Behavioral Pharmacology

Instructional Center 109 | **Tuesday and Thursday** | 0930 - 1045 ET
Prerequisites: PSYC 1101 AND CHEM 1310 or CHEM 1211K AND BIOS 1108 +L or 1208 +L
NEUR 2000 or NEUR 2001 or NEUR 2010, Principles of Neuroscience
Recommended Conceptual Knowledge:

- Neurochemical processes such as neurotransmission, ligand and receptor dynamics, enzymes
- Brain regions and circuits such as the autonomic nervous system, reinforcement circuits,

Recommended Skills:

- Applications of conceptual biological, chemical, neuroscientific, psychological and physiological, knowledge
- Analysis of primary and review journal articles
- Knowledge and critique of experimental methods and statistical processes

INSTRUCTOR INFO

Professor: Mary Holder, PhD
Please call me: Dr./Prof Holder or Dr./Prof H.
Ask me about: Anything related to the class, real-world applications of behavioral pharmacology, becoming a psychology or neuroscience major, getting involved in research, graduate school and other psychology or neuroscience-based careers

Email: mary.holder@psych.gatech.edu (please use PSYC 4100 in the subject line).

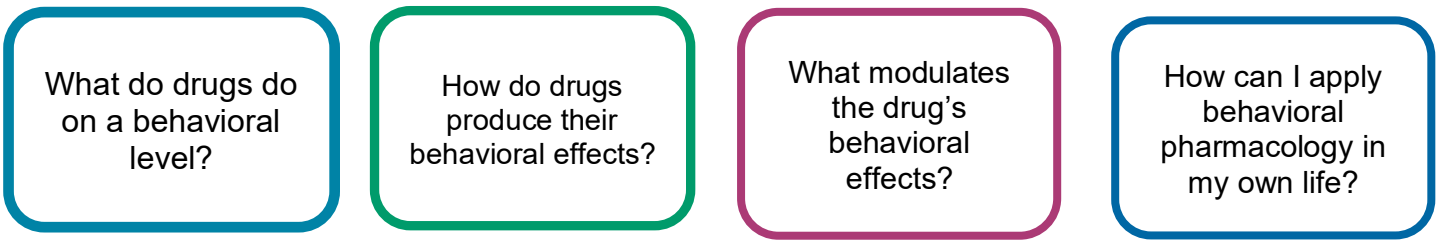
Dr. Holder's Student Hours: We will determine these via a poll during the first week of the class to ensure best availability for all students. Please see CANVAS for up-to-date information on these hours

A personal note to the students:
We believe that every student can improve their skills, learn from their mistakes, and be successful in this course. Attending office hours is the best way to deepen your understanding of the material and is a great opportunity to improve your skills. We recommend that all students attend office hours, regardless of performance. If you cannot attend our office hours, but would still like to meet with us, please email to set up a time.

TEACHING ASSISTANT INFO

See CANVAS for up-to-date information on your TA for this semester, including contact information and student drop-in hours.

COURSE DESCRIPTION

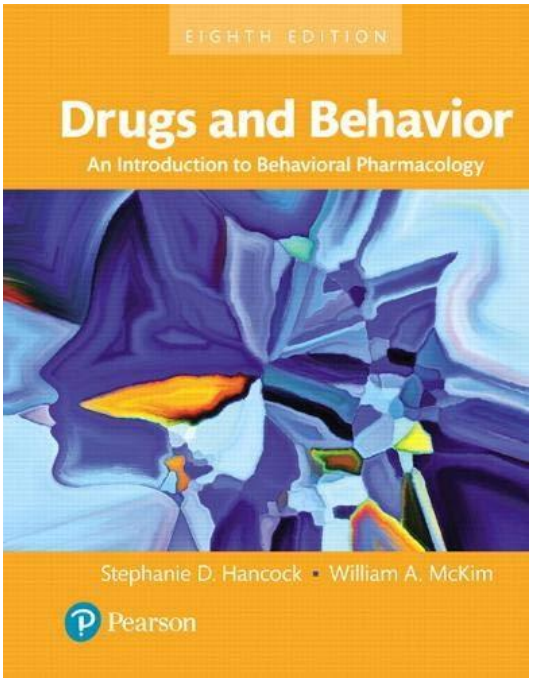


Behavioral pharmacology is the study of the physiological and behavioral mechanisms by which drugs operate. As such behavioral pharmacologists seek to determine i) the changes in the behavior produced by drugs, ii) the biochemical processes by which drugs produce their behavioral effects, and iii) the stimulus function of drugs. In this course, we will explore the effects of different categories of drugs on behavior and how behavioral factors contribute to the actions of the drugs and the ways in which they are used. We will use concepts from basic pharmacology and neuropharmacology and behavioral analysis in this exploration of drug-behavior interactions.

