PSYC51H3, The Cognitive Neuroscience of Vision: Course Syllabus

University of Toronto Scarborough, Winter 2024

January 8 – April 8

People

Role	Name	Email
CI	Marco A. Sama	marco.sama@mail.utoronto.ca
TA	Greer Gillies	greer.gillies@mail.utoronto.ca
TA	Kristina Knox	kristina.knox@mail.utoronto.ca

CI = course instructor; TA = teaching assistant

Instructor and TA Contact

I will try to respond within 24 hours. Please try to limit content related questions to office hours or lecture breaks. I ask students to use their UofT emails, as they are more secure and are governed by the University's codes of conduct. When contacting me, please include "PSYC51" somewhere in the subject line along with the topic of the email. TAs may have their own contact preferences, please discuss this with each TA.

Course Delivery

PSYC51H3 is an in-person course. Lectures take place Thursday from 7:00 PM – 9:00 PM in SW309. This course is delivered through live, in-person lectures. Lecture recordings should be used to supplement your studying and I cannot guarantee that classes will be recorded.

Course Description, Learning Outcome, and General Information

Prerequisites and Exclusions

This course requires one of the following from each of these three groups. (1) A content course: either PSYB51H3, or PSYB55H3, or PSYB65H3. (2) A methods course: either PSYB01H3, or PSYB04H3, or PSYB70H3. (3) A statistics course: either PSYB07H3, or STAB22H3, or STAB23H3. The only exclusion for this course is PSY380H

Course Description

In this course, we cover a broad range of fundamental concepts in the study of the cognitive neuroscience of vision. We cover the history, research, and current understanding of each area and how such concepts are represented in the brain. Some of the experimental methods include behavioural psychophysics, human neuropsychology, animal electrophysiology, transcranial magnetic stimulation (TMS), as well as numerous noninvasive brain imaging techniques such as functional magnetic resonance imaging (fMRI), electroencephalography (EEG), magnetoencephalography (MEG), and positron emission tomography (PET).

Learning Outcome

My goals for this course are threefold. First, as students, you should develop a critical understanding of the topics at hand and leave this course with an adept comprehension of the neural and cognitive mechanisms that underly human vision. This basis helps you in not only future courses on similar subjects, but may strengthen your eligibility for future academic positions (e.g., volunteering in a laboratory environment, graduate or medical school applications, or other professional degrees). Second, you will learn important critical thinking skills, such as how to scrutinize and interpret research. These skills are invaluable for you to navigate a world where science informs and contributes to almost all aspects of daily living. Third, you will be able to apply your understanding of vision in an every day sense and understand how the strengths and limitations of human vision impact our ability to navigate our environment (e.g., having an educated interpretation of laws governing distracted driving).

How to approach this course

Attend all lectures, ask questions, and participate in class discussion. While lecture recordings may be made available, this course is in-person and involves in-class participation.

Materials

A Note on Accuracy of Course Material

I will ensure material are accurate to the best of my ability. Like all humans, I am not infallible. If you notice a mistake anywhere in the course, please point it out and I will be sure to correct it.

Course website

PSYC51H3 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 for PSYC51H3. All content will be posted through this Quercus page. This includes links to class recordings. Please note that any grades posted are for your information only, so you can view and track your progress through the course.

Required Software

Written assignments must utilize Microsoft Word. As a student, you have free access to Microsoft Office. See https://onesearch.library.utoronto.ca/ic-faq-categories/microsoft-365-proplus. The poster at the end of the course will be submitted as a PowerPoint or PDF document, which also requires Microsoft Office.

Content Schedule

The course schedule is outlined in the table below. Please note that topics are subject to change depending on the pace that content is covered during lecture.

