

Behavioral Neuroscience

Department of Psychology – Columbia University

PSYC2450 - Course Syllabus – Spring 2025

Instructor: Dr. Sarah DeMoya

E-mail: sed2182@columbia.edu

Course Location: Schermerhorn 614

Course Meeting Time: MW 10:10 AM – 11:25 AM

Office: 355D Schermerhorn Extension

Office Hours: Fridays 12:30 PM – 2:30 PM

The TAs are here to help you this semester and are a fantastic resource. Please take advantage of their help! TAs will hold weekly office hours, answer emails, hold exam reviews, and grade your work. You are each assigned a TA who will be your go-to person for email questions or concerns. (See below for TA assignment.) For office hours, please go to whichever office hours work best in your schedule. Office hours are listed below. Please check back before you attend office hours for any updates to time and/or location.

Last Name: **Your Assigned TA:**

Email:

A to G

Carolyn Lee

cal2271@columbia.edu

H to L

Andrea Vasquez Guillen

adv2123@columbia.edu

M to Z

Paige Williams

phw2109@columbia.edu

Office Hours:

Location:

TA:

Mon. 3:00 – 5:00 PM

Zoom

Paige Williams

Wed. 2:30 – 4:30 PM

318C Schermerhorn

Carolyn Lee

Thur. 4:15 – 6:00 PM

318C Schermerhorn and Zoom*

Andrea Vasquez Guillen

*Please let Andrea know in advance

Zoom links available on Courseworks under “Zoom Class Sessions”

About Carolyn:

I'm a senior in CC majoring in Neuroscience on the pre-dental track. I'm from Westchester which is right above NYC and I'll be in the city for my gap year working as a dental assistant in midtown! I currently work in the Ivanov Lab at CUIMC doing research on commensal microbes and gut immunity, but I have broad research interests in oral health as well. I work as a tutor for middle school and high school students around the city and hope that my love for teaching translates to our course this semester!

About Andrea:

I'm Andrea Vasquez Guillen, a senior majoring in Neuroscience and Behavior. I'm deeply passionate about research, particularly exploring scientific topics that ignite my curiosity. Throughout my academic journey, I've been fortunate to participate in several research projects and co-author a few articles. Recently, I've also developed a growing interest in writing. Outside of my studies, I enjoy listening to music and watching movies during my free time.

About Paige:

Hi, all! My name is Paige Williams (she/her), and I'm a senior in Columbia College studying neuroscience and behavior. I'm originally from the Philadelphia area. I've been an undergrad

psychology TA for the past three semesters - and I've loved it!! Aside from that, I'm a member of CUEMS and conduct qualitative research with NYC Health+Hospitals. Please feel free to reach out at any time!

Course Description:

Behavioral Neuroscience is an introductory neuroscience course that explores what we know about the brain using animal models. It explores behavior by understanding the influences of biological processes. What does a prototypical neuron look like? How do neurons talk to each other? How does neuronal communication produce behavior? And then moving more into behavioral questions like: What happens in the brain when you want to move? Why do we dream? How do we form memories? What are the biological bases of mental disorders? How does the environment interact with our genes? We will explore answers to questions like these by looking at the principles governing neuronal activity, the relationship between brain activity and subjective experience, the role of neurotransmitter systems in memory and motivational processes, and the presumed brain dysfunctions that give rise to mental illnesses like schizophrenia and depression.

Course Prerequisites:

Psych1001UN or permission of the instructor. Basic knowledge of biology and chemistry is helpful, but not necessary.

Course Role in the Department:

PSYC2450UN Behavioral Neuroscience is an intermediate-level lecture course, open to undergraduates and students in the Post-baccalaureate Psychology program. It fulfills the following degree requirements:

- For the Neuroscience & Behavior major, this course can be used to fulfill either the P2 Course in Neuroscience requirement or the P4 Additional 2000-level Psychology lecture course, but not both.
- For the Psychology major and concentration, and for the Post-baccalaureate Psychology program, this course meets the Group II – Psychobiology & Neuroscience – distribution requirement.

Required Textbook:

Neuroscience Exploring the Brain. Mark R. Bear, Barry W. Connors, Michael A. Paradiso, Lippincott Williams and Wilkins, Fourth Edition, 2016; ISBN 9780781778176

Copies of this book are on reserve at the Science & Engineering Library in the Northwest Corner building. Call number: QP355.2.B425 2016

Supplemental Materials:

Various supplemental materials will be provided by the instructor on the course website.

