

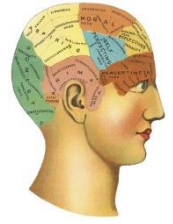
PSYB55: Introduction to Cognitive Neuroscience

0.5 credits

University of Toronto, Scarborough (UTSC)

Fall Term, 2023

LEC01 (in-person) & LEC02 (online, asynchronous)



Instructor: Prof. Michael Souza (he/him) (*note: my surname is pronounced “SUES-uh”*)

Email: michael.souza@utoronto.ca (*please note: I do not use or respond to Quercus messages*)

Office Hours: *Please see Quercus announcements for virtual office hours information*

Head TA: Gahyun Kim

Email: gh.kim@mail.utoronto.ca (*please note: I do not use or respond to Quercus messages*)

Office Hours: *Please see Quercus announcements for virtual office hours information*

I. Your instructor



Dr. Souza is an Associate Professor (Teaching Stream) of Psychology and Neuroscience, and he is also serving as Acting Associate Dean Undergraduate Programs and Curriculum here at UTSC. He received his Ph.D. in Psychology from the University of California, Berkeley in 2010. His teaching interests include cognitive neuroimaging, higher-order cognitive functions, and cognitive impairments and neurorehabilitation.

II. Course description, prerequisites, and learning outcomes

Cognitive Neuroscience is an interdisciplinary field of study that integrates cognitive psychology (the scientific study of mental processes) and neuroscience (the scientific study of the structure and function of the nervous system). Transformative achievements in engineering, computing, physics, biological sciences, and more have provided us with powerful tools to study the dynamics of the human mind in ways that seemed unimaginable some years ago. Cognitive neuroscientists employ a range of tools and techniques that you may have heard of (e.g., Magnetic Resonance Imaging [MRI]), and many others you may not have (e.g., Transcranial Magnetic Stimulation [TMS]). This course will provide you with a broad survey how we use such tools to elucidate the complex dynamics underlying how the brain gives rise to the mind.

Prerequisites: [PSYA01](#) and [PSYA02](#)

After successful completion of this course, you will have demonstrated an improved ability to do the following:

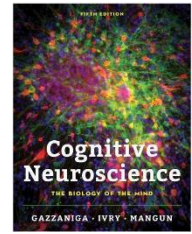
1. **Understand** and **describe** why the integration of cognitive psychology and neuroscience helps to promote a more rigorous understanding of human cognitive processes than either field alone might;
2. **Understand** and **describe** the core elements of a range of neurocognitive tools and research designs – including strengths/weaknesses – and to **apply** this knowledge to pertinent, novel research questions;
3. **Understand** and **describe** the core tenets of major theories in various domains in cognitive neuroscience (e.g., memory), and to consider how we might **create** experiments to test and **evaluate** these ideas;
4. **Understand** how and why primary research articles are organized the way they are, and to **develop** and **apply** strategies to effectively consume the information contained within them;
5. **Evaluate** whether the conclusions reached in a research study are appropriate given how the research was conducted (e.g., research design, neurocognitive tools employed, sample size and characteristics);
6. **Conceptualize** the content units of this course (e.g., attention) as both *integrative* and *hierarchical*;
7. **Identify** and **articulate** the value and contribution of this course to your broader program of study (Neuroscience, Mental Health Studies, and/or Psychology, as appropriate).

III. Course textbook

Gazzaniga, M., Ivry, R.B. & Mangun, G.R. (2018). Cognitive Neuroscience: The Biology of the Mind (5th edition). New York, NY: W.W. Norton & Co. (ISBN-13: 978-0-393-60317-0)

This textbook comes in multiple formats, including hardcover and e-book.

Publisher link: <https://wwnorton.com/books/9780393603170>



Please note that you should NOT use an earlier edition of this book.

IV. Course webpage

Please visit Quercus (<https://q.utoronto.ca/>) and sign in with your UTORid credentials to access our course webpage. This webpage will house all course-related materials, including announcements, discussion boards, lecture and related learning materials, assessments, and marks. You should expect to visit this webpage a few times per week to ensure you are up to date on any new happenings in the course throughout the term.

V. Assessment structure

Your mark in this course will consist of three (3) major assessments:

Midterm Examination I 27% of course grade	Covers lecture and textbook materials from the first four lectures.
Midterm Examination II 33% of course grade	Covers lecture and textbook materials from the next four lectures.
Final Examination 40% of course grade	Cover ALL lecture materials, textbook readings from weeks 11-13 only, and one assigned journal article (TBA).

