



UNIVERSITY OF
TORONTO
SCARBOROUGH

THE UNIVERSITY OF TORONTO SCARBOROUGH
Department of Psychology

PSYC51: The Cognitive Neuroscience of Vision, Winter 2018

1.0 CALENDAR DESCRIPTION

This course will provide an in-depth examination of research in the field of visual cognitive neuroscience. Topics will include the visual perception of object features (shape, colour, texture), the perception of high-level categories (objects, faces, bodies, scenes), visual attention, and comparisons between the human and monkey visual systems.

2.0 COURSE INFORMATION

Prerequisite: PSYB51H3 or PSYB57H3 or PSYB65H3

Exclusion: PSY380H

Class meeting time: Wednesdays between 9 am and 11 am, Room SW 128

Readings: There is no textbook in this course. Instead, you will be required to read review articles on the various topics covered in the course (see below).

3.0 INSTRUCTOR AND TEACHING ASSISTANT CONTACT INFORMATION

Instructor:

Professor Jonathan Cant [email: jonathan.cant@utoronto.ca (please put PSYC51 in the subject line of any emails); office hours: Thursdays between 1 – 3 pm (SW 411)]

Teaching assistants:

Marco Sama (marco.sama@mail.utoronto.ca)

Vignash Tharmaratnam (vignash.tharmaratnam@mail.utoronto.ca)

TA Office hours: will be held in SW411A, time TBA.

4.0 ONLINE COURSE RESOURCES

Blackboard: <https://portal.utoronto.ca/webapps/portal/frameset.jsp>

Blackboard will be used as the main online resource for this course. All important course-related information (e.g. announcements, syllabus, class schedule, assignment information, message boards, and grades) will be available via Black Board.

5.0 DETAILED COURSE DESCRIPTION

The purpose of this course is to introduce you to a number of fundamental concepts in the study of the cognitive neuroscience of vision. You will learn about the history of research in each topic area, and will also learn about the current understanding of how each concept is represented in the brain. We will be focusing on research conducted using a number of different experimental methods [e.g., behavioural psychophysics, human neuropsychology, monkey electrophysiology, transcranial magnetic stimulation (TMS), and brain imaging techniques such as functional magnetic resonance imaging (fMRI), electroencephalography (EEG), magnetoencephalography (MEG), and positron emission tomography (PET)]. The topics covered, and the associated readings, are listed in the chart below.

As a student in this course, you can expect to develop and improve upon the following types of skills, all of which are important for future academic or work-related endeavors: critical reasoning, problem solving, working effectively in groups, and scholarly writing. Moreover, you will have developed knowledge in current topics of interest in visual cognition, perception, and memory, and will be able to relate this knowledge to the broader question of how information is represented in the human brain.

Class Schedule and Readings:

Date	Topic	Reading
January 10	<ul style="list-style-type: none"> • Course introduction • Early visual system (retina → LGN) 	
January 17	<ul style="list-style-type: none"> • Primary visual cortex • Colour perception 	https://goo.gl/ZnoaTA https://goo.gl/epfzD3
January 24	<ul style="list-style-type: none"> • Motion perception • Shape and object perception part 1 (1st journal club report due) 	https://goo.gl/XYgC6f
January 31	<ul style="list-style-type: none"> • Shape and object perception part 2 	https://goo.gl/rRxELA
February 7	<ul style="list-style-type: none"> • Face perception (2nd journal club report due; 1st journal club revision due before handing in 2nd journal club report) 	https://goo.gl/1eZ2n1
February 14	Mid-term exam	
February 21	READING WEEK, NO CLASS	
February 28	<ul style="list-style-type: none"> • Body perception (Analysis/thought paper due) 	https://goo.gl/ZztjPV
March 7	<ul style="list-style-type: none"> • Scene perception (3rd journal club report due; 2nd journal club revision due before handing in 3rd journal club report) 	https://goo.gl/KKWHjZ
March 14	<ul style="list-style-type: none"> • Word perception 	https://goo.gl/7bVxDC
March 21	<ul style="list-style-type: none"> • Visual attention (4th journal club report due; 3rd journal club revision due before handing in 4th journal club report) 	https://goo.gl/HtgkNH
March 28	<ul style="list-style-type: none"> • Hemispatial neglect 	https://goo.gl/ZQZ1WU
April 4	<ul style="list-style-type: none"> • Visual awareness (4th journal club revision due) (Analysis/thought paper revision due) 	https://goo.gl/sYiiJx
To be determined	Final Exam	

