

NROC61
LEARNING AND MOTIVATION
UNIVERSITY OF TORONTO SCARBOROUGH
FALL 2021

INSTRUCTOR: Prof. Rutsuko Ito

TAS: Bilgehan Cavdaroglu
Nisma Khan, Tanner McNamara
Jennifer Wilkin, Dylan Yeates

LECTURES: Wednesdays 10-12pm, Online - Synchronous on Zoom

OFFICE HOURS: By appointment on Mondays between 3-5pm

TUTORIALS: Students are required to attend weekly 1hr tutorials online.

COURSE WEBSITE RESOURCES: Quercus & TopHat

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

	Day/Time	Location	TA
TUT1	Tuesdays 10-11am	ONLINE - Synchronous	Tanner McNamara
TUT2	Tuesdays 12-1pm		Dylan Yeates
TUT3	Tuesdays 2-3pm		Jennifer Wilkin
TUT4	Tuesdays 5-6pm		Nisma Khan
TUT5	Tuesdays 7-8pm		Bilgehan Cavdaroglu

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 an Associate 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. 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, travelling, 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.

Lecture slides and PDFs of papers for assigned reading will be posted on the course website **by 9pm (or before)** on the night before the lecture.

LECTURE SCHEDULE:

Lectures will occur synchronously, and the classes will be recorded. However, attendance is mandatory, as you will be asked to participate in an in-class quiz.

Week	Dates	Topic
1	Sep 8	Course Introduction
2	Sep 15	Pavlovian Conditioning
3	Sep 22	Laws of association
4	Sep 29	Instrumental conditioning
5	Oct 6	Learning and Memory systems
	Oct 9- Oct15	<i>Reading week – no class</i>
6	Oct 20	Exam in Class
7	Oct 27	Central Reward Systems
8	Nov 3	Hypothalamus and Motivation 1
9	Nov 10	Hypothalamus and Motivation 2
10	Nov 17	Limbic system and emotions
11	Nov 24	Stress and arousal
12	Dec 1	Biological Clocks: Sleep and Wakefulness
	TBA	Final exam (2hr 30min)**

I reserve the right to make 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 2 to 12 will be on the final exam.

TUTORIAL SCHEDULE:

Weekly tutorials will occur synchronously, and will NOT be recorded. Attendance of 9/10 of the mandatory tutorials is necessary.

Week	Dates	Topic - content	3	Topic – skills	Assignment
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1	Sep 7	No tutorial		
2	Sep 14	Introduction to assignments		
3	Sep 21	Pavlovian Conditioning	Using search engines – how to find relevant articles?	
4	Sep 28	Laws of association	Critically reading research articles	
5	Oct 5	Instrumental conditioning	Referencing and paraphrasing	
	Oct 12	<i>Reading week - No tutorial</i>		<i>Annotated Bibliography Assignment due Oct 12th 11.59pm</i>
6	Oct 19	Learning and Memory systems	Giving journal club presentations - demo	
7	Oct 26	Written assignment consultation – Optional		
8	Nov 2	Central Reward systems	2 paper presentations	
9	Nov 9	Hypothalamus and Motivation	2 paper presentations	
10	Nov 16	Written assignment consultation	2 paper presentations	
11	Nov 23	Limbic system and emotions	2 paper presentations	<i>Opinion piece due Nov 22nd 11.59pm</i>
12	Nov 30	Stress and Arousal	2 paper presentations	

EVALUATION

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

1. Quiz (10% overall grade)

In class - In order to **facilitate active learning**, there will be **5 quiz questions** during each lecture (starting on Sep 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 (illness, other important events), 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 to you for that particular week, to be completed within one week on line (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 on top of 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.

Please register on TOPHAT before the second lecture by simply visiting the Tophat website:

<https://app.tophat.com>

And entering the following codes:

Main Lecture Course for in class quiz

Leaning and Motivation –Fall 2021 **Join Code: 744515**

Course Handout, Out of class quiz and exam practice questions

Leaning and Motivation –Fall 2021 **Join Code: 149662**

Top Hat will require a paid subscription, and I have negotiated a discounted price of **\$22 for the semester**: www.tophat.com/pricing. A one year subscription is also available from the [UofT library](#) at \$34.20. 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 149662.

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 **October 20th in class**, and will consist of **multiple-choice questions** and **short answer questions** on the material covered in **Lectures 1-5**.

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 6-12**. There will also be **one long answer question** that will require conceptual understanding of knowledge covered *throughout the course* (including tutorial articles).