Exam scheduling

Please note that all assessments are scheduled by the Office of the Registrar and the dates of these assessments will be communicated as soon as they have been finalized. You must plan to take each assessment at the designated date/time slot that we have been assigned. All exams will be in-person.

Exam structure

All examinations will consist of both multiple-choice (MC) questions and a number of multi-part short-answer (SA) questions. These questions are designed to probe your knowledge of not only course content, but your ability to think and reason with what you have learned across a variety of scenarios.

Each MC question will have five (5) options and these questions may come in various formats, including (but not limited to) questions with diagrams and “all of the above” or “none of the above” options. MC questions will be drawn from both lecture and the textbook.

SA questions will consist of multi-part questions that are broken down to help you structure and scaffold your thinking. Each question will require a several sentence response, and may also require the creation or analysis of a visual (e.g., diagram). SA questions will be drawn from lecture only. SA questions will be weighted based on relative difficulty (i.e., the challenge/complexity of thought), as opposed to how many things you need to say (i.e., we will not employ a system of five points requiring five “things” to say).

On the whole, there will be more of a focus from lecture (approximately 2/3 to 3/4 of the points on the exam) than the textbook readings (approximately 1/4 to 1/3 of the points on the exam). For superior performance, you will need to develop a clear understanding of both the lectures and the readings. **Take note that rote memorization of lectures and the textbook will not ensure you a high mark;** rather, I expect you to not only learn what things are, but also why they are relevant, and how/why they are used, etc.

Practice questions will be made available for you for each lecture. These sample questions are an invaluable resource for many reasons, including (1) acclimating you to my testing style/expectations, and (2) giving you an opportunity to apply what you've learned in a test-like structure. Please note that while the answers to these questions will not be posted, we strongly encourage you to connect with Prof. Souza and/or your Head TA to discuss the answers after you've tried to work them out to receive positive and/or constructive feedback.

VI. Course policies

Classroom conduct and participation

I work to create an interactive dynamic during my lectures that engages you to think and reflect. I challenge you to use this time to actively engage with the content we are covering, as active learning and immersion in the material will facilitate your ability to think critically about these concepts. I challenge you to structure your time in such a way that you can reasonably space out your learning, as skill development requires practice and reflection.

Masks in the Classroom

While the mask mandate has been paused as of 01 July 2022, the use of medical masks continues to be strongly encouraged at U of T Scarborough in indoor settings where physical distancing is not possible. We ask everyone to respect each other's decisions, comfort levels, and health needs. Masks are available at all building entrances at U of T Scarborough and in all classrooms.

Lecture slides

Lecture materials will be posted on a weekly basis to control the flow of learning and engagement in the course. Lecture slides will be posted in PDF format in two version only (2 slide and 6 slides per page).

You must know that these lecture slides are not a suitable substitute for watching lectures and engaging the materials. Lecture slides alone are not themselves exhaustive, as we will regularly cover important material that extends beyond them during lecture. Know that you are responsible for this material.

Instructional materials are only for the purpose of learning in this course and must not be distributed or used for any other reason whatsoever.

Recording of Classroom Material by Students

Recording or photographing any aspect of a university course - lecture, tutorial, seminar, lab, studio, practice session, field trip etc. - without prior approval of all involved and with written approval from the instructor is not permitted.

Reading the textbook

The material covered in the textbook is meant to reinforce and complement what we discuss in lecture. At times, we may overlap more with the textbook than at other times. In the spirit of promoting fair and transparent expectations, we will primarily target your conceptual understanding of the bold face terms and figures (and their legends). To be clear, verbatim memorization of course content will not be sufficient here, as the goal of assessments is to tap conceptual understanding, not regurgitation. It is absolutely reasonable to assume that this is particularly important for terms and figures that were not covered in lecture.

E-mail policy

In most cases, e-mails will be answered within 48 hours of receipt (not including weekends). The email subject should include our course name and nature of the inquiry (i.e., "PSYB55: Question about the Dual Route theory"). The start of your email should include your full name and student ID number so that we know who you are. Emails that you send should contain no more than one question and you should try to explain your current understanding of the concept in the email (which will be affirmed or corrected).