Course Website:

The most up-to-date information, including changes to the syllabus or to the class schedule, announcements, lecture slides and additional materials are contained on the course website on CourseWorks (Canvas). Be sure you are familiar with it, that you are easily able

to login to the website, and that you always have the lecture slides with you (whether printer or digital). If you have problems accessing the course website at any point during the semester, please let me know.

Course Learning Objectives:

This course aims to provide students with a strong foundation in Behavioral Neuroscience. Below are broad learning objectives for each chapter. Specific learning objectives for each chapter are provided for you on the Module pages for each chapter. Some weeks have more than others. It is highly to your advantage to fill them out each week as you read because the questions for the exams will be taken directly from the learning objectives content. We may not have time to cover all learning objectives in class.

Grades:

Your overall course grade will be determined by your effort in the following areas:

- | | |
|------------------------------|-----|
| ▪ Midterm Exams | 60% |
| ▪ Final Exam | 20% |
| ▪ In-class Polling Questions | 5% |
| ▪ Pre-class Quizzes | 5% |
| ▪ Written Assignments | 10% |

Letter Grade Assignment:

97-100%: A+	87-89.9%: B+	77-79.9%: C+	67-69.9%: D+	<60%: F
93-96.9%: A	83-86.9%: B	73-76.9%: C	63-66.9%: D	
90-93.9%: A-	80-83.9%: B-	70-73.9%: C-	60-63.9%: D-	

Quizzes and Exams:

There will be four midterms given in this course. Your lowest midterm score will be dropped, and each of the three remaining midterms is worth 20% of your overall grade for a total of 60% of your grade being determined by your midterm performance. There is a comprehensive final that is worth 20% of your final grade.

The midterms will each be 1 hour and 15 minutes long. The final exam will be 2 hours long and will have comprehensive questions covering the entire semester. Exams will consist of multiple-choice questions. These questions will test your mastery of the learning objectives for each lecture.

- While studying, try to emphasize *understanding* and *critical thinking*. Knowing key concepts and definitions is highly valued, of course, but successful students use that knowledge to scaffold a more comprehensive understanding of the material. This is highly advisable for these exams and in general for your career. Rather than simply “memorizing,” try to “understand” the material and use your Instructor and the TAs for clarification. Test questions will include more basic definitional / conceptual knowledge as well as application of that knowledge to new scenarios.
- Slides on the course website should be considered as a study aid, but they may not be “good enough” on their own unless you come to class and take notes. Sometimes I may have to skip slides in the posted lectures if we run out of time in class. If that

happens, you should still read the relevant sections in the textbook and answer the learning objectives, as the exam questions will be taken directly from the learning objectives.

Make-up Exams:

Make-up exams are allowed only with written justification (e.g., by your doctor or advising dean) and must be taken within *one week* after the exam. (Make-up exams will not be offered before the scheduled exam date.) Exams taken after that time or that do not have written justification will have the same late penalty as all other assignments.

Written Assignments:

This semester you have an opportunity to explore the world of behavioral neuroscience in two ways in addition to attending class: A.) by reading about a recent discovery in the field of behavioral neuroscience, and B.) by watching a seminar on Youtube given by a neuroscientist about their work. To get credit for each of these, you will submit a written reflection. Reflection A is due by Sunday, March 2nd. Reflection B is due by Sunday, April 20th. All assignments must be submitted through the Assignments tab on CourseWorks. You can complete the assignments at any time during the semester so please plan appropriately as there are no extensions for these assignments.

In-Class Polling Questions:

Each class period we will have polling questions to check our understanding of the material. These questions will not be graded for accuracy, but your participation in the poll is required. We will use Poll Everywhere for our polling questions. Your 4 lowest scores will be dropped. If there are extenuating circumstances (hospitalization, etc.) that cause you to miss more than 4 consecutive class periods we will discuss this on a one-on-one basis.

Pre-Class Quizzes:

Before each class there will be a five-question quiz on Courseworks. They will be graded for accuracy, but you may retake the quiz as many times as you would like to get the score that you want. Note: all attempts must be completed before the deadline or a late penalty will be applied. Think of these quizzes as learning check-ins. They will help you to identify concepts that you did not understand when reading the textbook material for the upcoming class period. Your 2 lowest pre-class quiz scores will be dropped.

Course Policies: please read the following policies carefully!

Disability Services:

Students must register with their school's Disability Services office in order to receive disability-related accommodations and must complete the testing accommodation request form. More information is available at:

Columbia: <https://health.columbia.edu/content/disability-services>

Barnard: <https://barnard.edu/disabilityservices/register-cards>

Religious Observance:

If you are going to miss class(es) due to religious observance, you must notify me during the first week of class so that accommodations can be made.

