

PSY493H Cognitive Neuroscience

Fall 2021 Tuesdays 11:00AM – 2:00PM ROOM: OI 5170

CONTACT INFORMATION

Instructor:	Natalia Ladyka-Wojcik, M.A.
Office:	Zoom: https://utoronto.zoom.us/j/81600909579 <i>In-person by appointment only</i>
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Office Hours:	Zoom: Wednesdays (9AM – 10AM), Thursdays (11AM – 12PM) <i>To make a 1-on-1 appointment (Zoom or in-person):</i> https://calendly.com/nladyka-wojcik/15min
Teaching Assistant:	Ryan Williams, email*: ryanscott.williams@mail.utoronto.ca
Course Website:	Quercus (http://q.utoronto.ca)

*Email is only to be used for genuine emergencies or discussing personal circumstances. Please use the Quercus Discussion Board for questions about course content.

COURSE DESCRIPTION, GOALS, AND PREREQUISITES

Description: PSY493H Cognitive Neuroscience is a capstone course surveying research on how the mind arises from the brain. The course has two primary objectives: (1) to explore how processes in human brains (ranging from single neuron firing to the dynamics of billions) support cognitive processes, and (2) to investigate methods of contemporary cognitive neuroscience research, which will enable students to read primary literature and understand ongoing debates.

Prerequisites: PSY201H1 or equivalent, and PSY260H1/PSY270H1/PSY290H1/HMB200H1/HMB204H1/NRS201H1 or equivalent. 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. If you lack any prerequisites, you WILL BE REMOVED. No waivers will be granted.

TEXTBOOK & READINGS

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

Articles: For each lecture, there are two (2) assigned articles (see Course Schedule). You are responsible for reading one (1) assigned article (and can choose either article) per week. See full list of articles in Course Schedule below. Articles will be available on Quercus, and are listed below (see Assigned Articles).

MARKING SCHEME & GRADING BREAKDOWN

EVALUATION	WEIGHT	DUE DATE
MRI Neuroanatomy Atlas	5%	Sept. 28
Lecture quizzes	6% (Highest 6 of 7; 1% each)	Weekly
Paper Discussion #1	6%	Draft: Oct. 5 Final: Oct. 12
Paper Discussion #2	6%	Draft: Oct. 26 Final: Nov. 2
Exam 1 (Midterm)	20%	Oct. 19
Exam 2 (Final)	25%	TBA (Exam Period)
Thought Paper Topic Approval	0%	Oct. 26 (Optional)
Thought Paper Draft	6%	Nov. 16
Thought Paper Peer Review	6%	Nov. 23
Thought Paper Final Version	20%	Dec. 7

MRI Neuroanatomy Atlas (5% total)

This assignment is designed to familiarize students with the structural anatomy of the brain. Students will create their own mini brain atlas that identifies some key brain structures. More details will be given during the first lecture, as well as on Quercus (see Assignments page).

Lecture Quizzes (6% total)

To check your understanding of the lecture and textbook material, quizzes will be assigned on Quercus to be completed during the week between lectures. So, for example, the quiz for the material from Lecture 2 (Lecture 2 Quiz) is due by the end of the day (11:59 PM) one week later. These quizzes are timed at 15 minutes, and you may reference the readings or notes during the quiz. For this reason, quizzes will be much easier for those students who attend lectures and read the material before beginning. The quizzes will cover material from the previous lecture, so some topics will not have corresponding lecture quizzes (since an exam or reading week follows them).

A total of 7 quizzes have been assigned throughout the semester. However, your lowest quiz grade will not be included in your final course grade (so, you will be assessed on your top 6 grades, and each quiz will be worth 1% of your total grade). As such, there are no opportunities for make-ups on quizzes. A missed quiz will be graded as 0.

