

PSY 493H Cognitive Neuroscience Winter 2023 | revised Jan. 16

Instructor Dr. Meg Schlichting (she/her)
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 Questions? Ask in class, on Quercus, or make an appointment:
calendly.com/schlichting/10-minute-meeting-office-hours

Teaching Assistant Merron Woodbury (they/them)
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***Email** Email is ONLY to be used for genuine emergencies. Neither the instructor nor the TA will be able to respond to emails regarding course content.

Time & Place Tuesdays 1-4pm in SS1070

Text Gazzaniga, Ivry & Mangun. (2018). Cognitive Neuroscience (5th ed.): Norton Press.

Prerequisites PSY201H1/ ECO220Y1/ EEB225H1/ GGR270H1/ POL222H1/ SOC202H1/ STA220H1/ STA238H1/ STA248H1/ STA288H1/ PSY201H5/ STA215H5/ STA220H5/ PSYB07H3/ STAB22H3/ STAB23H3/ STAB57H3, and PSY260H1/ PSYB38H3 or PSY270H1/ PSY270H5/ PSYB57H3/ COG250Y1 or PSY290H1/ PSY290H5/ PSYB64H3/ HMB200H1/ PSL300H1 Exclusion: PSYB55H3
 It is your responsibility to ensure that you have met *all* prerequisites listed in the Psychology section of the A&S Calendar for this course. Visiting students from other universities should have the equivalent prerequisites from their home institutions. If you lack any prerequisites you will be removed. No waivers will be granted.

Objectives This is a capstone course surveying research on how the mind arises from the brain. The first objective of the course is to understand how processes in human brains (ranging from the firing of a single neuron to the dynamics of billions) support cognitive abilities, including memory, language, and decision making. The second objective of the course is to understand and critically evaluate the methods of contemporary cognitive neuroscience research through reading primary literature and engaging in ongoing debates.

Marking Scheme

Assignment	Weight	Due Date
Term Tests (3)	16% each	Jan 31 st , Mar 7 th & Apr 4 th
Reading Quizzes	7% (1% each)	weekly
MRI Neuroanatomy	5%	January 12 th
Paper Discussions [PD]	6% each	Jan 19 th /26 th & Feb 9 th /16 th
Paper Topic Approval	0%	March 2 nd
Paper Draft	4%	March 16 th
Paper Peer Review	4%	March 23 rd
Term Paper	20%	March 30 th

Provisional Course Overview, + see Required Readings for full article citations

Wk	Lec	Class Date	Topic	Readings	Due (Thursdays by 11:59pm)	
					Quiz	Assignment
1	1	Jan 10	Course Overview & Methods	Chapter 3; QALMRI; Syllabus	Prac.	MRI Neuroanatomy
2	2	Jan 17	Cells & Functional Anatomy	Chapter 2; NYT Methods article; [PD1]+ Jiahui et al. (2018)	✓	Draft Responses for Paper Discussion [PD] 1 (Jiahui et al., 2018) Due: Jan 19
3	3	Jan 24	Visual Perception & Object Recognition	Chapters 5-6	✓	Participate in group PD1 this week Date range: Jan 20-26 Final Responses for PD 1 Due: Jan 26
4		Jan 31	Test 1			
5	4	Feb 7	Language & Semantics	Chapter 11; [PD2]+ Rose et al. (2016)	✓	Draft Responses for PD 2 (Rose et al., 2016) Due: Feb 9
6	5	Feb 14	Memory 1	Chapters 12.3 (Working Memory) & 9.3 (Short-Term Memory)	✓	Participate in group PD2 this week Date range: Feb 10-16 Final Responses for PD 2 Due: Feb 16
		Feb 21	No class: Reading Week			
7	6	Feb 28	Memory 2	Chapter 9; + Brown et al. (2016)	✓	Term Paper Topic Approval
8		Mar 7	Test 2			
9	7	Mar 14*	Guest Lecture by Merron Woodbury: Attention & Cognitive Control	Chapters 10.1-10.6, 12.4 ⁺ ; OPTIONAL —NYT emotion article ⁺	✓	Complete Draft of Term Paper
<i>*March 19, 2023: last day to drop S classes</i>						
10	8	Mar 21	Emotion & Decision-Making	Chapters 7 & 12.1, 12.2, 12.6 ⁺ ; + Spadone et al. (2015) ⁺	✓	Peer Review
11	9	Mar 28	Consciousness	Chapter 14; OPTIONAL — +Fernández-Espejo & Owen (2013)	✓	Final Term Paper
12		Apr 4	Test 3			

