NROC61
LEARNING AND MOTIVATION
UNIVERSITY OF TORONTO SCARBOROUGH
WINTER 2025

INSTRUCTOR:
Prof. Rutsuko Ito

TEACHING ASSISTANTS:
Anna Cannella, Liv Engel, Nisma Khan, Yajan Pancholi

LECTURES: Wednesdays 11-1pm, IA2021

OFFICE HOURS: Fridays 12-1pm, SW627

TUTORIALS: Students are required to attend 1hr tutorials in specified weeks.

COURSE WEBSITE RESOURCES: Quercus & TopHat

COURSE E-MAIL: **nroc61.utsc@gmail.com**

	Day/Time	Location
TUT1	Tue 9-10am	HW402
TUT2	Tue 10-11am	HW402
TUT3	Tue 11-12pm	HW402
TUT4	Tue 12-1pm	HW402

Note about communication: Please post content related questions to relevant blackboard discussion forum for the benefit of other students. All other questions must be sent to nroc61.utsc@gmail.com, clearly indicating who the correspondence is addressed to. E.g., put the name of the TA in the subject line. Please note that emails pertaining to NROC61 sent to personal email accounts of Professor Ito's or the TAs will NOT be answered.

COURSE INSTRUCTOR:

Dr Ito is a Professor in the Department of Psychology. She obtained her PhD in Behavioural Neuroscience from the University of Cambridge, UK, and conducted postdoctoral research at the University of Oxford, prior to her appointment at U of T in 2011. Her research interests include the investigation of the neural circuit basis of motivated behaviour and decision-making under the control of salient cues in the environment in the healthy and diseased brain (e.g., addiction, anxiety, depression). Outside of work, Dr Ito enjoys spending time with family (incl a cat), travelling, running, eating, swimming, and hiking.

COURSE DESCRIPTION:

This course explores learning and motivation from a physiological, pharmacological and behavioral perspective, introducing the principal methods and logical inferences used in experiments that use laboratory animals. Thus, the course offers an in-depth exploration of the field of behavioural neuroscience. However, wherever possible, it is shown how these findings can be applied to humans, especially in a clinical setting. Topics covered under

learning include: different types of associative learning and their neural basis with a focus on the notion that the mammalian brain is organized into multiple learning and memory systems. Topics covered under the category of motivation include the neural basis of eating, drinking and sleep and the neural correlates of reward and emotion.

Course pre-requisites:

BIOB10H3 and NROB60H3 and NROB61H3 and [(PSYB01H3) or (PSYB04H3) or PSYB70H3] and [PSYB07H3 or STAB22H3] and [PSYB55H3 or (PSYB65H3)]

Please be advised that due to a strict enrolment cap for this course, the instructor will NOT be able to admit a student that does not meet the pre-requisite requirement.

Course objectives:

By the end of this course, a successful learner will be able to:

- Understand the core principles of associative learning and motivation from a physiological, pharmacological and behavioural perspective.
- Understand and evaluate different methodologies used in the field of behavioural neuroscience.
- Demonstrate proficiency in the use of search engines to search for articles of interest.
- Demonstrate the foundational skills necessary for understanding, interpreting, summarizing and evaluating primary scientific literature.
- Develop strategies to effectively design and deliver empirical research presentations to their peers.
- Work cooperatively in small groups, providing and receiving constructive peer feedback.

Course resources:

The lecture series will be loosely based on a book entitled 'Bear, Connors, & Paradiso. Neuroscience: Exploring the Brain (4th ed. Wolters Kluwer). However, there will be no assigned readings from this book. Instead, assigned readings will consist of a lecture handout written by myself (available electronically on TopHat) and original empirical articles pertaining to the lecture topic. You will be assessed on the content of the handouts/papers.

This course uses the University's learning management system, Quercus, to post information about the course. This includes posting readings and other materials required to complete class activities and course assignments, as well as sharing important announcements and updates. The site is dynamic and new information and resources will be posted regularly as we move through the term, so please make it a habit to log in to the site on a regular, even daily, basis. To access the course website, go to the U of T Quercus log-in page at https://q.utoronto.ca. Once you have logged in to Quercus using your UTORid and password, you should see the link or "card" for Learning and Motivation NROC61H3. You may need to scroll through other cards to find this. Click on the Learning and Motivation NROC61H3 link to open our course area, view the latest announcements and access your course resources. There are Quercus help guides that you can access by clicking on the "?" icon in the left side column.

