

# PSYC 1230 / NRSC 2249: Cognitive Neuroscience

Spring 2024, TR 1:45-3:14pm, [COLL 200](#)

**Instructor:** Mike Arcaro ([marcaro@sas.upenn.edu](mailto:marcaro@sas.upenn.edu))

Office: Goddard 422

Office hours: Thursday mornings 11-12PM

**TA:** Margaret Gardner ([Margaret.Gardner@Pennmedicine.upenn.edu](mailto:Margaret.Gardner@Pennmedicine.upenn.edu))

If your last name starts with A through K, email Margaret.

Office: Levin 450

Office hours: Wednesday mornings 10-11AM

**TA:** Jamie Samper ([jsamper@wharton.upenn.edu](mailto:jsamper@wharton.upenn.edu))

If you last name starts with L through Z, email Jamie.

Office: [Zoom](#)

Office hours: Tuesday nights 7-8PM

Course description: How does the brain give rise to our thoughts, actions, and emotions? This course explores the cognitive and neural processes that support sensory perception, attention, motor control, memory, language, and decision-making. We will cover basic neuroanatomy and physiology of the brain and tools used to study how the brain supports cognition and behavior. We will explore how we can sense and perceive the world, act in it, think about it, and learn and remember it. Each week, topics covered in class readings and lectures will be tied to central questions in the field of Cognitive Neuroscience. Throughout the course, we will relate our discussions of the brain to encounters in everyday life and illustrate central themes using case studies of brain dysfunction.

Prerequisites: Given the depth with which we will cover topics on brain physiology, methodology, and cognitive theories, it is **strongly** recommended that students have already taken a prior course related to the brain and cognitive psychology. e.g., Intro to Exp Psyc (PSYC 0001), Introduction to Brain and Behavior (BIOL 1110/NRSC1110), Introduction to Neuroscience (NEUR 1000), and/or similar courses. Historically, students who take this class without already having taken any of these courses have struggled with the material.

Textbook: [MS Gazzaniga, R Ivry, and GR Mangun \(2018\). Cognitive Neuroscience: The biology of the mind. FIFTH Edition. New York: W. W. Norton & Company, Inc. \(ISBN-13: 978-0393603170\)](#)

Course Canvas Web Page: Announcements, lectures, additional readings, and other important course information will be posted routinely on Canvas. Please monitor this website regularly.

## ----- Course Policies -----

Syllabus: **Read this syllabus!** It is your primary source of information about the policies and schedule of the course. We will expect you to be familiar with this information.

Lectures: This course is taught in a lecture-based format. You are encouraged to interrupt the lecture frequently with questions. If there is something that you do not understand in class, **speak up!** It is likely that many of your classmates do not understand it either.

If you want to do well in the class, it is best to attend the lectures. Lecture slides will be posted on Canvas before the lecture.

Attendance: It is mandatory and part of your grade!

Readings: You are expected to read the assigned portions of the textbooks.

Questions: The best way to get your questions answered is during lecture. We will be available after lecture for a few minutes, but there will be a course directly after ours. If you can't come to any of our office hours, please let us know, and we will try to adjust the schedule. The second-best way to get your questions answered is by posting to the relevant Discussion thread on Canvas.

Getting in contact with instructor or TAs: Attend office hours with the instructor or a TA. If you choose e-mail, please only e-mail your assigned TA. We will get back to you within 24-36 hours. We will cut off questions at 9 pm the nights before exams. If we find that many students have the same question, we will post the question anonymously, along with the answer, to Canvas.

Make-Up Policy: We can accommodate make-up exams for illnesses, family emergencies, and religious holidays. **Please look at the dates for the exams now.** If any exam conflicts with a religious holiday that you observe, you must let the teaching team know by e-mail by the end of the second week of the course. If you have to miss an exam due to illness, you must e-mail the teaching team **before the exam date. Make-up exams must be taken within 1 week of the original exam date. No make-ups will be offered for quizzes. No exceptions will be made to this policy.**

Re-grading Policy: If you have a question or concern that there was an error in grading an exam, you must submit your request to the teaching assistants in writing to have the exam regraded, no more than one week after the exam was returned in class. No regrade requests will be considered beyond this date. Your request must explain the specific error that you think was made. **If you submit a request, the exam will be regraded in its entirety, and the final grade might be higher or lower than your original grade.** Please only submit a re-grade request if you genuinely believe that an error has been made--a judgment call that could have gone either way is not an error.

Technology Policy: Cell phones need to be on silent and stowed away during lectures. Please let us know if you have personal reasons that prevent you from following this rule. Be considerate about your use of technology in the classroom. Turn off all alerts and sounds that might distract other students.