Week	Date	Lecture: Topic	Readings
1	Jan 11	Early vision in the retina and LGN	https://goo.gl/ZnoaTA
2	Jan 18	Primary visual cortex and colour perception	https://goo.gl/epfzD3
3	Jan 25	*Motion, shape, and object perception I	https://cutt.ly/6riyOU
4	Feb 1	Motion, shape, and object perception II	https://goo.gl/rRxELA
5	Feb 8	Face perception	https://goo.gl/1eZ2n1
6	Feb 15	*Midterm test – in class*	
	Feb 22	*Reading week, no classes are held*	
7	Feb 29	Body perception	https://goo.gl/ZztjPV
8	Mar 7	Scene perception	https://goo.gl/KKWHjZ
9	Mar 14	Word perception	https://cutt.ly/UriyA4P
10	Mar 21	Visual attention	https://goo.gl/HtgkNH
11	Mar 28	Hemispatial neglect	https://goo.gl/ZQZ1WU
12	Apr 4	Visual awareness	https://goo.gl/sYiiJx

* brainstorming lecture for written assignment

Attending lectures

Content from each new lecture builds on the preceding class. Due to this hierarchical structure, lectures should be viewed in the order they are delivered. Missing one lecture without properly reviewing the material will result in confusion for subsequent lectures. During lecture, you are invited to ask questions by raising your hand and waiting until I acknowledge you. Please be respectful during lecture and tutorial. Do not interrupt without being acknowledged, do not converse with a neighbor, and avoid distractions (e.g., playing a game on your phone or computer) which may impact the focus of other students, and myself.

Attending the term test and final exam

Information will be made available on Quercus. Please follow instructions closely to ensure a smooth and efficient experience. You are required to bring your University of Toronto Student

ID. The term test and final exam will be handwritten unless you have been granted an appropriate accessibility accommodation.

COVID-19 Contingency

If conducting in-person lectures or tests begin to pose an increased health risk due to the changing nature of the pandemic, some parts of the course may be moved to a virtual environment. It is up to all of us to do our part to ensure the safety of the UofT community by wearing masks where appropriate and following public health guidelines.

References for class readings

References are in order of appearance for each lecture

1. Grill-Spector, K., & Malach, R. (2004). The human visual cortex. *Annual Review of Neuroscience*, *27*, 649-677. https://doi.org/10.1146/annurev.neuro.27.070203.144220.
2. Gegenfurtner, K.R., & Kiper, D.C. (2003). Color vision. *Annual review of Neuroscience*, *26*(1), 181-206. https://doi.org/10.1146/annurev.neuro.26.041002.131116.
3. Culham, J., He, S., Dukelow, S., & Verstraten, F.A. (2001). Visual motion and the human brain: What has neuroimaging told us? *Acta Psychologica*, *107*(1), 69-94. https://doi.org/10.1016/s0001-6918(01)00022-1.
4. Peissig, J.J., & Tarr, M.J. (2007). Visual object recognition: Do we know more now than we did 20 years ago? *Annual Review of Psychology*, *58*, 75-96. https://doi.org/10.1146/annurev.psych.58.102904.190114.
5. Duchaine, B., & Yovel, G. (2015). A revised neural framework for face processing. *Annual Review of Vision Science*, *1*, 393-416. https://doi.org/10.1146/annurev-vision-082114-035518.
6. Peelen, M.V., & Downing, P.E. (2007). The neural basis of visual body perception. *Nature Reviews Neuroscience*, *8*(8), 636-648. https://doi.org/10.1038/nrn2195.
7. Epstein, R.A., Bar, M., & Kveraga, K. (2014). Neural systems for visual scene recognition. *Scene vision*, 105-134.

8. Dehaene, S., & Cohen, L. (2011). The unique role of the visual word form area in reading. *Trends in Cognitive Sciences*, *15*(6), 254-262. https://doi.org/10.1016/j.tics.2011.04.003.

9. Moore, T., & Zirnsak, M. (2017). Neural mechanisms of selective visual attention. *Annual Review of Psychology*, *68*, 47-72. https://doi.org/10.1146/annurev-psych-122414-033400.

10. Corbetta, M., & Shulman, G.L. (2011). Spatial neglect and attention networks. *Annual review of neuroscience*, *34*, 569-599. https://doi.org/10.1146/annurev-neuro-061010-113731.

11. Rees, G., Kreiman, G., & Koch, C. (2002). Neural correlates of consciousness in humans. *Nature Reviews Neuroscience*, *3*(4), 261-270. https://doi.org/10.1038/nrn783.

Evaluative Material

The purpose of this course is to facilitate your comprehension ability of the cognitive neuroscience of vision. Evaluations are designed to reflect this objective.