SPECIAL NOTE ABOUT GRADES POSTED ONLINE: Please also note that any grades posted are for your information only, so you can view and track your progress through the course. No grades are considered official, including any posted in Quercus at any point in the term, until they have been formally approved and posted on

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.

Lecture schedule:

Lectures attendance is strongly encouraged, as you will be asked to participate in a graded in-class quiz.

Week	Dates	Topic
1	Jan 8	Course Introduction
2	Jan 15	Pavlovian Conditioning
3	Jan 22	Laws of association
4	Jan 29	Instrumental conditioning
5	Feb 5	Learning and Memory systems
	Feb 12	Exam in Class
	Feb 17 - Feb 21	Reading week – no class
6	Feb 26	Central Reward Systems
7	Mar 5	Hypothalamus and Motivation 1
8	Mar 12	Hypothalamus and Motivation 2
9	Mar 19	Limbic system and emotions
10	Mar 26	Stress and arousal
11	Apr 2	Sleep and Wakefulness
	TBA	Final exam (2hr 30min)**

I reserve the right to make minor alterations to the course content/schedule with advance notice.

* Content listed for Weeks 1 to 5 inclusive will be tested on the midterm.
** Content listed for Weeks 6 to 11 will be on the final exam.

TUTORIAL SCHEDULE:

Week	Dates	Topic - content	Topic – skills	Assignment
1	Jan 14	Introduction to assignments	Academic integrity Effective use of search engines	
2	Jan 21	Pavlovian Conditioning	Reading journal articles	
3	Jan 28	Laws of association	Updating referencing	
4	Feb 4	Instrumental conditioning	Methods in behavioral neuroscience	
5	Feb 11	Revision tutorial	Demo presentation by TA	
	Feb 18	Reading week – No tutorial		
6	Feb 25	Written assignment consultation (optional attendance)		Annotated Bibliography Assignment due Mar 3rd 11.59pm
7	Mar 4	Central Reward systems	2 paper presentations	
8	Mar 11	Hypothalamus and Motivation	2 paper presentations	
9	Mar 18	Limbic system and emotions	2 paper presentations	
10	Mar 25	Stress and Arousal	2 paper presentations	
11	Apr 1	Sleep and Wakefulness	2 paper presentations	Opinion piece due April 4th 11.59pm

EVALUATION:

The tests will be based on the materials covered in the lectures and handouts.

1. Quiz (10% overall grade)

In class - To facilitate active learning, there will be 5 quiz questions during each lecture (starting on Jan 15th), which you must participate in answering (5% overall grade for correctness and participation) using the TopHat* (see below for details) learning platform.

- If you miss a class for a valid reason (e.g., illness), then you will need to email the course email account within 24hrs of the lecture (nroc61.utsc@gmail.com) with appropriate documentation, and then I will assign the in-class quiz to you for that particular week, to be completed within one week online (when the out of class quiz is due). Otherwise you will be awarded 0% for the week.

Out of class – You will be given the opportunity to complete 5 more quiz questions out of class during a limited window of a week following the relevant lecture using the TopHat platform. 5% of the overall grade will be awarded for correctness and participation.

These quizzes are designed to keep you actively engaged with the material, and to prepare you for the exams.

TOPHAT

The Top Hat (www.tophat.com) classroom response system will be used in class and out of class for exam practice and review. You will be able to submit answers to in-class and out of class review questions using Apple or Android smartphones and tablets, laptops, or through text message.
You can visit the Top Hat Overview (https://success.tophat.com/s/article/Student-Top-Hat-Overview-and-Getting-Started-Guide) within the Top Hat Success Center which outlines how you will register for a Top Hat account, as well as providing a brief overview to get you up and running on the system.

If you already have a Top Hat account, go to [https://app.tophat.com/e/387601/] and [https://app.tophat.com/e/547811/] to be taken directly to our course.

If you are new to Top Hat, follow these steps:

- *Go to https://app.tophat.com/register/student*
- *Click "Search by school" and input the name of our school*
- *Search for our course with the following join code:*

Main Lecture Course for in class quiz
Leaning and Motivation –Winter 2025 Join Code: 547811
Course Text, Out of class quiz and exam practice questions
Leaning and Motivation – Winter 2025 Join Code: 387601

Top Hat will require a paid subscription, and I have negotiated a discounted price of $26 for the semester: from the UofT library. Please consider this fee as an investment in an enhanced learning experience, which will hopefully translate into better exam performance. Also remember that you do NOT need to purchase a coursepack or textbook for this course as I have written a course text for you, which is available on Course code *387601*.