If you are not used to writing emails in an academic context, I encourage you to review this online resource so that you adopt proper email etiquette now and in the future: <<https://tinyurl.com/kysxwtx>>

Office hours

You should consider visiting Prof. Souza's office hours if you would like to (1) discuss course content (e.g., weekly practice questions), (2) review an issue with course performance or progress, (3) contest a question on an assessment (note: this is a starting place for the process and must occur within two weeks of releasing the marks), or (4) discuss the field of psychology/neuroscience and how to get more involved.

Syllabus changes

There may be minor changes to the syllabus during the term. You will be notified of these changes ASAP and no changes will be instituted that dramatically affect your ability to properly prepare for an examination (e.g., reading an extra chapter the week before the Midterm).

Missed Term Work Policy

Using the Missed Term Work policy below is **optional**. You may prefer to develop your own system (ex. you could create your own online form instead of using our MTW form), but you must account for the following:

- If there are legitimate, documented reasons beyond a student's control for missed work, they should be accommodated **without academic penalty** (as per the [Academic Handbook](#), 6.6)
- Students who miss a term test for an acceptable reason (e.g. illness or bereavement) **should be offered a make-up test**. For some courses it may be appropriate to allocate the value of the missed test to another test, or other piece(s) of term work, but this is **strongly discouraged** (as per the [Academic Handbook](#), 7.3)
- For a **first absence** in a course, students may simply **declare their absence on ACORN**. They can declare absence only once per term, for a period of up to 7 days. ACORN absence declarations should be considered sufficient documentation for missed work.
- If a student is **away more than once** in the term, they cannot declare additional absences on ACORN. In these cases, you have the **option to request proof** of their second+ absence, for example:
 - o A University approved Verification of Illness (VOI) form
 - o A death certificate, funeral announcement, or other supporting document for bereavement
 - o A note from a university staff member (advisor, coach, residence staff, etc.) who can substantiate the student's claims, sent directly to the instructor by email

Department of Psychology Missed Term Work Policy

For missed term work (assignments and term tests) due to illness, emergency, or other mitigating circumstances, please follow the procedure outlined below.

Procedure:

1. Complete the [Request for Missed Term Work Accommodations Form](#) ("MTW Form").
2. Email **BOTH** your MTW Form and Supporting Documentation to gh.kim@mail.utoronto.ca **and** also cc Prof. Souza [michael.souza@utoronto.ca] > according to the instructions specified below.

Supporting Documentation Requirements and Deadlines:

Reason for Missed Work	Documentation required for a first absence in the term	Documentation required for subsequent absences in the term	Deadline for submitting MTW form and supporting documentation
Illness or Injury	ACORN Absence Declaration	UofT Verification of Illness Form	WITHIN 2 BUSINESS DAYS of the missed work
Bereavement	ACORN Absence Declaration	A death certificate or funeral announcement	WITHIN 2 BUSINESS DAYS of the missed work
University-sponsored athletic or artistic obligation at the varsity/provincial/national level	ACORN Absence Declaration	A note from a university staff member (advisor, coach, residence staff, etc.) who can substantiate the obligation, sent directly to the course email	10 BUSINESS DAYS IN ADVANCE of the missed deadline
Disability-related reasons for students registered with AccessAbility Services	<p>For missed TERM TESTS,</p> <ul style="list-style-type: none"> - Contact your AccessAbility consultant and have them write to the course email detailing the accommodations needed. <p>For missed ASSIGNMENTS,</p> <ul style="list-style-type: none"> - If your desired accommodation is within the scope of your Accommodation Letter (e.g. your letter includes “extensions of up to 7 days” and you need 3 days), send your Accommodation Letter to the course email and specify how many days extension you are requesting. - If your desired accommodation is outside the scope of your Accommodation Letter (e.g. your letter includes “extensions of up to 7 days” but you need more time than that), contact your AccessAbility consultant and have them write to the course email detailing the accommodations needed. 		PREFERABLY IN ADVANCE OF THE MISSED WORK, OR AS SOON AS POSSIBLE
Academic Conflict (e.g. two midterms at the same time)	Screenshot from Quercus demonstrating the conflict.		10 BUSINESS DAYS IN ADVANCE of the missed work
Religious Conflict	None required		

Notes:

- The following reasons are not considered sufficient for missed term work: social activities, recreational travel, technological issues, avoidance of assessments or deadlines, work commitments
- [Missed Final Exams](#) are handled by the Registrar’s Office and should be declared on eService.
- For ACORN absence declarations, the date you declare the absence is required to fall within the seven-day declaration period (i.e.) the absence cannot be submitted proactively or retroactively.
- Instructors cannot accept term work any later than five business days after the last day of class. Beyond this date, accommodations are only possible via the Registrar’s Office [petition process](#).