References for Readings:

January 17: Primary Visual Cortex

Grill-Spector, K., & Malach, R. (2004). The human visual cortex. *Annu. Rev. Neurosci.*, *27*, 649-677.

The beginning of this article covers processing in early visual cortex, but the rest of the article is relevant to many other topics we will be covering in the course (e.g., colour perception, motion perception, object perception, etc.), so the entire article is required reading.

January 17: Colour Perception

Gegenfurtner, K. R., & Kiper, D. C. (2003). Color vision. *Annual review of neuroscience*, *26*(1), 181-206.

January 24: Motion Perception

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.

January 24/31: Shape and Object Perception

Peissig, J. J., & Tarr, M. J. (2007). Visual object recognition: do we know more now than we did 20 years ago?. *Annu. Rev. Psychol.*, *58*, 75-96.

February 7: Face Perception

Duchaine, B., & Yovel, G. (2015). A revised neural framework for face processing. *Annual Review of Vision Science*, *1*, 393-416.

February 28: Body Perception

Peelen, M. V., & Downing, P. E. (2007). The neural basis of visual body perception. *Nature Reviews Neuroscience*, *8*(8), 636-648.

March 7: Scene Perception

Epstein, R. A., Bar, M., & Kveraga, K. (2014). Neural systems for visual scene recognition. *Scene vision*, 105-134.

March 14: Word Perception

Dehaene, S., & Cohen, L. (2011). The unique role of the visual word form area in reading. *Trends in cognitive sciences*, *15*(6), 254-262.

March 21: Visual Attention

Moore, T., & Zirnsak, M. (2017). Neural mechanisms of selective visual attention. *Annual review of psychology*, 68, 47-72.

March 28: Hemispatial Neglect

Corbetta, M., & Shulman, G. L. (2011). Spatial neglect and attention networks. *Annual review of neuroscience*, 34, 569-599.

April 4: Visual Awareness

Rees, G., Kreiman, G., & Koch, C. (2002). Neural correlates of consciousness in humans. *Nature Reviews Neuroscience*, 3(4), 261-270.

6.0 EVALUATION

Mid-term exam: 33%

Analysis/Thought paper: 14%

Group journal club reports: 20%

Final exam: 33%

Mid-term exam (33%)

The mid-term examination will cover material from the first five lectures, and will include material from both the lectures and the assigned readings. Since some of the material presented in class will not be covered in the readings (and vice versa), it is important to both attend class and to read the required readings. There will be a number of multiple choice questions to answer, and you will have to write one essay, the topic of which you will choose from five different essay questions (one question provided per lecture topic).

Analysis/Thought paper (14%)

You will be required to write one analysis/thought paper, which is worth 14% of your final grade. The purpose of this paper is to improve your ability to critically analyse scientific research published in a peer-reviewed journal, and to improve your scientific writing ability. The paper will have two main components (an initial submission and a second, revised submission), and will be based on a specific research article that focuses on either object or face perception (you will be provided with 2 object perception and 2 face perception articles, and you must choose one to write your paper on). The initial submission is due at the beginning of class on February 28. In the initial submission, you will need to: a) evaluate the content of the article, and b) form your own opinion of the research presented in the article.

a) **Evaluating the content of the article:** this involves summarizing the rationale of the article, the specific hypotheses tested, the methods used, the results found, and the conclusions made by the authors. This summary should be no more than one page in length.

b) **Forming your own opinion of the article:** this involves critically analysing the data/arguments presented in the article, and evaluating whether or not the conclusions made are supported by the data or arguments. In other words, do you agree or disagree with the conclusions made in the article? If you liked the article, what aspects of it did you like? If you

did not like the article, what aspects of it do you think could be improved? In this section, you will need to cite two additional research papers on the topic that support your critical analysis of the primary article.