Should you require assistance with Top Hat at any time, due to the fact that they require specific user information to troubleshoot these issues, please contact their Support Team directly by way of email (support@tophat.com), the in app support button, or by calling 1-888-663-5491.

2. Midterm Test (25% overall grade)

This test will take place on February 12th in class, and will consist of multiple-choice questions and short answer questions on the material covered in Lectures 1-5.

Please note that many of the questions will require the application of the knowledge gained in the first 5 weeks of the lecture series. Thus, rote memorization of lectures and readings will not guarantee you a high mark.

3. Final exam (30% overall grade)

This test will consist of multiple-choice questions and short answer questions on the material covered in Lectures 6-11.

4. Tutorial grade (35% overall grade)

The tutorials are primarily intended to familiarize students with the general knowledge base of neuroscience, namely the published literature.

The format of each tutorial will be:

- 25 min Discussion/Recap/Questions on the Lecture material

Followed by:

- 30min on skill learning (Weeks 2-5)
- OR
- 2 x 15min Oral presentations of pre-assigned primary articles (Weeks 7-11)

a. Class presentation of primary article –10 %

8 empirical articles will be assigned for **tutorials 7-11**, **to be presented by 2-3 students per article (within the same Tutorial group). The article links will be made available on Quercus 2 weeks before the presentation date.** Each presentation will be 15 minutes in length – 12 minutes to present key details of the article (Introduction/Rationale of study/Methods/Results/Discussion/Caveats & Future directions) and ~3 minutes to answer questions about the article from the class. *The presentation (12min) will be timed, and any content presented beyond this time will not be considered for marking. Therefore, it is important that you get your timings right!*

In the first few tutorials, please identify your presentation group, and sign up for the week that you would like to present, and the week in which you would like to provide discussion questions (see Tutorial attendance and participation for details). If you do not sign up by the end of the third week, the TA will assign partners on your behalf.

A demonstration of what is expected of you will be provided by your TA in the 5th tutorial. You are required to discuss the paper and present the paper together as a team and will be expected to make equal contribution to both the preparation and presentation. Please ensure an equal division of labour for the presentation between the two of you.

At the end, each of you must present a slide answering these questions: 1) Why is the study important? 2) What are the limitations and critique/future directions? You must come up with your own thoughts on these.
Marks will be awarded individually for clarity of presentation, effective use of visual aids/handouts, and the ability to answer questions about the research. There will also be a mark for evidence of co-operation and cohesiveness between the two of you. You will also be given the opportunity to make comments on your partner (in confidence), should you feel that there was an unfair division of labour.

On the day of your presentation, please come prepared with a hardcopy of your PowerPoint presentation, or send the TA an electronic copy of your presentation. Your TA will indicate their preference.

Note: The content of the articles cannot be discussed with your TAs or myself during tutorials or office hours. Furthermore, while you will not be directly tested on the content of the articles, knowing/reading the articles will help in answering exam questions.

b. Current advances written assignment – 20%

In this assignment, you will be writing an opinion piece on how **1 empirical article of your choice published in the last 3 years (**2022-2024**)** advances our **understanding of the neural basis of a specific process of learning or motivation**. This assignment is designed for you to make use of the internet referencing services such as *pubmed* (http://www.ncbi.nlm.nih.gov/pubmed), or *google scholar (*https://scholar.google.ca) in selecting your current empirical article. The list of topics will be released after your first tutorial.

The article must describe rodent work in the field of systems/circuit neuroscience (but not molecular or genetics). The assignment is divided up into two parts, to help guide you in the process of writing.

- **Annotated bibliography** (5%): You will be asked to generate an extended abstract of your chosen empirical article (NOT reviews) from the last 3 years (2022-2024) that, in your opinion, have provided novel insight into the neural basis of learning/motivation. You will be given a template to fill out (available on Quercus). This document must have a title of your chosen topic, followed by a description of what we already know of the topic (relating back to class material). You will then present the article including the title of the paper, all authors' names, year of publication, journal, journal volume, page numbers, followed by the original abstract from the paper, and a short paragraph summarizing the findings of the papers **in your own words**, and how it advances knowledge. The assignment must be uploaded to **Quercus** on **March 3rd, 11.59pm**.