Paper Discussions [PD] (2 discussions, 12% total)

Twice throughout the term you will read an article and discuss it in a 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** (2%): You will individually read the paper and write a draft of your responses to the questions (see Quercus Assignments page). These will be marked for completion, within reason, and do not need to be written in complete sentences. If your responses indicate you have read the paper and thought critically about it on your own, you will receive full points for this step.
- **Step 2 – Group Discussion** (2%): 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. You will be assigned randomly to groups and will need to contribute on Quercus asynchronously to your group discussion board at least twice (i.e., minimum 2 discussion points/questions) *up to 24 hours before* the final response due date.
- **Step 3 – Final Responses** (2%): Submit an updated version of your responses on Quercus, taking into account what you learned during your group discussion. The content of your assignments across group members may be similar (or can differ if your group did not reach a consensus), but you must write your own (individual) responses. 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.

Exams (2 exams, 45% total)

Emphasis on the two exams will be on material covered during lectures and the assigned articles, though textbook material not explicitly covered in lecture may still be evaluated. The exams are non-cumulative. However, some questions will require integration of material covered across the course. Due to the ongoing pandemic, the exams will be administered online on Quercus. Tests will be timed (i.e., you will have 2.5 hours to complete them) but you will have flexibility as to when during a 48-hour period you will begin them. *For the midterm, students who do not have access to a quiet, internet-connected space may choose to write the assessment in the lecture classroom (OI 5170) during regular lecture hours on Oct. 19th, as no lecture will be hosted that week.*

Exam Hotlines: Typically, I will not respond to online communication (email, Quercus) after 8pm on weekdays, or on weekends. One exception to this policy will be to answer last-minute questions the night before each exam. I will be available to respond to student questions posted to the Exam Hotline Discussion Boards on the Quercus course website up until 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 hotline hours and are encouraged to answer each other's questions up until the exams start. Questions will be answered as quickly as possible, in the order they were asked.

Thought Paper (32% total)

The major writing assignment for this course is an 8-10 page research paper in which you will explore a controversy or debate in cognitive neuroscience. Find more details on the Quercus Assignments page.

- **Topic Approval** (0%, optional): Students may choose to submit a topic proposal to the instructor via Quercus before Tuesday, Oct. 26th by 11:59 PM. This step optional.
- **Draft** (6%): A draft of your Thought Paper is due on Tuesday, Nov. 16th by 11:59 PM on Quercus. Please do not wait until the week of the deadline to start writing your paper draft. The draft is NOT meant to be a rough, unfinished version of your paper. Instead, consider this step as if you were submitting to a journal publication for peer review. Late draft submissions will receive no credit (unless accommodations have been arranged BEFORE the deadline with the instructor), and students who do not submit a draft will not be assigned a peer review.
- **Peer Review** (6%): All students who have submitted a draft will be assigned one paper authored by an anonymous classmate to peer review. You will be graded on the completion and quality of the peer review that you provide your classmate. To be clear, your classmate's peer review will not affect your own draft or final paper grade. Peer reviews must be completed by Tuesday, Nov. 23rd at 11:59 PM. Late peer review submissions will receive no credit.
- **Final Version** (20%): Your final paper is due at 11:59 PM on Tuesday, Dec. 7th, on Quercus. A late penalty will apply for final papers submitted after the deadline (see Course Policies).

“Introduce Yourself” Survey (0%, special bonus applies)

Please fill out the “Introduce Yourself” Survey on Quercus by Tuesday, Sept. 21st at 11:59 PM. While no grade has been assigned to this survey, if 75% of the class completes this survey before the deadline, I will reveal one (1) question from the long answer portion of the midterm exam.