An important aim for this assignment (and the group journal club reports; see below) is to help you improve your writing skills while thinking critically about relevant course material. However, it is difficult to improve writing after feedback has been given without being given an opportunity to revise your work. Thus, this assignment offers you a direct way to address feedback on written work in order to develop your skills at writing and critical thinking, which are skills that will be required long after your university degree is complete. To do so, there will be two submissions for this assignment: an initial submission, and a second submission where you are able to incorporate the feedback given to you by the TA to improve upon the first submission. More details are given in the rubric posted online on the Blackboard site, but below is a brief breakdown of how the submissions will be graded.

Total Grade (both initial and revised submissions): out of 10, with 6 points allocated to the first submission and 4 points allocated to the second (revised) submission.

First submission: will be given either 4 points (needs heavy revision) or 6 points (default; appropriate, but revision still needed) out of 10. A 0 indicates that no assignment, or a plagiarized assignment, was handed in. A 10 is unlikely on the first submission, but is possible.

Revised Submission: handing in a revision earns you 1 point plus additional points that will vary between 0 (very little feedback has been taken into account) to 3 (all feedback was taken into account) out of 10.

Each component of the assignment (i.e., both the first and revised submissions) is marked by one TA. Late submissions are penalized 10% (1 point) per day past the submission deadline. See the rubric posted online for more specific details.

Formatting: Each paper (i.e., the initial submission) should be no longer than 4 double-spaced pages in length (not including title page and references), should be prepared according to APA format (see <http://www.apastyle.org/manual/> and <https://owl.english.purdue.edu/owl/resource/560/01/>), should be written in 12-point font, should be double-spaced with 1 inch margins, and should include both a title page and reference list. You do not need an abstract for this assignment.

Note: The initial submission is due in hard copy at the beginning of class on February 28, and the revised submission is due in hard copy at the beginning of class on April 4.

Group journal club reports (20%)

The purpose of this assignment is to help you think critically about the quality of research that gets published, and to improve your writing ability. You will form groups of four, and over the course of the semester will write journal club reports on four separate published papers of your choosing, insofar as they relate directly to the course material. Your TA will need to approve your article selections, so please email him a link to each article once your group has found an appropriate article for each report. For each journal club report, you will need to meet with your group (i.e., have a journal club meeting), either during class when time permits, or outside of class, to discuss the content of the article and to brainstorm your critique (see rubric posted

online on Blackboard for more details). As a group, you can decide if each member will take a turn at being group leader and will thus be responsible for writing up the journal report summarizing the group's discussion of the article, or if all of you will collaborate to write each group journal club report. All members of the group will receive the same grade.

Each journal club report will be marked out of 10 and will be worth 5% of your overall final grade (4 entries = 20% of your final grade). Like the thought paper, you will be handing in a first submission, and after feedback, will hand in a second (revised) submission. The first submission will be graded as 6/10 (if it needs revision) or 10/10 if no revision is needed (which is unlikely but possible). Failing to submit a journal report, or submitting plagiarized or inadequate material, will receive a grade of 0/10. Upon appropriate revision, the grade will be updated to 10/10. Late submissions are penalized 10% (1 point) per day past the submission deadline. See the rubric posted on Blackboard for further details.

Formatting: Each journal club report (i.e., the initial submission) should be no longer than 500 words in length, and should be written in the style of a blog entry. You do not need to worry about writing in APA format, but you should include references where appropriate. You do not need a title page, but all of the names of the group members should be included on each report.