Studies have shown that attention is lost when students switch between tasks (social media, email, etc.) while taking notes on laptops, and test performance was significantly lower for students who used e-mail, chat programs, or social media during class than for students who did not. Moreover, it is distracting for your fellow students if you are accessing e-mail or online in class. Research has found that laptop use impairs academic performance not only for students using a laptop, but for students within view of a laptop screen. That said, if using the laptop is the best method of taking notes and paying attention for you, this will not pose a problem.

Academic Integrity: Please note that Penn has strict rules on academic integrity (see [www.upenn.edu/academicintegrity](http://www.upenn.edu/academicintegrity)). Violations of the rules will be reported to the Office of Student Conduct and will likely result in automatic failure of the course. See additional information at end of syllabus.

## ----- Assignments and grading -----

### Grades:

- 30% Two Midterm Exams (15% each)
- 20% Final exam
- 15% Weekly quizzes
- 15% Two lab exercises (7.5% each)
- 10% Attendance
- 10% Research participation

Midterm Exams (15% each; 30% total): Each exam will comprise 40 multiple choice questions. The first midterm will be focused on material from Chapters 1, 2, 3, and related lectures. The second midterm will be focused on material from Chapters 5-8 + related lectures. Multiple choice questions are designed to assess both basic and detailed knowledge about topics presented in lecture and in readings.

Final Exam (20%): The final exam will comprise 40 multiple choice questions and short paragraphs. The multiple choice questions will be focused on material covered in Chapters 9, 11-13 + related lectures. The final exam will have a few (4-5) **short** paragraph questions. These questions will be open-ended and allow you to draw on knowledge gained **throughout the course**. There will be multiple ways to correctly answer the short paragraph questions but will require you to integrate information across chapters. These questions are designed to assess your ability to explicate scientific arguments by integrating multiple sources of information discussed throughout the semester and find common themes.

Lab exercises (15% total): There will be two in-class lab exercises where we use online platforms (<https://neurosynth.org/> & <https://bioimagesuiteweb.github.io/webapp/mni2tal.html>) to explore the anatomical and functional organization of the human brain. Please bring a laptop or pair up with a classmate. After each in-class exercise, there will be a workbook to complete and hand in the following week. See schedule below for dates. In-class labs will focus on getting students oriented to the online platforms and tutorials for exploring brain data. After each in-class lab, there will be a take-home worksheet to complete and submit to Canvas. The due date is 11:59PM on the second

Thursday after each in-class lab. **Lab submissions will be deducted 5 points out of 100 (i.e., 5% of the assignment) per late day.**

Weekly quizzes (15% total): Most weeks we will have a short, in-class ~5 question quiz on the prior week's readings and lecture. They are intended to ensure you keep up with the material throughout the course. There will be 8 quizzes total. The lowest 3 will be dropped. **If you miss a quiz for any reason (late to class, sickness, holidays, travel, other deadlines, etc.), that will count as one of the dropped scores).** No make-up quizzes will be offered – no exceptions to this policy. See schedule below for quiz dates.

Attendance (10% total): Showing up to class is important. We will have a sign-in sheet that needs to be completed at the beginning of class. The sheet must be signed within 10 minutes of the start of class to receive credit. We understand that students are shopping around the first two weeks. Attendance will begin on February 1<sup>st</sup> and will be taken all non-quiz / exam days. Students will be allowed 4 missed attendances. **If you miss attending class for any reason (late to class, sickness, holidays, travel, other deadlines, etc.), that will count as one of the dropped scores).** No exceptions to this policy.

Research participation (10% total): For this assignment, you will be exposed to the types of research being conducted at Penn, and the methods used to answer these questions. This requirement is **due April 30th by 11:59PM** to Canvas. Please choose **ONE** of the following:

A. **Research Participation:** Participate in research happening at Penn through [SONA](#).

Detailed directions are posted on Canvas in Files/Research Participation. Participating in research gives you a better sense of how knowledge is gained in Cognitive Neuroscience. You must submit a brief description of the experiment(s) you participate in and relate them to topics discussed in the course (no more than 250 words total). You must earn TWO experiment credits. Multiple experiments are fine. **Make sure that your experimental credits are logged in SONA. We cannot credit you unless they are in the SONA system.**

B. **Research talk response paper:** Attend ONE [cognitive science](#) or [psychology](#) research talk on campus **in person (no zoom)** and write 250-word summary and analysis. If you fail to attend the talk in person, you will receive a 0. Your write up should include a summary of the research presented (methods, findings, etc.), and (if the talk topic relates to the course) you should also relate the work presented to topics and methodologies learned in this course. Submit the 250-word paragraph on Canvas in Assignments. No exceptions to these rules. Don't wait until end of semester to complete!