COURSE SCHEDULE

DATE	LEC	TOPIC	READINGS		ASSIGNMENTS DUE
Sep 14	1	Overview & Fundamentals	Textbook: Ch. 2 Quercus: Syllabus	Articles: Albright et al. (2000) Posner et al. (2000)	-
Sep 21	2	Methods	Textbook: Ch. 1.4 & 3 Quercus: QALMRI	Articles: Chatterjee (2005) Pinti et al. (2020)	"Introduce Yourself" Survey (optional)
Sep 28	3	Sensation & Action	Textbook: Ch. 5 & 8	Articles: Davare et al. (2006) Gelstein et al. (2011)	Lecture 2 Quiz MRI Neuroanatomy Atlas
Oct 5	4	Object Recognition	Textbook: Ch.6 Quercus: PD1 article	Articles: Freud et al. (2020) Martin et al. (2018)	Lecture 3 Quiz Paper Discussion #1 (Draft Responses) <i>Participate in Paper Group Discussion #1</i>
Oct 12	5	Spatial Cognition	Textbook: n/a	Articles: Brunec et al. (2018) Coutrot et al. (2019)	Lecture 4 Quiz Paper Discussion #1 (Final Responses)
Oct 19	Midterm Exam				
Oct 26	6	Memory Pt. 1	Textbook: Ch. 9.3 & 12.3 Quercus: PD2 article	Articles: Baddeley (1992) Miller et al. (2018)	Thought Paper Topic Proposal (Optional) Paper Discussion #2 (Draft Responses) <i>Participate in Paper Group Discussion #2</i>
Nov 2	7	Memory Pt. 2	Textbook: Ch.9 Quercus: Signposting	Articles: Cooper et al. (2019) Olsen et al. (2012)	Lecture 6 Quiz Paper Discussion #2 (Final Responses)
Nov 9	Reading Week				
Nov 16	8	Attention & Cognitive Control	Textbook: Ch.7 & 12.5 - 12.7	Articles: Fischer et al. (2020) Spadone et al. (2015)	Thought Paper Draft
Nov 23	9	Language	Textbook: Ch.11 Quercus: Peer Reviewing	Articles: Romeo et al. (2018) Sterling et al. (2020)	Lecture 8 Quiz Thought Paper Peer Review
Nov 30	10	Emotions & Decision Making	Textbook: Ch.10 & 12.1 - 12.4 Quercus: NYT Emotions	Articles: Blakemore et al. (2012) Stillman et al. (2015)	Lecture 9 Quiz
Dec 7	11	Cognitive Neuroscience Beyond the Lab	Textbook: Ch.14.1, 14.8	Articles: Pearce et al. (2016) Pennycook et al. (2018)	Lecture 10 Quiz Thought Paper Final Version
TBA	Final Exam				

Assigned Articles

All articles listed below are available in the Modules section on Quercus as PDFs. If you require Word Document (.docx) format for any article, please let me know ASAP. Remember, you are only responsible for reading one (1) of the two provided articles per lecture.

- Lecture 1** Albright, T. D., Kandel, E. R., & Posner, M. I. (2000). Cognitive neuroscience. *Current Opinion in Neurobiology*, 10(5), 612-624.
Posner, M. I., & DiGirolamo, G. J. (2000). Cognitive neuroscience: origins and promise. *Psychological Bulletin*, 126(6), 873.
- Lecture 2** Chatterjee, A. (2005). A madness to the methods in cognitive neuroscience?. *Journal of Cognitive Neuroscience*, 17(6), 847-849.
Pinti, P., Tachtsidis, I., Hamilton, A., Hirsch, J., Aichelburg, C., Gilbert, S., & Burgess, P. W. (2020). The present and future use of functional near-infrared spectroscopy (fNIRS) for cognitive neuroscience. *Annals of the New York Academy of Sciences*, 1464(1), 5.
- Lecture 3** Davare, M., Andres, M., Cosnard, G., Thonnard, J. L., & Olivier, E. (2006). Dissociating the role of ventral and dorsal premotor cortex in precision grasping. *Journal of Neuroscience*, 26(8), 2260-2268.
Gelstein, S., Yeshurun, Y., Rozenkrantz, L., Shushan, S., Frumin, I., Roth, Y., & Sobel, N. (2011). Human tears contain a chemosignal. *Science*, 331(6014), 226-230.
- Lecture 4** Freud, E., Stajduhar, A., Rosenbaum, R. S., Avidan, G., & Ganel, T. (2020). The COVID-19 pandemic masks the way people perceive faces. *Scientific Reports*, 10(1), 1-8.
Martin, C. B., Douglas, D., Newsome, R. N., Man, L. L., & Barense, M. D. (2018). Integrative and distinctive coding of visual and conceptual object features in the ventral visual stream. *Elife*, 7, e31873.
- Lecture 5** Brunec, I. K., Bellana, B., Ozubko, J. D., Man, V., Robin, J., Liu, Z. X., ... & Moscovitch, M. (2018). Multiple scales of representation along the hippocampal anteroposterior axis in humans. *Current Biology*, 28(13), 2129-2135.
Coutrot, A., Schmidt, S., Coutrot, L., Pittman, J., Hong, L., Wiener, J. M., ... & Spiers, H. J. (2019). Virtual navigation tested on a mobile app is predictive of real-world wayfinding navigation performance. *PloS One*, 14(3), e0213272.
- Lecture 6** Baddeley, A. (1992). Working memory. *Science*, 255(5044), 556-559.
Miller, E. K., Lundqvist, M., & Bastos, A. M. (2018). Working Memory 2.0. *Neuron*, 100(2), 463-475.