Assessment	Quantity	Weight	Due date(s)
Participation	8 of 10 lectures	10%	Participation in lecture
Research paper	Three phases	20%	Feb 9, Mar 15, & Apr 5
Group research poster	1	10%	March 29
Midterm term test	1	25%	February 15 (during lecture)
Final exam	1	35%	During final exam period

Completing evaluative material

Students are required to complete all graded assessments (those listed in the above table) *INDIVIDUALLY* unless explicitly stated as part of a group. An academic offense includes, but is not limited to, discussing answers to questions, discussing ways to complete questions, sharing answers, completing another student's work, or having another student complete your work, or using generative AI content. All non-graded assessments (practice questions, etc.) can be discussed with your peers.

Participation: 10%

This is one of the smallest portions of the overall grade, but participation is an extremely important way to self-assess that you are following the material and can help you evaluate your own gaps in understanding. This is to ensure that, if you fall behind in one lecture, you do not fall behind in subsequent lectures. For example, understanding the structure of the eye is a precursor to understanding colour vision in visual cortex. Participation involves completing lecture-based exercises. Students should prepare by following along in lecture, asking questions when necessary, and completing practice material. It is understandable that students will miss certain classes, or may struggle with the occasional lecture material, and so the top 8 of 10 in-lecture participations will contribute to your final grade. Make sure to take advantage of the opportunity to improve your comprehension if you realize you are struggling with a lecture topic! Each lecture contributes to 1% towards your participation grade and only the top 8 of 10 will count. Again, while this is a minor contribution to your final grade, these participation events are invaluable in ensuring you are keeping up with course material.

Written assignments: 20%

Since no students' writing is perfect, the goal of these assignments is to evaluate the ability for students to improve their writing while engaging and thinking critically about visual cognitive neuroscience research. To this end, the evaluation of these assignments will be based on a student's ability to consider reviewer feedback and revise their work. The written assignment is divided into three phases. Each section of the paper will have an initial and revised component. This means that students who provide a comprehensive revision of their written assignment can receive 10/10 as the final grade, even if the writing is not considered "perfect", insofar that they have adequately demonstrated their ability to revise and improve. More information will come on the Assignment specific module on Quercus. Assignments will be submitted through Quercus, and checked using Ouriginal. Phase I: submit an APA Introduction section (due February 9). Phase II: submit a revised APA Introduction and an APA Discussion section (due March 15). Phase III: submit a revised APA Discussion section (due April 5). The topic of the paper will be a research study brainstormed during the January 25th class (Lecture 3).

Group research poster: 10%

Based on the content from your research paper, students will submit a poster in group sizes of maximum three students. The research poster will summarize the most important themes from your research paper and present an aesthetically-pleasing and informative review of your background, methods, results, and general findings. This final poster will be due on March 29.

Midterm term test: 25%

This serves as the midterm test and will include up to Lectures 5 (depending on scheduling). The length is two hours. Work will be handwritten, unless accommodated through accessibility. This will include multiple choice, and short/long answer questions.

Final exam: 35%

Content will be comprehensive, with a focus on the latter half of the course. The format will be consistent with the midterm test.

Extensions, late penalties, and missed assessments

We all live busy lives and sometimes it is difficult to make deadlines even with fair notice. To aid you, all students get up to six free late days that can be used up at a self-assigned pace. You do not need to request these extensions. Merely submit your assignment a certain number of days late and include a comment on the submission that you are using up those number of late days. For example, the deadline for Phase I is February 9. If you submit on February 11, you have used up two of your six days and can have up to four late days to be used on additional submissions. If you submit Phase I on February 15, this uses all six late days and you have no free extensions on future submissions.

These free extensions are <u>not</u> to be used for health-related events, accessibility-related reasons, or other emergencies. Please reach out to me to grant extensions for these more emergent situations.

Submitting the written assignment late (or going beyond your free six days), without an approved extension, accrues a 10% (1 mark) penalty per day it is late. An assignment is deemed late the moment the clock strikes midnight and accumulates late days every midnight following. Please do not wait until the last minute to complete and submit your assignment. Be cognizant of increased Quercus traffic near midnight, and possible internet connectivity issues. After one week of non-approved lateness, the student will no longer be allowed to submit the assignment and it will receive a final grade of zero.

If a student misses the midterm or final exam due to illness or any other valid reason, please reach out to the instructor as soon as possible. Students have one week from missing the date of the test or quiz to inform the instructor and submit an Absence Declaration on ACORN. Missed tests will be accommodated on a case-by-case basis and may involve make-up assessments, reweighing grades, or alternative assignments.