Class Attendance and Electronics Policy:

It is strongly encouraged that you take hand-written notes. If you need to use a device, please be respectful of your classmates and your instructor by only accessing the document for class and not using the device to message or access the internet. Coming to class is of no value if you are not paying attention. Messaging friends, watching videos online, and browsing social media are not appropriate for the classroom. Remember to silence your phones before class.

Unreadable File Submission:

Any assignments that have unreadable files will automatically receive a 0% score. It is a student's responsibility to make sure that submissions are done in a proper manner and double check that files are readable and accessible to the teaching team. To avoid the penalty for unreadable file submission, try to work on the assignments ahead of time and give yourself enough time to check that the files submitted are accessible/readable.

Late Assignments:

Any assignment that is turned in late will have a 10% deduction in points per day. Any assignments turned in 5 or more days late will receive a maximum score of 50%. Any assignments not turned in by the last day of class (Monday, May 5th at 11:59 PM) will receive 0% credit. Courseworks will automatically apply this deduction in points. If there are extenuating circumstances (death in the family, hospitalization, etc.) please notify me immediately. I cannot make accommodations if I don't know what's going on or if something occurs after the due date. Note: to avoid the penalty for late submissions, do not wait until the last minute to submit an assignment. Courseworks is sometimes slow to upload. Submitting in advance of the deadline is your best bet.

Academic Honesty:

Academic honesty is taken very seriously. Columbia students commit to the Honor Code as follows: "I affirm that I will not plagiarize, use unauthorized materials, or give or receive illegitimate help on assignments, papers, or examinations. I will also uphold equity and honesty in the evaluation of my work and the work of others. I do so to sustain a community built around this Code of Honor." All suspected cases of dishonest behavior will be reported to Student Conduct and Community Standards. All submissions will be run through TurnItIn.

Sexual Respect:

Any form of gender-based misconduct will not be tolerated. "Columbia University is committed to fostering an environment that is free from gender-based discrimination and harassment, including sexual assault and all other forms of gender-based misconduct." Visit this website for more information: <http://sexualrespect.columbia.edu/>

COVID-19:

We will comply with all University-mandated COVID-19 policies.

Course Schedule:

The calendar below details topics, readings, and assignments for each class period. Students should complete the assigned reading before coming to class.

Date	Topic	Reading
January 22 nd (Wed.)	Course Info and Historical Intro	Chapter 1
January 27 th (Mon.)	Neurons and Glia	Chapter 2
January 29 th (Wed.)	Neurons and Glia	Chapter 2
February 3 rd (Mon.)	Membrane Potential	Chapter 3
February 5 th (Wed.)	Membrane Potential	Chapter 3
February 10 th (Mon.)	Action Potential	Chapter 4
February 12 th (Wed.)	Action Potential	Chapter 4
February 17 th (Mon.)	Exam #1	Chapters 2, 3, 4
February 19 th (Wed.)	Synaptic Transmission	Chapter 5
February 24 th (Mon.)	Synaptic Transmission	Chapter 5
February 26 th (Wed.)	Neurotransmitter Systems	Chapter 6
March 3 rd (Mon.)	Neurotransmitter Systems	Chapter 6
March 5 th (Wed.)	Structure of the Nervous System	Chapter 7
March 10 th (Mon.)	Exam #2	Chapters 5, 6, 7
March 12 th (Wed.)	Brain Control of Movement	Chapter 14
March 17 th (Mon.)	Spring Break	
March 19 th (Wed.)	Spring Break	
March 24 th (Mon.)	Brain Rhythms and Sleep	Chapter 19
March 26 th (Wed.)	Brain Rhythms and Sleep	Chapter 19
March 31 st (Mon.)	Motivation	Chapter 16
April 2 nd (Wed.)	Motivation	Chapter 16
April 7 th (Mon.)	Exam #3	Chapters 14, 19, 16
April 9 th (Wed.)	Emotion	Chapter 18
April 14 th (Mon.)	Emotion	Chapter 18
April 16 th (Wed.)	Attention and Consciousness	Chapter 21
April 21 st (Mon.)	Attention and Consciousness	Chapter 21
April 23 rd (Wed.)	Wiring the Brain, Memory	Chapter 23, 24
April 28 th (Mon.)	Exam #4	Chapters 18, 21, 23, 24
April 30 th (Wed.)	Memory	Chapter 24

May 5 th (Mon.)	Psychiatric Disorders	Chapter 22
TBD	Final Exam	Cumulative – All Chapters
SUBJECT TO CHANGE		

Any changes will be announced in lecture and posted as an announcement on CourseWorks.