- Lecture 7** Cooper, R. A., & Ritchey, M. (2019). Cortico-hippocampal network connections support the multidimensional quality of episodic memory. *Elife*, 8, e45591.
- Olsen, R. K., Moses, S. N., Riggs, L., & Ryan, J. D. (2012). The hippocampus supports multiple cognitive processes through relational binding and comparison. *Frontiers in Human Neuroscience*, 6, 146.
- Lecture 8** Fischer, M., Moscovitch, M., & Alain, C. (2020). Incidental auditory learning and memory-guided attention: Examining the role of attention at the behavioural and neural level using EEG. *Neuropsychologia*, 147, 107586.
- 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*, 112(26), 8112-8117.
- Lecture 9** Romeo, R. R., Segaran, J., Leonard, J. A., Robinson, S. T., West, M. R., Mackey, A. P., ... & Gabrieli, J. D. (2018). Language exposure relates to structural neural connectivity in childhood. *Journal of Neuroscience*, 38(36), 7870-7877.
- Sterling, J., Jost, J. T., & Bonneau, R. (2020). Political psycholinguistics: A comprehensive analysis of the language habits of liberal and conservative social media users. *Journal of Personality and Social Psychology*, 118(4), 805.
- Lecture 10** Blakemore, S. J., & Robbins, T. W. (2012). Decision-making in the adolescent brain. *Nature Neuroscience*, 15(9), 1184-1191.
- Stillman, P. E., Van Bavel, J. J., & Cunningham, W. A. (2015). Valence asymmetries in the human amygdala: Task relevance modulates amygdala responses to positive more than negative affective cues. *Journal of Cognitive Neuroscience*, 27(4), 842-851.
- Lecture 11** Pearce, M. T., Zaidel, D. W., Vartanian, O., Skov, M., Leder, H., Chatterjee, A., & Nadal, M. (2016). Neuroaesthetics: The cognitive neuroscience of aesthetic experience. *Perspectives on Psychological Science*, 11(2), 265-279.
- Pennycook, G., & Thompson, V. A. (2018). An analysis of the Canadian cognitive psychology job market (2006–2016). *Canadian Journal of Experimental Psychology/Revue canadienne de psychologie expérimentale*, 72(2), 71.

COURSE POLICIES

Quercus

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.

Note about grades posted on Quercus: 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.

Course Materials

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.

Asking Questions

The Quercus Discussion Board is the appropriate place to ask all course content questions. For course policy/deadline/grading questions, please only ask your question after you have double-checked the syllabus and Quercus for the answer to your question. Email should only be used for emergency situations or to discuss personal circumstances. Your TA and I will make every effort to respond to questions posted to the Discussion board within one business day, except for evenings, holidays, and weekends – so plan ahead! The only exception to this will be the Exam Hotlines.