Required Readings

Lecture 2: NYT Methods Op-Ed and Response:

Iacoboni, M., Freedman, J., Kaplan, J., Jamieson, K. H., Freedman, T., Knapp, B., & Fitzgerald, K. (2007, November 11). Op-Ed: This Is Your Brain on Politics. *The New York Times*.

Aron, A. R., Badre, D., Brett, M., Cacioppo, J. T., Chambers, C., Cools, R., ... Winkielman, P. (2007, November 14). Letter: Politics and the Brain. *The New York Times*.

Lecture 8: NYT emotion article:

OPTIONAL—Barrett, L. F. (2015, July 31). What Emotions Are (and Aren't). *The New York Times*, pp. 2–5.

All other readings:

Brown, T. I., Carr, V. A., LaRocque, K. F., Favila, S. E., Gordon, A. M., Bowles, B., ... Wagner, A. D. (2016). Prospective representation of navigational goals in the human hippocampus. *Science*, 352(6291), 1323–1326.

OPTIONAL—Fernández-Espejo, D., & Owen, A. M. (2013). Detecting awareness after severe brain injury. *Nature Reviews Neuroscience*, 14(11), 801–809.

[PD1] Jiahui, G., Yang, H., & Duchaine, B. (2018). Developmental prosopagnosics have widespread selectivity reductions across category-selective visual cortex. *Proceedings of the National Academy of Sciences of the United States of America*, 115(28), E6418–E6427.

[PD2] Rose, N. S., LaRocque, J. J., Riggall, A. C., Gosseries, O., Starrett, M. J., Meyering, E. E., & Postle, B. R. (2016). Reactivation of latent working memories with transcranial magnetic stimulation. *Science*, 354(6316), 1136–1139.

Spadone, S., Della Penna, S., Sestieri, C., Betti, V., Tosoni, A., Perrucci, M. G., ... Corbetta, M. (2015). Dynamic reorganization of human resting-state networks during visuospatial attention. *Proceedings of the National Academy of Sciences of the United States of America*, 112(26), 8112–8117.

Evaluation Details

Term Tests

Although the emphasis will be on material covered during lectures, the term tests may contain any material from the class lectures, textbook, or the assigned articles. As the lectures will always cover some information not contained in the texts (and vice versa), it is important that you both attend the lectures and do the readings. The term tests are non-cumulative. That is, the questions are grounded in the material covered in the preceding three lectures. However, some questions will require integration of material covered across the course, so don't forget what you've learned! Term tests will be in person and during our normal class time and place. *There is no final exam during the Final Examination Period for this course.*

Term Test Hotlines

Typically, I will not respond to online communication outside of normal business hours (see Course Policies, Online Communication). One exception to this policy will be to answer last-minute questions the night before each term test. I will be available to respond to student questions posted to the Term Test Hotline Discussion Boards on our Course Website between 8pm and 10pm. These Discussion Boards will be open for posts the whole day prior to and all the way up until the start of the test. Students are welcome to post outside the 8-10pm hotline hours and are encouraged

to answer each others' questions up until the test starts. *However, I will only be responding to questions between the hours of 8-10pm the night before the test.* I will answer questions as quickly as possible, in the order they were asked. Note that depending on the number of questions posted, there is a chance I will not get to your question.

Reading Quizzes

Quizzes will consist of a few questions that are based on the assigned readings for that day's class. You may reference the readings and any notes during the quiz, but Quizzes are timed at 15 minutes. For this reason, quizzes will be *much* easier for those students who have read the material before beginning. Your highest 7/8 quiz grades will comprise a total of 7% of your course grade. This means you may skip up to one quiz for any reason without an impact on your mark. There is a sample quiz (optional; does not count toward your grade) on the readings for the first lecture; see the Week 1 Quercus Module.