"*All Dinge sind Gift, und nichts ist ohne Gift, allein die Dosis macht dass ein Ding kein Gift ist*."
All things are poison, and nothing is without poison, the dosage alone makes it so a thing is not a poison.
– Paracelsus

The general goal of this course is to develop the ability to think like a behavioral pharmacologist. By the end of this course, you should be able to understand and explain how psychoactive drugs works to produce their effects to alter affect, behavior, and cognition and apply this knowledge to your personal life and/or professional goals.

COURSE MATERIALS AND RESOURCES



Drugs and Behavior: An Introduction to Behavioral Pharmacology, purchased via Perusall
Stephanie D. Hancock
William A. McKim
ISBN: 978-0-13-440502-5

Laptop computer that connects to the university wifi and runs the quiz function found in Canvas.

Respondus Lockdown Browser to access the Exams

Cell phone or computer to run the Point Solutions app

All other materials (e.g., pre-class reading, case studies, additional information, and all assignments) will be made available on Canvas.

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 Exams. 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.

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.

LEARNING OBJECTIVES

The ultimate goal of this course is for students to be able to **think like a behavioral pharmacologist**; 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:

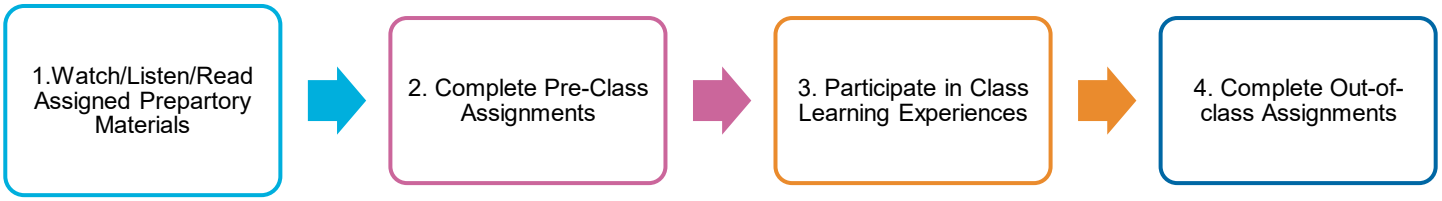
1. **Identify, describe**, and **explain** basic pharmacological concepts (e.g., pharmacokinetics, pharmacodynamics, tolerance, sensitization, withdrawal, etc.) and basic principles of behavioral analysis (e.g., stimulus, responses, conditioning, etc.) as related to behavioral pharmacology
2. **Explain** how psychoactive drugs produce their pharmacodynamic effects using basic principles of neurotransmission and **categorize** psychoactive drugs based upon their behavioral and pharmacological actions
3. **Identify** in **context, describe**, and **differentiate** the biochemical, physiological, and behavioral mechanisms of psychoactive drugs
4. **Analyze** and **interpret** graphical representations of behavioral and/or pharmacological data
5. **Read, interpret, explain**, and **evaluate** popular press and primary literature that concerns behavioral pharmacology
6. Effectively **communicate** behavioral pharmacological information using text and graphical representations of data

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, and small-group work. Attendance and participation in the learning activities are expected from all individuals in the course.

The out of class work will be i) reading the listed, required pre-class reading, ii) making comments and asking and answering questions them, iii) writing short reflections, iv) working on longer written assignments, and v) studying for exams. This class set-up is because studies have shown that student 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).

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 one writing assignment; pre-class assessments; a research project; post-class reflections; and on three (3) exams.

Please note there is no final exam for this course; the final item in your DEA project will be your final assessment.

Assessment Type	Number of Assessments	Total Points
FDAs	20*	100
BATFE	1	20
Written Reflections	5	50
"High"-ku & Explanations	1	50
Unit 1 Exam	1	150
Unit 2 Exam	1	150
Unit 3 Exam	1	150
DSHEA project	1 major	330

*only the top 20 will count 1000 points total

Foundational Daily Activity (FDA): Before each class, you'll read a pre-class assignment, which will consist of reading a portion of the book. I can understand that reading and comprehending the material 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 material, each other, and me to make comments, 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.

