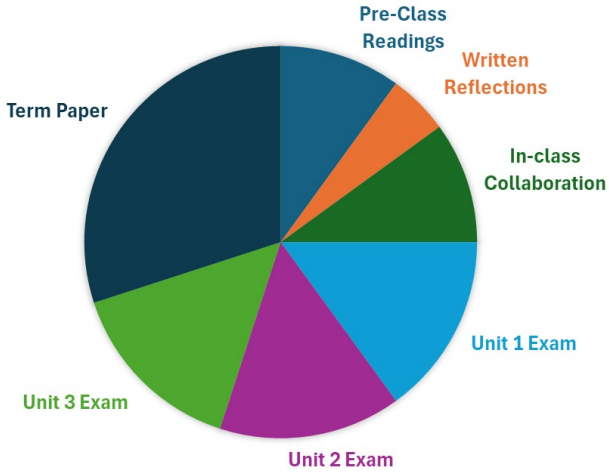
Exams: Exams will include multiple-choice, true-false, fill-in-the-blank, and free response questions. These exams will be administered via Canvas using the Respondus Lock-down Browser. The exams will require you to use critical thought to analyze data and apply your knowledge. That is, exams assess your understanding of concepts and ability to explain and apply those concepts, rather than your ability to memorize facts. Therefore, you will be able to bring in one (1) index card 'cheat sheet' for the exams. You may use both sides of the card, but this crib sheet **must be hand-written directly on the index card**. That is, writing the crib sheet on an iPad or similar tablet and then printing it out is not allowed. The crib sheet must be turned in before you leave the exam room.

Term Paper: The ultimate goal of this course is to help you develop the skills to be a cognitive or behavioral neuroscientist who extends the field. One key skill of a scientist is to be able to read, integrate, and apply information from primary literature. In addition, a good scientist must know how to communicate information to a larger audience. This paper is an opportunity to learn more about a topic you find interesting. This paper could include material we discuss in class in further detail for your paper or you may choose a topic that is relevant to the course but not explicitly covered.

Science is not done in isolation. Scientists routinely share their written work with one another for the expressed purpose of getting feedback, so this term paper will be worked on in parts for feedback. The assessment criteria for each assignment are described in Canvas.

1. Plagiarism & Citation Quiz (4 pts)
2. Term Paper Topic (6 pts)
3. Literature Review Quiz (4 pts)
4. Annotated Bibliography (16 pts)
5. Paper Outline (30 pts)
6. Complete Submission (80 pts)
7. Peer Review (20 pts)
8. Response to Reviewers (40 pts)
9. Term Paper Press Release (in-class activity) (100 pts)

Assessment Type	Number of Assessments	Total Points
Pre-Class Readings	20*	100
Written Reflections	5	50
In-class Collaboration	20*	100
Unit 1 Exam	1	150
Unit 2 Exam	1	150
Unit 3 Exam	1	150
Term Paper	Multiple contributing assessments	300
	**Only the top 20 will count*	**1000 points total**



COURSE POLICIES

Georgia Tech Inclusive Values Statement

At Georgia Tech, we see different backgrounds and perspectives as essential to learning, discovery, and creation. We strive to remove barriers to student success, and to build a welcoming community where everyone has the opportunity to contribute to our mission. As outlined in our strategic plan (https://strategicplan.gatech.edu/values), we want to create an environment of holistic learning where all individuals can grow and learn to lead healthy, purposeful, impactful lives.

We will work together to set classroom climate and norms on the first day of the course.

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.

Attendance Policy

In person attendance is required to complete the In-Class Collaboration (ICC) assignments. As a reminder, only the top 20 of the ICC assignments will be counted. This allows for flexibility if students need to miss class for any reason.

Grading

This course is graded on a point scale – you are not competing against anyone else for your grade.

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

We highly recommend that you keep track of your own scores. The grade estimates in Canvas are often inaccurate.

Grade Repair: Out of fairness, extra credit must be offered to all students and will not be offered on an individual basis. These grade repair options provide opportunities to add an extra 20 points to the overall final semester grade. Each option is worth 5 points.

Course Surveys: If ≥ 80% of students do the mid-semester term course feedback and the final CIOS
Pre-and Post-Tests: Completing both the pre- and post-term quizzes

Grade Changes & Regrades: Grades are not negotiable commodities. However, mistakes can and do occur. If you feel an assignment or quiz has been incorrectly scored, notify your instructor by email as soon as possible. **Any requests for adjustment of grades must be submitted in writing within seven (7) days of the grade posting.** In all cases, the entire assignment will be re-evaluated, and a final, revised grade (higher or lower) will be assigned, if warranted. In addition, the instructor reserves the right to re-evaluate and re-assess previous assignments, if warranted.

Do not ask your instructors for additional points or "grade rounding." This type of request is asking your instructor to alter the academic grade or rating so as to obtain unearned academic credit, which is a violation of the Academic Honor Code.

Extensions, Late-Work, and Make-ups: No make-up exams will be administered unless you have documented reasons of illness, family emergency, or participation in approved Institute activities (such as field trips and athletic events, see http://catalog.gatech.edu/rules/12/ for more information).

If you do need a make-up, you will need to make prior arrangements to take the exam earlier, unless there is a medical emergency which prevents the prior arrangements.

All late work will receive a 10% per day late penalty; however, you will be given one (1) "Phase Delay" late token. This late token will allow you to have an extra twenty-four hours (24 h) to complete one assignment without penalty. The use of the late token is not retroactive; that is, you need to tell us no later than **12hr in advance of the due date** when you are using this late token.

The late token cannot be used to extend the deadline for any in-class activity.