MRI Neuroanatomy

Students will use MRI data to make a mini brain atlas that identifies some key brain structures. Find more details on the Quercus Assignment page.

Paper Discussions

Twice throughout the term you will read an article and discuss it in your small group. The outcome of this discussion will be a short written assignment, which you will submit individually but should be informed by your group discussion.

- Step 1 – Draft responses: You will individually read the paper and write a draft of your responses to the questions (see Quercus assignment page). These will be marked for completion, within reason. You do not need to worry about writing full sentences, etc. for this; the goal is for you to think critically about the assigned paper on your own, and make notes to yourself so you can contribute to the group discussion. If your responses indicate you have read the paper and thought critically about it, you will receive full points for this step.
- Step 2 – Discuss with your group: Bring your draft responses (as well as any questions you might have) to your group and discuss. All group members need to participate in the discussion. Be sure that you use this time to clear up any confusion you have about the paper. You should allocate about 1 hour for this discussion, and it can be held either remotely (e.g., via Zoom) or in-person as your group prefers.
- Step 3 – Refine your responses: Submit an updated version of the assignment on Quercus that has your refined responses, refined to take into account what you learned during your group discussion. The content of your assignments across group members may be similar, but you must write your own (individual) responses. In addition, your responses do not *have* to reflect the thoughts of your group members (e.g., if your group did not reach consensus or you have a different opinion). This assignment will be marked for both quality of content and writing style; this is a formal writing (though short) assignment and you should use complete sentences.

Term Paper & Peer Review

The writing assignment is an 8-10 page research paper in which you explore a controversy in cognitive neuroscience. Find more details on the Quercus Assignment page.

Students should submit a **complete draft** of their term paper via Quercus by the

draft deadline noted in the course overview table. Students who submit their draft late will receive no credit on the draft and may not receive peer feedback. All students who have submitted a draft (including late) will be assigned one paper authored by an anonymous classmate to peer review. **Peer reviews** are to be submitted one week in advance of the final paper deadline to allow your classmate time to revise their paper in response to the feedback you provide. Late peer review submissions will receive no credit. Students should submit the **final version** of their paper via Quercus by the final term paper deadline noted in the course overview table.

Course Policies

University's Plagiarism Detection Tool (Ouriginal)

Normally, students will be required to submit their course essays to the University's plagiarism detection tool for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the tool's reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of this tool are described on the Centre for Teaching Support & Innovation website (<https://uoft.me/pdt-faq>).

Quercus, including expectations for students to check

This course uses the University's learning management system, Quercus, to post information about the course. This includes posting readings and other materials required to complete class activities and course assignments, as well as sharing important announcements and updates. The site is dynamic and new information and resources will be posted regularly as we move through the term, so please make it a habit to log in to the site on a regular, even daily, basis. To access the course website, go to the U of T Quercus log-in page at <https://q.utoronto.ca>. Once you have logged in to Quercus using your UTORid and password, you should see the link or 'card' for PSY493 Cognitive Neuroscience. You may need to scroll through other cards to find this. Click on the PSY493 Cognitive Neuroscience link to open our course area, view the latest announcements and access your course resources. There are Quercus help guides for students that you can access by clicking on the '?' icon in the left side column. SPECIAL NOTE ABOUT GRADES POSTED ONLINE: Please also note that any grades posted are for your information only, so you can view and track your progress through the course. No grades are considered official, including any posted in Quercus at any point in the term, until they have been formally approved and posted on ROSI at the end of the course. Please contact me as soon as possible if you think there is an error in any grade posted on Quercus.

Lecture Slides

Lecture slides will be posted on Quercus before class each week. Please consider the environment before printing your lecture slides. You might opt to take notes digitally instead of on print-outs or print double-sided.

Lecture Capture by Instructor

If lecture recordings are provided, they are only for the exclusive use of enrolled students, for their personal learning. Lecture recordings are not to be shared in any way beyond enrolled students.