Basics of Action potentials, neuroTransmission, Functional Areas Evaluation (BATFE): There are some concepts that are foundational for the discipline of behavioral pharmacology, which should have been covered in the pre-requisite course work (e.g., neurons, action potentials, neurotransmitters, and key brain regions). To ensure students have this knowledge, there will be an asynchronous quiz, which can be retaken, about these topics. Should you need to a refresher on any of these topics, further information about them can be found in Canvas.

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 assignment on Canvas. Your response should be your original works and thoughts, in your own words. **Generative AI is not allowed on these assignments.**

These reflections will be assessed according to the relevance to the student and the course learning goals; the analysis of how the student has gained some insight; how this material may relate to other courses; past experiences, or future goals; and how the material changes views from something in the popular media. Further information is available on Canvas.

"High"-ku & Explanation**:** Conveying scientific knowledge with accuracy and fluency takes practice and requires a deep understanding of the concepts being conveyed. Internalizing information and constructing it into a form that is unique and coherent to you creates a depth of knowledge.

You will be assigned to write a haiku about your assigned hypothesis of substance abuse and addiction. This haiku should capture something specific about the hypothesis. That is the haiku should express what the hypothesis deems important about explaining substance abuse and addiction. In addition to the haiku, you should write a paragraph explaining how you constructed this haiku. This paragraph should reflect your understanding of your assigned drug addiction hypothesis. **You may use CoPilot to help you understand your assigned hypothesis of addiction. Generative AI is not allowed in the writing of the haiku or in the writing of your explanation about the hypothesis or the construction of the haiku.**

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.

Dietary Supplement Health Evaluation and Assessment (DSHEA) Project: Your task is to teach someone who did not take this course about how food and drugs are regulated and how dietary supplements and/or nutraceutical scould work. You are to select a dietary supplement, and once the topic is approved conduct research about how the reasons one could take the supplement, identify the mechanism through which the supplement is thought to work, and to evaluate the safety and efficacy claims.

The medium you choose as a teaching tool is up to you, as long as it's not a traditional written essay or slide deck and lecture presentation. You can record a podcast, create an NPR style radio segment, write a blog post or magazine article, create a short video, develop an animation, create an infographic, etc. Please note for any audio or video your voice and likeness must be featured. **Generative AI tools are NOT allowed to be used in the peer review of teaching tool plan or in the creation of this final product.**

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 project will be worked on in parts for feedback. These smaller assignments are available and will be submitted on Canvas. Within each assignment on Canvas, there will be more information about the tasks, the criteria for success, whether generative AI tools are allowed to be used (and if so, which parts), and the assessment.

1. Plagiarism & Citation Quiz (4 pts)
2. DSHEA Project Topic (16 pts)
3. Annotated Bibliography (50 pts)
4. Teaching Tool Plan (80 pts)
5. Peer Review (30 pts)
6. Teaching Tool Submission (150 pts)

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, 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.

Criteria to Determine Course Grade

This course is graded on a straight scale – you are not competing against anyone else for your grade. Your final grade will be assigned as a letter grade according to the following scale:

Letter Grade	Percentage	Points
A	90 – 100 %	900+ pts
B	80 – 89.99 %	800 – 899 pts
C	70 – 79.99 %	700 – 799 pts
D	60 – 69.99 %	600 – 699 pts
E	0 – 59.99 %	< 600 pts

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

Grade Repair/Extra Credit: 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 of the options are worth 5 points each.

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

Grade Changes & Regrade: 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.

Final grades are determined based upon the criteria outlined above. Requests for grade rounding or exceptions are not considered in fairness to all students and to prevent conversations from running afoul of the Academic Honor Code. 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.

The Honor Code states, "*Students are expected to act according to the highest ethical standards. The immediate objective of an Academic Honor Code is to prevent any Students from gaining an unfair advantage over other Students*".

Extension, 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 the catalog for more information regarding exam policies). 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 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** when you are using this late token.

The late token cannot be used to extend the deadline for your final submission for the DSHEA project.

Submitted Work Policy: It is your responsibility to ensure that you have submitted the correct file and that the TAs and instructors will be able to grade your work. This means that you should submit your work before the deadline and check to ensure that it was submitted appropriately. In addition, all work needs to be accessible for screen readers; this means that screenshots of the work are not acceptable.

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 or unreadable, 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. If there is work that you have submitted or plan on submitting for another course that is relevant to the assignment in this course, please reach out to discuss an appropriate approach in this situation.
- 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.
- Not submitting the exams prior to leaving the classroom and continuing to edit your responses.

- 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 assignments and writing you submit are ultimately your own. One way to help protect yourself is to use a platform that shows your version history or keep your written notes, outlines, etc. throughout the term to show to develop of your thinking towards the creation of the submitted assignment

Any student suspected of cheating or plagiarizing 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.