Plagiarism Checker

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 web site (<https://uoft.me/pdt-faq>). *Note that this review will happen automatically when your paper is submitted on Quercus.*

Missed Tests

I expect students to make every effort to take required exams. There will be no make-up exams. If you are unable to attend class on the exam day and you have a legitimate excuse, the student's marking scheme will be reweighted entirely at the instructor's discretion. This will be based on the student's performance and the class averages for the remaining elements. The Verification of Student Illness or Injury form, now the new official University of Toronto form for all students who are requesting special academic consideration based on illness or injury, must be submitted to you or your TA within one week of missing the test. This form must show that the physician was consulted within one day of the missed term test. An email from the student's College registrar's office will also suffice as appropriate documentation. Students who miss final examinations should file a petition for a deferred exam with their College Registrar's Office.

Missed Lecture Quizzes

I will drop the lowest grade of the reading quizzes, such that only 6 of the 7 reading quizzes count towards your grade. This means you can miss one quiz for any reason without it adversely impacting your grade. Please do not email me if you miss one (1) quiz. Documentation is required for reweighting beyond the first missed quiz.

Penalties for Lateness

All assignments must be submitted by 11:59 PM on the specified due date (unless otherwise specified in the Syllabus and on Quercus). Except in the case of a documented emergency, late assignments will be marked down 5% per day. Appropriate documentation is required in all emergency situations. However, given the uncertainty of the ongoing pandemic, I am offering all students one 24-hour "free" extension throughout the semester to use on one of the following assignments: MRI Neuroanatomy Atlas, Paper Discussion #1 Final Response, Paper Discussion #2 Final Response, or Thought Paper Final Version. To use this extension, please contact the instructor via email directly up until the deadline for the assignment (see Course Information for contact information).

Religious Accommodation

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 (like a test, or in-class assignment) 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.

Contesting a Grade

All requests for a re-grade must be submitted in writing within 1 week of the first day the exam or assignment is available for student viewing. Only requests that include adequate written justification of an error in the original grading will be considered. A legitimate request will result in the entire exam or assignment being re-graded. Your overall grade may be raised, lowered, or it may 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). 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.

ACADEMIC RESOURCES

Accessibility Needs

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) (www.accessibility.utoronto.ca) at the beginning of the academic year. 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 medical 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 condition with any instructor, and your instructors will not reveal that you are registered with AS.

Please note: Because I believe that accessibility is an issue that should be addressed broadly, not only for specific individuals with appropriate documentation, I have tried my best to design a flexible course where every learner’s needs can be met. For example, everyone may miss one quiz without any explanation required. Similarly, all students can use the “free” extension option for one of the major assignments. Of course, if you have specific needs that have not been met by default in the design or format of the course (e.g., extra time is needed on quizzes), simply let me know (e.g., via your accommodation letter) and I will make sure it is taken care of. If you have any concerns about your ability to learn in this course, please just let me know.

Writing Support

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 achieve this. For more information on campus writing centres and writing courses, please visit <http://www.writing.utoronto.ca/> .

Academic Dishonesty and Plagiarism

Academic integrity will be taken seriously in this course. In accordance with the University of Toronto's Code of Behaviour on Academic Matters

(<http://sites.utoronto.ca/academicintegrity/resourcesforstudents.html>), the following are offences:

- To use 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.
- To include false, misleading or concocted citations in one's work.
- To obtain unauthorized assistance on any assignment or to provide unauthorized assistance to another student.
- To use or possess an unauthorized aid in any test or exam.
- To submit work for credit in more than one course without permission of the instructor.
- To falsify or alter any documentation required by the University (e.g., doctors' notes).

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 <http://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 <http://www.artsci.utoronto.ca/osai> and <https://www.academicintegrity.utoronto.ca/>.

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.

Ongoing COVID-19 considerations: I acknowledge that we continue to face challenges related to the Covid-19 global pandemic. As we transition back to in-person classes, I understand that attending lectures on campus after an extended period of remote learning may mean significant adjustments for students. Please speak to me if you have any concerns.

Other Resources

Student Life Programs and Services (<http://www.studentlife.utoronto.ca/>)

Academic Success Services (<http://www.studentlife.utoronto.ca/asc>)

Counselling and Psychological Services (<http://www.studentlife.utoronto.ca/hwc>)