- **Paper (15%):** The paper should be typed double spaced, 12pt Times New Roman font, and should be a maximum of 5 pages in length. In addition to these pages, you must include a cover page (title, candidate name and number of word count), and a reference page. Thus, your final paper will be a maximum of 7 pages in length. **APA format is required for the submission of this paper. Your paper is due on 4th April, 11.59pm Quercus.**

PLAGIARISM DETECTION TOOL

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 website (https://uoft.me/pdt-faq).

c. Tutorial attendance and participation – 5 %

Students are expected to attend and participate in all mandatory tutorials **(10), but allowed to miss 1 tutorial without penalty. 5% of the overall mark** will be awarded for weekly attendance and active participation in the tutorials. The breakdown of the grade will be:

1) **Attendance (2.5%)**
2) **Generating and asking 'Discussant' questions (2.5%)** for ONE research article being presented by another group. You should read the article, and prepare at least **2 questions** to ask the students during 'discussion/question time'. 'This will ensure that everyone will have an opportunity to participate, and be

fairly evaluated for participation. *So that the TAs can assess the quality of the questions, you must email the questions to them by 11.59pm on the Monday night before the presentation.*

Course Policies:

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 **nroc61.utsc@gmail.com** 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	For missed TERM TESTS, - Contact your AccessAbility consultant and have them write to the course email detailing the accommodations needed. For missed ASSIGNMENTS, - 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.		PREFERABLY IN ADVANCE OF THE MISSED WORK, OR AS SOON AS POSSIBLE

	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.	
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.

Missed presentation

A grade of zero will be given if you do not give your presentation on the assigned date. Missed presentations will only be rescheduled provided official documentation has been submitted to the course email address. You should be prepared to give your presentation at any tutorial following the missed date. Your TA will try to give you advance notice but this may not be possible.

Missed exams

You are expected to make every effort to take required mid-terms/final exam. Absence from a mid-term/exam will only be granted for genuine, legitimate reasons, including a documented family emergency, or a documented severe illness. This does not include reasons of scheduling conflict. There will be one make-up test for the midterm for those who can supply legitimate documents via the official route described above. Exams that are missed without a genuine, legitimate reason will receive a 0% mark.

Late Assignments

All late assignments will be accepted with a penalty of 5% per day, up until the third day after the assignment is due in. All assignments are due by 11.59pm (midnight) on the due date.

Contesting a grade

All requests for a re-grade must be submitted in writing within one week of the day the grade is received. Only requests that include adequate written justification of an error in the original grading will be considered. A legitimate request will result in the entire exam or assignment being re-graded. Your overall grade may be raised, lowered, or it may stay the same. If there has been an error in our arithmetic, please let us know and we will immediately recalculate your grade (no written request necessary). Arbitrary requests for grade increases will not be entertained (e.g., "I need to get into grad school, so could you please give me a higher grade?").

Scheduling conflict

A web option will NOT be offered for this course, so it is your responsibility to ensure that you are able to attend all the lectures. Given the nature of the material and course, attendance is critical to your success. If you have an ongoing conflict with lecture or tutorial time, you should strongly consider dropping the course or adjusting your schedule to allow you to attend. Accommodations are not possible for scheduling conflicts.

Video and Auditory Recording

For reasons of privacy as well as protection of copyright, unauthorized video or audio recording in classrooms is prohibited. This is outlined in the Provost's guidelines on Appropriate Use of Information and Communication Technology. Note, however, that these guidelines include the provision that students may obtain consent to record lectures and, "in the case of private use by students with disabilities, the instructor's consent must not be unreasonably withheld."

Copyright of lecture material

As protection of copyright, unauthorized copying, use, or uploading of any of the lecture slides, lecture handouts produced by Professor Ito is strictly prohibited.

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 feel free to approach me and/or the AccessAbility Services Office (http://www.utsc.utoronto.ca/ability/) 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.utsc@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.

Use of generative artificial intelligent tools

The knowing use of generative artificial intelligence tools, including ChatGPT and other AI writing and coding assistants, for the completion of, or to support the completion of, an examination, term test, assignment, or any other form of academic assessment, may be considered an academic offense in this course.

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.