Requests for regrading

Students should expect fair evaluation and feedback from the instructor and TAs. Students are more than welcome to request a regrade if they believe their assigned grade is incorrect or does not accurately reflect the submitted work insofar that they provide valid reasoning (i.e., a student cannot simply say “I feel I deserve a higher mark”, but must justify where they believe they were unfairly penalized). I, the Course Instructor, will do the regrade, and there is no guarantee the grade will increase, it is possible that the grade may decrease. This new grade becomes the assigned grade. Requests must come in within two weeks of the posted grade.

Bonus marks

Throughout the course, bonus material may be assigned as they are deemed necessary at the discretion of the Course Instructor. These do not count towards the main 100% of your final grade and are, instead, additional boosters to your final grade.

Quercus grades

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 ACORN 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.

Academic Integrity

About 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.

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.

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 feel free to approach me and/or 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 416-287-7560 or email ability.utsc@utoronto.ca. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

Use of 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 web site (https://uoft.me/pdt-faq).

Important links

Definition of Academic Integrity: https://www.academicintegrity.utoronto.ca/

University of Toronto Code of Behaviour on Academic Matters: https://governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019

How to ensure academic integrity

Here are three easy ways to ensure you meet academic integrity

1. Turn in original work. Do not copy/paste from any external source (including websites, encyclopedias). Do not use work you have submitted in other classes. Do not reword another source without citing it as the original author's intellectual property.
2. Do not use unauthorized software, including generative AI, to formulate your work for you.
3. All graded work, unless otherwise specified, should be completed independently. This includes assignments, quizzes, and assessments/tests/exams.

What counts as plagiarism

There are many forms of plagiarism. Many people assume plagiarism occurs when one directly copies another authors' work as their own. However, rewording another's work without proper credit is also a form of plagiarism. This is because you are essentially taking another person's ideas and making them your own. Self-plagiarism occurs when you reuse your own work without acknowledgement. Thus, all student submissions should be the student's own fresh and original work, not used in other courses. They should be the ideas of the student submitting them, and not from another student, person, or computer/AI generated idea.

Repercussions for violating Academic Integrity

Academic misconduct may receive one or both of the following, and/or other consequences:

1. An assigned grade of zero to any graded material in the course
2. Acceleration to the Department or other disciplinary action

Use of generative AI

Students may use artificial intelligence tools (e.g., ChatGPT) for creating an outline for an assignment, but the final submitted assignment must be original work produced by the individual student alone. Students may not use artificial intelligence tools for taking tests, writing research papers, creating computer code, or completing major course assignments. However, these tools may be useful when gathering information from across sources and assimilating it for understanding. Students may not use artificial intelligence tools for taking tests in this course.

Support for Students

Accessibility Services

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 feel free to approach me and/or 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 416-287-7560 or email ability.utsc@utoronto.ca. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

Mental health

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. Everyone feels stressed now and then – it is a normal part of university life. Some days are better than others, and there is no wrong time to reach out. There are resources for every situation and every level of stress. There are many helpful resources available through UTSC Health and Wellness (https://www.utsc.utoronto.ca/hwc/). 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.

Writing support

Developing your writing ability is a critical skill to take advantage of during your undergraduate career. A strong writing ability is crucial to communicate ideas. I often recommend students to re-read their first university writing assignment and their final university writing assignment to gauge how much they improve. The university Center for Teaching and Learning offers writing assistance through the Writing Center (https://www.utsc.utoronto.ca/ctl/writing-support).

Other support

International students can find support at the International Student Centre (https://www.utsc.utoronto.ca/utscinternational/). The University provides support for students with children or who have family responsibilities (https://familycare.utoronto.ca/).

Academic Advising and Career Centre

The university has a support center for students to engage in learning strategies and develop a roadmap for undergraduate success (https://www.utsc.utoronto.ca/aacc/).

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.

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.

Privacy/FIPPA statement

Personal information is collected pursuant to section 2(14) of the University of Toronto Act, 1971 and at all times it will be protected in accordance with the Freedom of Information and Protection of Privacy Act. Please note that this course requires presentations of one's work to the group. For more information, please refer to http://www.utoronto.ca/privacy.

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.

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.