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. Please be aware that everything that you give to the AI model becomes data that is used to train the model. **Do not upload anything generated by your instructors (including but not limited to slides, assignments, or rubrics) to a generative AI model as that would constitute theft of intellectual property.** This course will have a GT-affiliated Gemini Notebook that can be used as a virtual assistant for quizzing.

There are some assignments that you are explicitly permitted to use CoPilot as a tool. CoPilot is a Georgia Tech approved AI agent, and Georgia Tech has an agreement that the data generated at Georgia Tech will not be used by Microsoft or stored in a repository. If you choose to use CoPilot on the permitted assignments, you are asked to write a declaration of AI use and to upload your conversations with CoPilot as an appendix for the relevant assignment.

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); APA does have guidance for how to cite the use of AI tools.

Including anything you did not write in your assignment without proper citation and declaration 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 or code directly into your submission, so also you should avoid using tools that directly add content to your submission.

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.

Attendance and Participation: 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, and small-group work. Attendance and participation in the learning activities are expected from all individuals in the course, but they are not a graded component. It may be difficult to do well on the exams without participating in the learning activities as they are opportunities to practice course content.

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 the registrar's page for more information about approved absences.

Learning Accommodations: We have designed this course with principles of Universal Design for Learning in mind to try to make this course accessible for all. Some specific aspects of the accessible design already incorporated include: i) the use of live captioning during the lecture (please note, that this live captioning is not always accurate, especially with respect to scientific terms), ii) use of microphone during lecture (if possible), and iii) use of a color scheme that should allow for contrasts in individuals with colorblindness. The course instructor is in process of updating all instructional materials posted on Canvas to the Web Content Accessibility Guidelines (WCAG) Version 2.1, Level AA technical standards such that materials are Perceivable (e.g., use of alt text for image, captions), Operable (e.g., keyboard navigable, Understandable (e.g., with clear language and consistent formatting), and Robust (e.g., compatible with assistive technology such as screen readers).

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 me 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.

Mobile 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.

Modified Campus Operations / Digital Learning Days:

In the event of incremental weather or other reasons for campus shutdown students should expect to move to a virtual class session (using the instructor's zoom link found above) at the regularly scheduled class time, unless otherwise specified via Canvas Announcement. Depending on the day(s) that campus is closed we may choose to hold class via zoom, assign an alternative assignment for students to work on (replacing an in-class activity), or give students free time to work on their group projects. In the unlikely event that an exam/quiz is scheduled for that time/day then we will move it to the next in-person class.

Email Policy:

Please email both using our direct gatech email address on all matters. You should expect a response within 24 – 48 business hrs. In general, this means 8am - 5 pm Monday through Friday as I do not always check my emails during the weekend. In addition, please use PSYC 4100/NEUR 4803 or Behavioral Pharmacology in the subject line to help us quickly identify the context of your email. Please do not use the Canvas email platform or Canvas messages.

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.

STUDENT-FACULTY EXPECTATIONS

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. See the Student-Faculty Expectations for an articulation of some basic expectation that you can have of me and that I have of you. We strive to remove barriers to access and success, and to build a learning community where people of all backgrounds have the opportunity to learn and contribute to our mission. As outlined in our strategic plan, we want to create an environment of holistic learning where all individuals can grow and learn to lead healthy, purposeful, impactful lives.

Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class. In the end, simple respect for knowledge, hard work, and cordial and professional interactions that assume best intentions of each other will help build a learning community and environment in which we handle the stressors of a semester with tolerance, compassion, and mutual respect.

ON ACADEMIC AND PERSONAL SUPPORT

Undergraduate Student Academic Success Resources

A list of resources for undergraduate students' academic success and information about advising can be found at Success at Tech.

Student Well-Being

At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. You are recognized as a human being navigating life's ups and downs. You may experience stressors that can impact both your academic journey and your personal wellness. These may include academic pressure and challenges associated with relationships, mental health, alcohol or other drugs, finances, etc.

If you are experiencing disruptive challenges, seeking help is a courageous thing to do for yourself and those who care about you. 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.

- In an emergency, please call Georgia Tech Police Department at (404) 894-2500 or 911.
- For immediate mental health support, you can call the Center for Mental Health Care and Resources at (404) 894-2575.
- You can call or text 988 or chat at 988lifeline.org for yourself of if you are worried about a loved one who may need crisis support.

COURSE SCHEDULE

Please see CANVAS for the course calendar details what you can expect during each scheduled class session in addition to the due dates for your assignments.