

# PSYB55: Introduction to Cognitive Neuroscience

0.5 credits

University of Toronto, Scarborough (UTSC)

Summer Term, 2023

LEC01 (Online, Asynchronous)



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

**Email:** [michael.souza@utoronto.ca](mailto: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*

## I. Your instructor



**Dr. Souza** is an Associate Professor (Teaching Stream) of Psychology and Neuroscience 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:

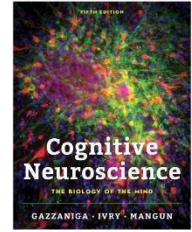
1. **Understand** and **describe** why the integration of cognitive psychology and neuroscience helps to promote a more rigorous understanding of human cognitive processes than either field alone might;
2. **Understand** and **describe** the core elements of a range of neurocognitive tools and research 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 (5<sup>th</sup> 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://wnorton.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:

<b>Midterm Examination I</b> 27% of course grade	Covers lecture and textbook materials from the first four lectures.
<b>Midterm Examination II</b> 33% of course grade	Covers lecture and textbook materials from the next four lectures.
<b>Final Examination</b> 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.

#### **Academic integrity for examinations**

While all of these online assessments will essentially be “open notes and open book,” you are absolutely NOT permitted to work with or obtain any pertinent information from any other person – a student in this course or anyone otherwise – for or during any of the assessments. A failure to respect this policy will be treated as potential academic misconduct and will be investigated and pursued accordingly. **Put quite simply, put in the time and effort to do your own work and this will not be something for you to worry about.**

#### **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 in requires practice and reflection.

### **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.**

### **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).

### Department of Psychology Missed Term Work Policy (SUMMER 2023)

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

Note:

- The following reasons are not considered sufficient for missed term work: travel for leisure, weddings, personal commitments, work commitments, human error.
- [Missed Final Exams](#) are handled by the Registrar's Office and should be declared on eService.
- 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](#).

The email address to submit missed term work accommodation requests in PSYB55 is:  
<[gh.kim@mail.utoronto.ca](mailto:gh.kim@mail.utoronto.ca)> with cc to <[michael.souza@utoronto.ca](mailto:michael.souza@utoronto.ca)>

### ILLNESS OR EMERGENCY accommodations:

For missed work due to ILLNESS OR EMERGENCY, complete the following process:

1. Complete the [Request for Missed Term Work Accommodations Form](#).
2. Declare your absence on [ACORN](#) (Profile & Settings > Absence Declaration)
3. Email **both** of the following items to the course email **WITHIN 2 BUSINESS DAYS** of the missed work:
  - the [Request for Missed Term Work Accommodations Form](#)
  - \*AND\***
  - a screenshot of your Self-Declared Absence on ACORN

Note:

- *If you are unable to submit your request within 2 business days, you must still email your instructor within the 2 business day window to explain the nature of the delay. Exceptions to the 2 business day deadline will only be made under exceptional circumstances.*
- *If your absence is declared on ACORN, we do not require any additional supporting documentation (e.g. medical notes) to support your missed term work accommodation request.*

### ACADEMIC CONFLICT accommodations:

For missed term work due to an ACADEMIC CONFLICT (e.g. two midterms at the same time):

1. Complete the [Request for Missed Term Work Accommodations Form](#).
2. Take screenshots of your course Quercus pages that demonstrate the conflict.
3. Email the form and screenshots to the course email **at least two weeks (10 business days) before the date of the activity**, or as soon as possible if it was not possible to identify the conflict earlier. Requests sent after the activity deadline may not be accommodated.

Note:

- Multiple assignments due on the same day are not considered conflicts. Students are expected to manage their time effectively to meet assignment deadlines.
- Back-to-back tests/quizzes are not considered 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.

**RELIGIOUS CONFLICT accommodations:**

For missed term work due to a RELIGIOUS CONFLICT:

1. Complete the [Request for Missed Term Work Accommodations Form](#).
2. Email the form to the course **email at least two weeks (10 business days) before the date of the activity**, or as soon as possible if it was not possible to identify the conflict earlier. Requests sent after the activity deadline may not be accommodated.

**ACCESSABILITY SERVICES accommodations:**

For missed **TERM TESTS** due to ACCESSABILITY REASONS:

- **Contact your AccessAbility consultant** and have them email the course email detailing accommodations required.