**Online
Communication**

Emails to the instructor and/or TA are *ONLY* for genuine emergencies (e.g., illness). Please do *not* use the build-in communication tool on Quercus, called "Inbox," for this purpose. Neither the instructor nor teaching assistant will be able to respond to emails regarding course content; see below for information on how to ask your questions. You must use your utoronto email address for all course-related communication, and it is expected that you will check your utoronto email account regularly. With the exception of the Term Test Hotlines, I will *not* respond to questions on evenings, holidays, or weekends, so plan ahead!

**Missed Term
Tests**

I expect students to make every effort to take required tests. *There will be no make-up tests.* If you are unable to write a test for a legitimate reason (e.g., illness), your marking scheme will be reweighted entirely at the instructor's discretion. Contact me as soon as you are aware of the conflict and (ideally) before the day of the test to determine the best course of action. I must receive any documentation within one calendar week of the test. An unexcused missed test will receive a mark of zero.

**Missed Reading
Quizzes**

I will drop the lowest grade of the reading quizzes, such that only 7 of the 8 reading quizzes count towards your grade. This means you can miss one quiz for any reason without it adversely impacting your grade.

Late Assignments

See the table above for assignment due dates and contact the instructor if you have a legitimate reason why you might benefit from an extension. Without prior approval, late Term Paper (final) and MRI Neuroanatomy Homework, Paper Discussion assignments, and Reading Quizzes will be marked down 10% of the assignment grade per day. Late Term Paper Drafts, and Peer Reviews will receive a mark of zero.

**Religious
Accommodations**

As a student at the University of Toronto, you are part of a diverse community that welcomes and includes students and faculty from a wide range of backgrounds, cultural traditions, and spiritual beliefs. For my part, I will make every reasonable effort to avoid scheduling tests, examinations, or other compulsory activities on religious holy days not captured by statutory holidays. Further to University Policy, if you anticipate being absent from class or missing a major course activity due to a religious observance, please let me know as early in the course as possible, and with sufficient notice (at least two to three weeks), so that we can work together to make alternate arrangements.

**Students with
Disabilities or
Accommodation
Requirements**

Students with diverse learning styles and needs are welcome in this course. If you have an acute or ongoing disability issue or accommodation need, you should register with Accessibility Services (AS) at the beginning of the academic year by visiting <http://www.studentlife.utoronto.ca/as/new-registration>. Without registration, you will not be able to verify your situation with your instructors, and instructors will not be advised about your accommodation needs. AS will assess your situation, develop an accommodation plan with you, and support you in requesting accommodation for your course work. Remember that the process of accommodation is private: AS will not share details of your needs or condition with any instructor, and your instructors will not reveal that you are registered with AS.

**Specific Medical
Circumstances**

For 2023 S-term, a Verification of Illness (also known as a "doctor's note") is not required. Students who are absent from academic participation for any reason (e.g., COVID, cold, flu and other illness or injury, family situation) and who require consideration for missed academic work should report their absence through the

online absence declaration. The declaration is available on ACORN under the Profile and Settings menu. Students should also advise their instructor of their absence. If an absence extends beyond 7 consecutive days, or if you have a non-medical personal situation preventing you from completing your academic work, you should connect with your College Registrar. They can provide advice and assistance reaching out to instructors on your behalf. If you get a concussion, break your hand, or suffer some other acute injury, you should register with Accessibility Services as soon as possible

Accommodation for Personal Reasons There may be times when you are unable to complete course work on time due to non-medical reasons. If you have concerns, speak to me. It is also a very good idea to speak with an advisor in your College Registrar's office; they can support you in requesting extensions or accommodations, and importantly, connect you with other resources on campus for help with your situation.