----- Course Schedule -----

Reading assignment	Tuesday	Thursday
Chapter 1		January 18 Introduction

Chapter 2	January 23 Structure & function of nervous system	January 25 Structure & function of nervous system
Chapter 3 (/optional 4)	January 30 Research Methods	February 1 Research Methods <b>Quiz 1</b>
No readings	February 6 <b>Midterm Exam 1</b>	February 8 Sensation & Perception
Chapter 5	February 13 Sensation & Perception	February 15 <b>Exam Review / Lab Exercise 1</b>
Chapter 6	February 20 Object Recognition <b>Quiz 2</b>	February 22 Object Recognition
<b>February 27<sup>th</sup> Drop period ends</b>		
Chapter 7	February 27 Attention <b>Quiz 3</b>	February 29 Attention <b>Lab Exercise 1 Worksheet Due</b>
	March 5 Spring Break	March 7 Spring Break
Chapter 8	March 12 Action <b>Quiz 4</b>	March 14 Action
No readings	March 19 <b>Midterm Exam 2</b>	March 21 Memory
Chapter 9	March 26 Memory	March 28 <b>Exam Review / Lab Exercise 2</b>
<b>April 2<sup>nd</sup> Last day to withdraw from course</b>		
Chapter 11	April 2 Language <b>Quiz 5</b>	April 4 Language
Chapter 12	April 9 Cognitive Control <b>Quiz 6</b>	April 11 Cognitive Control <b>Lab Exercise 2 Worksheet Due</b>
Chapter 13	April 16 Social Cognition <b>Quiz 7</b>	April 18 Social Cognition
No readings	April 23 Brain Development <b>Quiz 8</b>	April 25 Guest lecture
No readings	April 30 Review for final <b>Research Participation Due</b>	May 6-14 <b>Final Exam</b> <b>Penn sets date mid semester</b>

----- Other information and resources -----

**Support, resources, and practical tools for wellness at Penn:** <https://www.wellnessatpenn.com/>

**Accommodations for students with disabilities:**

The University of Pennsylvania provides reasonable accommodations to students with disabilities who have self-identified and received approval from the Office of Student Disabilities Services (SDS). If SDS has approved your request for accommodations, please get in touch with me as soon as possible in order to discuss the arrangements for your accommodations.

If you have not yet contacted Student Disabilities Services, and would like to request accommodations or have questions, you can make an appointment by calling (215) 573-9235. Please visit the SDS website at <https://wlrc.vpul.upenn.edu/sds/>

SDS services are free and confidential.

**Code of Academic Integrity:**

Since the University is an academic community, its fundamental purpose is the pursuit of knowledge. Essential to the success of this educational mission is a commitment to the principles of academic integrity. Every member of the University community is responsible for upholding the highest standards of honesty at all times. Students, as members of the community, are also responsible for adhering to the principles and spirit of the following Code of Academic Integrity. Please note that Penn has strict rules on academic integrity (see [www.upenn.edu/academicintegrity](http://www.upenn.edu/academicintegrity)). Violations of the rules will be reported to the Office of Student Conduct and will likely result in automatic failure of the course.

Academic Dishonesty Definitions - activities that have the effect or intention of interfering with education, pursuit of knowledge, or fair evaluation of a student's performance are prohibited. Examples of such activities include but are not limited to the following definitions:

- Cheating: using or attempting to use unauthorized assistance, material, or study aids in examinations or other academic work or preventing, or attempting to prevent, another from using authorized assistance, material, or study aids. Example: using a cheat sheet in a quiz or exam, altering a graded exam and resubmitting it for a better grade, etc.
- Plagiarism: using the ideas, data, or language of another without specific or proper acknowledgment. Example: copying another person's paper, article, or computer work and submitting it for an assignment, cloning someone else's ideas without attribution, failing to use quotation marks where appropriate, etc.
- Fabrication: submitting contrived or altered information in any academic exercise. Example: making up data for an experiment, fudging data, citing nonexistent articles, contriving sources, etc.
- Multiple submission: submitting, without prior permission, any work submitted to fulfill another academic requirement.

- Misrepresentation of academic records: misrepresenting or tampering with or attempting to tamper with any portion of a student's transcripts or academic record, either before or after coming to the University of Pennsylvania. Example: forging a change of grade slip, tampering with computer records, falsifying academic information on one's resume, etc.
- Facilitating academic dishonesty: knowingly helping or attempting to help another violate any provision of the Code. Example: working together on a take-home exam, etc.
- Unfair advantage: attempting to gain unauthorized advantage over fellow students in an academic exercise. Example: gaining or providing unauthorized access to examination materials, obstructing or interfering with another student's efforts in an academic exercise, lying about a need for an extension for an exam or paper, continuing to write even when time is up during an exam, destroying or keeping library materials for one's own use, etc.

If a student is unsure whether their action(s) constitute a violation of the Code of Academic Integrity, then it is that student's responsibility to consult with the instructor to clarify any ambiguities.