For missed **ASSIGNMENTS** due to ACCESSABILITY REASONS:

- 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):
  1. Complete the [Request for Missed Term Work Accommodations Form](#).
  2. Email the form **\*AND\*** your **Accommodation Letter** to the course email specifying 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):
  1. **Contact your AccessAbility consultant** and have them email the course email detailing the accommodations required.

**Accommodation Procedure:**

After submitting your documentation, you will receive a response from your instructor or TA. This form does not guarantee that you will be accommodated. The course instructor reserves the right to decide what accommodations (if any) 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.

For an **anticipated absence** (e.g. a scheduled surgery or an illness with a prolonged recovery period), if you would like to request accommodations in advance, submit a [Verification of Illness Form](#) completed by your doctor AND the [Request for Missed Term Work Accommodations Form](#) to the course email. Absences can be declared up to 14 days into the future on ACORN.

**Missed Accommodations**

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**. E.g. If you are given an extension but are still sick and need more time, or if you miss a **make-up** term test, you must submit *another* [Request for Missed](#)

[Term Work Accommodations Form](#) and declare your extended absence on ACORN. \*Note: In the case of a missed make-up test, an opportunity to write a second make-up test may not necessarily be provided.

### **Disability-Related Accommodations**

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please contact the [AccessAbility Services Office](#) as soon as possible.

AccessAbility Services staff (located in Rm AA142, Arts and Administration Building) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations. Please contact 416-287-7560 (tel/TTY) or email [ability.uts@utoronto.ca](mailto:ability.uts@utoronto.ca) for more information. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

### **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.

### **Religious Accommodations**

The University has a commitment concerning accommodation for religious observances. I will make every reasonable effort to avoid scheduling tests, examinations, or other compulsory activities on religious holy days not captured by statutory holidays. According 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.

### **Equity, Diversity, 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.

## 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 (Summer 2023)

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

<u>Week #</u>	<u>Week of</u>	<u>Agenda for the week</u>	<u>Textbook Readings</u>
1	8-May	<b>Course introduction; A bit of history</b> <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	15-May	<b>Neurotransmission and neuroanatomy</b> <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	22-May	<b>Neurocognitive tools and methodologies</b> <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	29-May	<b>Perception</b>	<u>Book</u> : Ch. 5 (pp. 184-219), OR <u>E-book</u> : Sections 5.5-5.10
-	TBD	<b>MIDERM EXAMINATION I</b>	(please see below)
5	5-Jun	<b>Object recognition</b> <i>Skills: Experimental Design (pt. 2 of 2)</i>	<u>Book</u> : Ch. 6 (pp. 223-64), OR <u>E-book</u> : Sections 6.1-6.5
6	12-Jun	<b>Attention</b> <i>Skills: Reading journal articles (overview, abstracts)</i>	<u>Book</u> : Ch. 7 (pp. 276-308), OR <u>E-book</u> : Sections 7.1-7.4
7	19-Jun	<b>Reading Week</b> (no lecture this week)	(none)
8	26-Jun	<b>Action</b> <i>Skills: Reading journal articles (the introduction)</i>	<u>Book</u> : Ch. 8 (pp. 325-58; 365-75), OR <u>E-book</u> : Sections 8.1-8.6; 8.8
9	3-Jul	<b>Memory</b> <i>Skills: Reading journal articles (methods)</i>	<u>Book</u> : Ch. 9 (pp. 379-418), OR <u>E-book</u> : Sections 9.1-9.6
-	TBD	<b>MIDERM EXAMINATION II</b>	(please see below)
10	10-Jul	<b>Prepare for Midterm Examination II</b> (no lecture this week)	(none)
11	17-Jul	<b>Emotion</b> <i>Skills: Reading journal articles (results)</i>	<u>Book</u> : Ch. 10 (pp. 427-59; 468-71), OR <u>E-book</u> : Sections 10.1-10.7; 10.10
12	24-Jul	<b>Language</b> <i>Skills: Reading journal articles (discussion)</i>	<u>Book</u> : Ch. 11 (pp. 475-504), OR <u>E-book</u> : Sections 11.1-11.5
13	31-Jul	<b>Cognitive Control</b> <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	<b>FINAL EXAMINATION</b> To be scheduled sometime between 12-25 Aug	(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 5-6 and 8-9. 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 August). Precise scheduling of term tests is handled by the Office of the Registrar and will be communicated ASAP. This exam will occur sometime between 12-25 Aug.