Harassment and Discrimination The University of Toronto is a richly diverse community and as such is committed to providing an environment free of any form of harassment, misconduct, or discrimination. In this course, I seek to foster a civil, respectful, and open-minded climate in which we can all work together to develop a better understanding of key questions and debates through meaningful dialogue. As such, I expect all involved with this course to refrain from actions or behaviours that intimidate, humiliate, or demean persons or groups or that undermine their security or self-esteem based on traits related to race, religion, ancestry, place of origin, colour, ethnic origin, citizenship, creed, sex, sexual orientation, gender identity, gender expression, age, marital status, family status, disability, receipt of public assistance or record of offences.

Re-Marking All requests for re-marking must be submitted *in writing* within two calendar weeks of the first day the marked test or assignment is available for student viewing. Only requests that include adequate written justification of an oversight in the original grading will be considered. Be as specific as possible. A legitimate request will result in the entire test or assignment being re-graded. Note that in agreeing to resubmit your work for remarking, you are agreeing to a re-evaluation of the entirety of your work; your grade may go up, go down, or stay the same. If there has been an error in our arithmetic, please let us know and we will immediately recalculate your grade (no written request necessary). The work will first be re-marked by the original grader (usually the TA); if the student's concern is not satisfied, they can appeal to the instructor. *Negotiations for extra marks once final grades are in will not be tolerated. Arbitrary requests for grade increases will not be entertained (e.g., "I need to get into grad school, so could you please change my grade from a B+ to an A-?"). If I did this for one person, I would need to do it for everyone in the class. Please do not ask for special treatment – it is unfair to your classmates.*

Course materials, including lecture notes Course materials are provided for the exclusive use of enrolled students. Do not share them with others. I do not want to discover that a student has put any of my materials into the public domain, has sold my materials, or has given my materials to a person or company that is using them to earn money. The University will support me in asserting and pursuing my rights, and my copyrights, in such matters.

Have a question? Please only ask your questions *after* you have double-checked the syllabus and Quercus pages for the answer to your question. Questions related to content should be asked in class, during an office hours appointment, or on the Quercus Discussion Boards. Questions of a personal nature (e.g., accommodations, illness)

can be sent to Dr. S via email or discussed during office hours.

Additional Resources

Mental health and well-being As a student, you may experience challenges that can interfere with learning, such as strained relationships, increased anxiety, substance use, feeling down, difficulty concentrating and/or lack of motivation, financial concerns, family worries and so forth. These factors may affect your academic performance and/or reduce your ability to participate fully in daily activities. All of us benefit from support and guidance during times of struggle; there is no shame in needing help or in asking for help. There are many helpful resources available through your college Registrar or through Student Life (studentlife.utoronto.ca and studentlife.utoronto.ca/feeling-distressed). An important part of the University experience is learning how and when to ask for help. Please take the time to inform yourself of available resources and do not hesitate to seek assistance from your Teaching Assistant or from me to help learn what supports are available.

Academic Integrity All students, faculty and staff are expected to follow the University's guidelines and policies on academic integrity. For students, this means following the standards of academic honesty when writing assignments and collaborating with fellow students. Ensure that all work you submit represents your own honest efforts. Plagiarism—representing someone else's work as your own or submitting work that you have previously submitted for marks in another class or program—is a serious offence that can result in sanctions. The following are *examples* of offences:

- Using someone else's ideas or words in one's own work without acknowledging in a citation that those ideas/words are not one's own.
- Including false, misleading or concocted citations in one's work.
- Obtaining unauthorized assistance on any assignment or to provide unauthorized assistance to another student.
- Using or possessing an unauthorized aid in any test or exam.
- Submitting work for credit in more than one course without permission of the instructor.
- Falsifying or altering any documentation required by the University (e.g., doctors' notes).

Speak to me for advice on anything that you find unclear. To learn more about how to cite and use source material appropriately and for other writing support, see the U of T writing support website at writing.utoronto.ca. Consult the Code of Behaviour on Academic Matters for a complete outline of the University's policy and expectations. For more information, please see artsci.utoronto.ca/osai and academicintegrity.utoronto.ca.

Writing As a student here at the University of Toronto, you are expected to write well. The university provides its students with a number of resources to help them improve their writing, including one-on-one appointments with writing instructors, free workshops, and English Language Support. For more information on campus writing centres and activities, visit writing.utoronto.ca.