Note: You need to submit the revised journal club report before the next report is due (e.g., you have to hand in the revision of the first journal club report before the due date for the second journal club report; the revision of the second journal club report is due before the due date for the third journal club report, etc.).

Final Exam (33%)

The final examination will cover material from the last six lectures, and will include material from both the lectures and the assigned readings. The format of this examination is identical to the format of the mid-term examination.

Important Dates

- January 24:** 1st group journal club report due at the beginning of class; the revised submission must be handed in before the 2nd group journal club report is due
- February 7:** 2nd group journal club report due at the beginning of class; the revised submission must be handed in before the 3rd group journal club report is due
- February 14:** Mid-term exam (covering material from lectures 1 – 5, and assigned readings)
- February 28:** Analysis/thought paper due at the beginning of class
- March 7:** 3rd group journal club report due at the beginning of class; the revised submission must be handed in before the 4th group journal club report is due
- March 21:** 4th group journal club report due at the beginning of class
- April 4:** 4th group journal club revision due at the beginning of class
Analysis/thought paper revision due at the beginning of class
- TBD:** Final exam (covering material from lectures 6 – 11, and assigned readings)

Policy on late assignments: late assignments will lose 10% for each day past the deadline that they are not submitted. Extensions will only be granted with proper documentation (i.e., documented family emergency, or UTSC medical certificate). Please note, according to UTSC policy, I am not permitted to extend the deadline for any assignment past the last day of classes for the semester (April 6).

Policy on missed term work due to medical illness or emergency: All students citing a documented reason for missed term work must bring their documentation to the Psychology Course Coordinator in SW427C **within three (3) business days** of the assignment due date. You must bring the following:

- (1.) A completed [Request for Missed Term Work form](http://uoft.me/PSY-MTW) (<http://uoft.me/PSY-MTW>), and
- (2.) Appropriate documentation to verify your illness or emergency, as described below.

Appropriate Documentation:

In the case of missed term work due to **illness**, only an **original copy** of the official [UTSC Verification of Illness Form](http://uoft.me/UTSC-Verification-Of-Illness-Form) will be accepted (<http://uoft.me/UTSC-Verification-Of-Illness-Form>). Forms are to be **completed in full**, clearly indicating the start date, anticipated end date, and severity of illness. The physician's registration number and business stamp are required.

In the case of **medical emergency**, an original copy of the record of visitation to a hospital emergency room should be provided.

In the case of a **death of a family member**, a copy of a death certificate should be provided.

In the case of a **disability-related** concern, an email communication should be sent directly to the Course Coordinator (psychology-undergraduate@utsc.utoronto.ca) from your Disability Consultant at AccessAbility Services, detailing the accommodations required. The Course Instructor should also be copied on this email.

For U of T **Varsity athletic commitments**, an email communication should be sent directly to the Course Coordinator (psychology-undergraduate@utsc.utoronto.ca) from a coach or varsity administrator, detailing the dates and nature of the commitment. The email should be sent **well in advance** of the missed work.

Documents covering the following situations are **NOT acceptable**: medical prescriptions, anything related to personal travel, weddings/personal/work commitments.

Procedure:

Submit your (1.) [request form](#) and (2.) [medical](#)/other documents in person **within 3 business days** of the missed test or assignment. Forms should be submitted to **SW427C between 9 AM - 4 PM**, Monday through Friday. If you are unable to meet this deadline for some reason, you must contact the Course Coordinator via email (psychology-undergraduate@utsc.utoronto.ca) within the three business day window. Exceptions to the documentation deadline will only be made under exceptional circumstances.

Within approximately one week, you will receive an email response from the Course Instructor / Course Coordinator detailing the accommodations to be made (if any). You are responsible for checking your official U of T email and Blackboard course announcements daily, as

accommodations may be time-critical. The Course Instructor reserves the right to decide what accommodations (if any) will be made for the missed work.