Submitted Work Policy: It is your responsibility to ensure that the TAs and instructors will be able to grade your work. This means that you need to check the formatting of your work after you submit it in Canvas. If

your work is blank, the document converted your text into symbols, the file format is corrupted, etc., that work cannot be assessed and will be scored as a zero (0). Instructors will not click links to access files. Assignments submitted as links will be scored as a zero (0). Subsequent submissions will be subject to the above-stated late penalty.

Academic Integrity: Georgia Tech seeks to cultivate a community based on trust, academic integrity, and honor. This Honor Code helps maintain an optimal learning environment that foster academic and scholastic integrity. These include respecting the intellectual property of others, submitting your own individual work unless otherwise allowed by an instructor, and protecting your own academic work from misuse by others. All students are assumed to have read the GT Academic Honor Code and consented to be bound by it.

This Academic Honor Code prevents any students from gaining an unfair advantage through academic misconduct while supporting your ability to develop your own cognitive skills. For this class, specific examples of academic misconduct and dishonesty include:

- Plagiarism: the unattributed use of words and/or ideas of another person. Examples include but are not limited to: words written by another person (including yourself for a previous class) or lifted from the internet with and without proper citation; ideas taken from another person without proper citation.
- Unauthorized collaboration: working with someone else on graded work (e.g., assignments, quizzes, or presentations) without explicit permission from the instructor
- Use of unauthorized aids (including, but not limited to, online 'homework' help sites) during quizzes
- Unauthorized use of generative AI in which students copy and paste from the AI-based assistance on graded work (see Policy on Use of Generative AI below).

In short, produce your own work unless you are told otherwise. You are more than welcome to use your notes and work with others for pretty much every aspect of the course except the exams; you just need to make sure that the writings you submit are ultimately your own.

Policy on Use of Generative AI for class work:

In this class we treat AI-based assistance, such as ChatGPT and Copilot, the same way we treat collaboration with other people: for individual assignments, you are welcome to talk about your ideas and work with other people, both inside and outside the class, as well as with AI-based assistants.

However, all work you submit must be your own. You should never include in your assignment anything that was not written directly by you without proper citation (including quotation marks and in-line citation for direct quotes).

Including anything you did not write in your assignment without proper citation will be treated as an academic misconduct case. If you are unsure where the line is between collaborating with AI and copying AI, we recommend the following heuristics:

Heuristic 1: Never hit "Copy" within your conversation with an AI assistant. You can copy your own work into your own conversation, but do not copy anything from the conversation back into your assignment.

Instead, use your interaction with the AI assistant as a learning experience, then let your assignment reflect your improved understanding.

Heuristic 2: Do not have your assignment and the AI agent open at the same time. Similar to the above, use your conversation with the AI as a learning experience, then close the interaction down, open your assignment, and let your assignment reflect your revised knowledge.

This heuristic includes avoiding using AI directly integrated into your composition environment: just as you should not let a classmate write content directly into your submission, so also you should avoid using tools that directly add content to your submission. The more time you let pass between using GenAI and writing your assignment, the better off you will be.

Deviating from these heuristics does not automatically qualify as academic misconduct; however, following these heuristics essentially guarantees your collaboration will not cross the line into misconduct.

Institute Approved Absences (including accommodations for religious observances): Any letter for Institute approved absences (e.g., conference presentations, athletic events or competitions, religious absences, and/or health emergencies) should be given to the instructor as soon as possible. If you are requesting an absence due to religious observations, those could be made informally with the instructor or via the request form submitted to the Registrar. These religious absences should be requested within the first two weeks of the semester. Please see https://registrar.gatech.edu/info/institute-approved-absence-form-for-students for more information about approved absences.

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 or accommodations. We are happy to work with you.

Technology Usage: As research on learning shows, unexpected noises and movement automatically divert and capture people's attention, which means everyone's learning experience is affected if a cell phone, pager, laptop, etc. makes noise or is visually distracting during class. In addition, the literature also demonstrates that students recall information better if they take notes by hand. Therefore, it is highly encouraged that you put your electronic devices away and take your notes using pen and paper.

That said, there will be times in which you will need your electronic device to take quizzes, answer poll questions, or conduct some research on the internet, so please bring your laptop, phone, iPad, or other electronic devices to class. We will let you know when we will be using the devices and provide sufficient time for you to get started.

Email Policy: Please email using gatech email address on all matters as we are team-teaching this course. You should expect a response within 24 – 48 business hrs. In addition, please use NEUR 3003 or

Beh Neuro in the subject line to help me quickly identify the context of your email. Please do not use the Canvas email platform or Canvas messages.

TOLERANCE, COMPASSION AND ASSUMING THE BEST

We can all agree that life recently has had its challenges, so it is important to emphasize the importance of virtues like tolerance, compassion, and assuming the best. We know that common responses trauma and stress are increased anxiety, more irritability, and decreased cognitive capacity and endurance.

We have worked hard to try to make it a good course, being as transparent as possible with which assessments are due, we are sure there will be some mistakes along the way. We will also have issues with Canvas throughout the course, such as when it doesn't factor any manually scored items into the grades. We are just as certain that we will create a community of learners, growing along the way. When there are bumps in the road, our tolerance, compassion, and assuming the best of each other will help us handle this with grace and humor.

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: 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.
https://studentlife.gatech.edu/services/mental-health-well-being

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
Equity and Compliance Programs: https://eoc.gatech.edu/

Non-Discrimination: The 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.

Recordings of Class Sessions and Required Permissions:
Classes may **not** be recorded by students without the express consent of the instructor unless it is pursuant to an accommodation granted by the Office of Disability services. Class recordings, lectures, presentations, and other materials posted on Canvas are for the sole purpose of educating the students currently enrolled in the course.

Students may not record or share materials or recordings, including screen capturing or automated bots, unless the instructor gives explicit permission.