- If you are unable to submit your request within the specified number of business days, you must still email your instructor within that window to explain the nature of the delay. Exceptions to the deadlines are made only under exceptional circumstances.
- Multiple assignments due on the same day are not considered academic conflicts. Students are expected to manage their time effectively to meet assignment deadlines.
- Back-to-back tests/quizzes are not considered academic conflicts. Only overlapping activities are conflicts.
- Students are responsible for keeping their course timetables conflict-free. Students who register in two courses with overlapping lecture/tutorial/lab schedules will not be accommodated.

Next Steps:

After submitting your documentation, you will receive a response from your instructor or TA. The course instructor reserves the right to decide what accommodations will be made. Failure to adhere to any aspect of this policy may result in a denial of your request. **You are responsible for checking your official U of T email and Quercus course announcements daily**, as accommodations may be time-critical.

For missed assignments, **do not wait for the instructor's response to resume work on your assignment.** Extensions may be as short as one business day, depending on the nature of the illness/emergency. Complete your assignment as soon as you're able, and email it to your instructor.

If an accommodation is granted but a continued illness/emergency prevents you from meeting its requirements, you must repeat the missed term work procedure to request additional accommodations. **Please make it clear in your subject line that you are requesting a second accommodation.** Examples: If you were granted an extension for a paper but are still unable to meet the new deadline, or if you miss a make-up term test, you must submit *another* MTW form and supply documentation according to the "subsequent absences" column in the chart above. *Note: In the case of a missed make-up test, an opportunity to write a second make-up test may not necessarily be provided.

Academic Integrity

The University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behaviour on Academic Matters (<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences.

Potential offences in papers and assignments include using someone else's ideas or words without appropriate acknowledgement, submitting your own work in more than one course without the permission of the instructor, making up sources or facts, obtaining or providing unauthorized assistance on any assignment.

On tests and exams cheating includes using or possessing unauthorized aids, looking at someone else's answers during an exam or test, misrepresenting your identity, or falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes.

Equity, Diversity and Inclusion

The University of Toronto is committed to equity, human rights and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another's differences. U of T does not condone discrimination or harassment against any persons or communities.

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.

University Land Acknowledgement

I wish to acknowledge this land on which the University of Toronto operates. For thousands of years, it has been the traditional land of the Huron-Wendat, the Seneca, and the Mississaugas of the Credit. Today, this meeting place is still the home to many Indigenous people from across Turtle Island and we are grateful to have the opportunity to work on this land.

VII. Resources you will likely find helpful...

(a) UTSC administrative information, academic support, and well-being

[Quercus \(learning platform for this course\)](#)

[Important Dates and Deadlines](#)

[Academic Advising and Career Centre](#)

[Writing Services](#)

[AccessAbility](#)

[Health and Wellness](#)

(b) Relevant academic programs and opportunities at UTSC

Neuroscience Specialist in Cognitive Neuroscience

[Neuroscience Calendar](#) (course listings, program requirements, etc.)

[Psychology, Mental Health Studies Calendar](#) (course listings, program requirements, etc.)

[Chapter of Psi Chi, the International Honours Society in Psychology](#)

[Psychology and Neuroscience Departmental Association \(PNDA\)](#)

[Department of Psychology](#)

[Psychology Experiential Learning opportunities](#)

(c) If you enjoy this course, consider checking out these UTSC faculty and courses below!

[Prof. Blair Armstrong](#)

[PSYC59](#)

[Prof. Michael Best](#)

[PSYD33](#)

[Prof. Jonathan Cant](#)

[PSYC51](#) | [PSYC75](#) | [PSYD51](#)

[Prof. George Cree](#)

[PSYC70](#) | [PSYD52](#)

[Prof. Vina Goghari](#)

[PSYD33](#)

[Prof. Cendri Hutcherson](#)

[PSYC57](#) | [PSYD17](#)

[Prof. Michael Inzlicht](#)

[PSYC19](#)

[Prof. Andy Lee](#)

[PSYC53](#) | [PSYD55](#)

[Prof. Adrian Nestor](#)

[PSYB03](#) | [PSYC03](#) | [PSYD54](#)

[Prof. Matthias Niemeier](#)

[PSYB51](#) | [PSYC52](#) | [PSYD51](#)

[Prof. Anthony Ruocco](#)

[PSYC31](#)

[Prof. Mark Schmuckler](#)

[PSYC74](#)

(d) So you're considering graduate studies in Cognitive Neuroscience...?