Failure to adhere to any aspect of this policy may result in a denial of your request for accommodation.

Note that this policy applies only to missed term work (assignments and midterms). Missed final exams are handled by the Registrar's Office (<http://www.utsc.utoronto.ca/registrar/missing-examination>)

Policy on missed final examinations: students are expected to write the final examination. If a student fails to write the final examination, they may petition the Registrar's office for permission to write a deferred exam, but note that the Registrar's office only grants these petitions under conditions of illness or extreme emergency at the time of the examination (see <http://www.utsc.utoronto.ca/registrar/deferred-exams> for more details). Thus, you must ensure that you have proper documentation to support your petition (e.g., documented family emergency, or UTSC medical certificate). Students who fail to provide proper documentation for missing the final exam will receive a mark of 0% on that exam.

7.0 ADDITIONAL INFORMATION

Help With Writing

If you would like help with academic writing, the following resources are available to you:

- The Centre for Teaching and Learning (AC312) Writing Centre offers students one-to-one appointments and supplementary materials to help improve upon their writing skills.

<http://ctl.utsc.utoronto.ca/home/>

<http://ctl.utsc.utoronto.ca/twc/>

- The English Language Development Centre offers support and specialized writing programs for students who do not speak English as their primary language.

<http://ctl.utsc.utoronto.ca/eld/>

- Advice on academic writing

<http://www.writing.utoronto.ca/advice>

Academic Integrity

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student's individual academic achievement. As a result, 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/Assets/Governing+Council+Digital+Assets/Policies/PDF/ppjun011995.pdf>) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences include, but are not limited to:

In papers and assignments:

- 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:

- Using or possessing unauthorized aids;
- Looking at someone else's answers during an exam or test;
- Misrepresenting your identity; and
- When you knew or ought to have known you were doing it.

In academic work:

- Falsifying institutional documents or grades;
- Falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes; and
- When you knew or ought to have known you were doing so.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If students have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, they are expected to seek out additional information on academic integrity from their instructors or from other institutional resources.

Note:

You may see advertisements for services offering grammar help, essay editing and proof-reading. Be very careful. If these services take a draft of your work and significantly change the content and/or language, you may be committing an academic offence (unauthorized assistance) under the *Code of Behaviour on Academic Matters*.

It is much better and safer to take your draft to the Writing Centre as early as you can. They will give you guidance you can trust. Students for whom English is not their first language should go to the English Language Development Centre.

If you decide to use these services in spite of this caution, you must keep a draft of your work and any notes you made before you got help and be prepared to give it to your instructor on request.

TurnItIn

Written assignments may be subject to submission for textual similarity review and detection of possible plagiarism using the commercial plagiarism detection software under license to the University (<http://www.turnitin.com>). If used, students will allow their essays to be included as source documents in the Turnitin.com reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of the Turnitin.com service are described on the Turnitin.com web site.

AccessAbility 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 as soon as possible.

AccessAbility Services staff (located in Rm SW302, Science Wing) are available by appointment to assess specific needs, provide referrals and arrange appropriate

accommodations [416-287-7560](tel: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.

Literature Searches

Students can use the following resources when conducting literature searches to find relevant articles for their presentation and final essay:

The UTSC Library (AC235)

<http://www.library.utoronto.ca/utsc/>

PubMed

<http://www.ncbi.nlm.nih.gov/pubmed>

PsychINFO

<http://www.apa.org/pubs/databases/psycinfo/index.aspx>

Google Scholar

<http://scholar.google.ca/>

For Your Health

The Health and Wellness Centre (SL270, 416-287-7065) provides diagnostic, treatment and referral services for all illnesses ranging from the medical to psychological to health promotion. The professional staff of physicians, nurses and counselors provides personal advice and assistance with family issues, eating disorders, depression, stress, drug and alcohol abuse, relationship issues, a positive space for gender/sexuality issues, and more.

<http://www.utsc.utoronto.ca/wellness>