[Local graduate training opportunities](#)

[University of Toronto: Experimental Psychology Tri-Campus graduate program](#)

[UTSC: Graduate Training in Clinical Psychology](#) (for those interested in Clinical Cog Neuro)

[Relevant professional associations to check out](#)

[Cognitive Neuroscience Society](#) (CNS)

[Society for Neuroscience](#) (SfN)

PSYB55 Course Timeline (Fall 2023)

May be subject to minor revisions with advance notice from the instructor

<u>Week</u>	<u>Date</u>	<u>Agenda for the week</u>	<u>Textbook Readings</u>
1	6-Sep	Course introduction; A bit of history <i>Skills: Strategies for success in this course (and beyond)</i>	<u>Book</u> : Ch. 1 (pp. 2-18), OR <u>E-book</u> : Sections 1.1-1.5
2	13-Sep	Neurotransmission and neuroanatomy <i>Skills: Navigating exam questions</i>	<u>Book</u> : Ch. 2 (pp. 22-61), OR <u>E-book</u> : Sections 2.1-2.5
3	20-Sep	Neurocognitive tools and methodologies <i>Skills: Experimental Design (pt. 1 of 2)</i>	<u>Book</u> : Ch. 3 (pp. 73-115), OR <u>E-book</u> : Sections 3.1-3.7
4	27-Sep	Perception <i>Skills: Experimental Design (pt. 2 of 2)</i>	<u>Book</u> : Ch. 5 (pp. 184-219), OR <u>E-book</u> : Sections 5.5-5.10
-	TBD	MIDERM EXAMINATION I	(please see below)
5	4-Oct	Object recognition <i>Skills: Reading journal articles (overview, abstracts)</i>	<u>Book</u> : Ch. 6 (pp. 223-64), OR <u>E-book</u> : Sections 6.1-6.5
6	11-Oct	Reading Week (no lecture this week)	(none)
7	18-Oct	Attention <i>Skills: Reading journal articles (the introduction)</i>	<u>Book</u> : Ch. 7 (pp. 276-308), OR <u>E-book</u> : Sections 7.1-7.4
8	25-Oct	Action <i>Skills: Reading journal articles (methods)</i>	<u>Book</u> : Ch. 8 (pp. 325-58; 365-75), OR <u>E-book</u> : Sections 8.1-8.6; 8.8
9	1-Nov	Memory <i>Skills: Reading journal articles (results)</i>	<u>Book</u> : Ch. 9 (pp. 379-418), OR <u>E-book</u> : Sections 9.1-9.6
-	TBD	MIDERM EXAMINATION II	(please see below)
10	08-Nov	Emotion <i>Skills: Reading journal articles (discussion)</i>	<u>Book</u> : Ch. 10 (pp. 427-59; 468-71), OR <u>E-book</u> : Sections 10.1-10.7; 10.10
11	15-Nov	Language	<u>Book</u> : Ch. 11 (pp. 475-504), OR <u>E-book</u> : Sections 11.1-11.5
12	22-Nov	Prepare for Midterm Examination II (no lecture this week)	(none)
13	29-Nov	Cognitive Control <i>Skills: Synthesizing and reflecting upon your learning</i>	<u>Book</u> : Ch. 12 (pp. 515-53), OR <u>E-book</u> : Sections 12.1-12.6
-	TBD	FINAL EXAMINATION To be scheduled sometime between 07-20 Dec	(please see below)

Notes:

- (1) Textbook readings are provided to accommodate both a physical copy of the book as well as the E-book.
- (2) Midterm Examination I covers all lectures/readings from Weeks 1-4. Precise scheduling of term tests is handled by the Office of the Registrar and will be communicated ASAP.
- (3) Midterm Examination II covers all lectures/readings from Weeks 5 and 7-9. Precise scheduling of term tests is handled by the Office of the Registrar and will be communicated ASAP.
- (4) The Final covers ALL lectures, the readings from Weeks 11-13, and one assigned journal article (more in November). Precise scheduling of term tests is handled by the Office of the Registrar and will be communicated ASAP. This exam will occur sometime between 07-20 Dec.