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:

- 20 min Discussion/Recap/Questions on the Lecture material
- 30min on Skill based topic (Weeks 2-5)
- OR
- 2 x 15min Oral Presentations on pre-assigned primary articles (Weeks 8-12)

a. Class presentation of primary article –10 %

10 empirical articles will be assigned for **tutorials 8-12, to be presented by 2 students per article (within the same Tutorial group)**. 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 article for which you will 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 **2 empirical articles of your choice published in the last three years (2018-2021)** advance 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 2 current empirical articles. **The list of topics will be released after your first tutorial.**

The articles 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 abstract list of **2 empirical articles (NOT reviews)** from the last 3 years (2018-2021) that, in your opinion, have provided novel insight into the neural basis of learning/motivation. This document must have a title of your chosen topic, followed by a description of what we already know of the topic. You will then list your 2 articles, each of which should include 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 reference list must be uploaded to your **Tutorial Quercus site on October 12th 2021, 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 **22nd November 2021, 11.59pm on the Tutorial site on Quercus.**

Please note that all assignments submitted on Quercus will be assessed by a plagiarism detection program (now called Ouriginal), which is a tool that assists in detecting textual similarities between compared works (which includes past student work). Any similarity score/index of >25% will be investigated.

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:

Psychology Department Missed Term Work Policy

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

- 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: <http://www.utsc.utoronto.ca/registrar/missing-examination>
- Instructors cannot accept term work any later than five business days after the last day of class. Beyond this date, you would need to file a petition with the Registrar's Office: <https://www.utsc.utoronto.ca/registrar/term-work>

Accommodations for Illness or Emergency:

For missed work due to ILLNESS OR EMERGENCY, complete the following **three-step** process:

1. Complete the **Request for Missed Term Work Accommodations Form** (<http://uoft.me/PSY-MTW>)
2. **Declare your absence** on **ACORN** (Profile & Settings > Absence Declaration)
3. **Email both the Request for Missed Term Work Accommodations Form AND a screenshot of your Self-Declared Absence on ACORN to nroc61.utsc@gmail.com with the name of your TA in the subject line, **WITHIN 2 BUSINESS DAYS** of the missed work.**

Note: If you are unable to submit your documents within 2-business days, **you must still email nroc61.utsc@gmail.com within the 2-business day window** to explain the nature of the delay, and when you will be able to provide your documents. Exceptions to the documentation deadline will only be made under **exceptional circumstances**.

Note: For this semester, we do not require any additional supporting documentation (e.g. medical notes) to support your missed term work accommodation request.

Accommodations for Academic Conflicts:

For missed term work due to an ACADEMIC CONFLICT (i.e. two midterms scheduled at the same time), please complete the following process:

1. Complete the **Request for Missed Term Work Accommodations Form** (<http://uoft.me/PSY-MTW>), choosing “Other” and explaining the conflict in the space provided.
2. Take screenshots of your course homepages that demonstrate the conflict.
3. Email the form and screenshots to your course instructor **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.

Note: Multiple assignments due on the same day are not considered conflicts. Accommodations may only be possible in the case of quizzes and tests that are both scheduled during the same discrete period. Back-to-back tests/quizzes are not considered conflicts.

Note: Students are responsible for keeping their course timetables conflict-free. Students who choose to register in two synchronous courses with overlapping lecture/tutorial/lab schedules may not necessarily be accommodated.

Accommodations for Religious Conflicts:

For missed term work due to a RELIGIOUS CONFLICT, please complete the following process:

1. Complete the **Request for Missed Term Work Accommodations Form** (<http://uoft.me/PSY-MTW>), choosing “Other” and noting “Religious conflict” in the space provided.
2. Email the form to your course instructor **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.

Accommodations for Time Zone Conflicts:

If you are physically in a different time zone and a quiz or midterm is scheduled outside of 7:00am to midnight in your local time, please complete the following process:

1. Complete the **Time Zone Conflict Form** (<https://uoft.me/PSY-TimeZone>), and
2. Email the form to your course instructor **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.

Accommodations for Students Registered with AccessAbility Services:

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

- **Contact your AccessAbility consultant** and have them email your instructor 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 your instructor, 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 your instructor 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 for accommodation. **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 an instructor response to resume work on your assignment**. Extension accommodations may be as short as one business day, depending on the nature of the illness/emergency. You should complete your assignment as soon as you are able and email it your instructor.

For an anticipated event (e.g. scheduled surgery or an illness with a prolonged recovery period), submit a [Verification of Illness Form](#) completed by your doctor, AND this form to your instructor if you would like to request accommodations in advance of the assignment deadline or midterm date. **Declare your future absence on ACORN (absences can be declared up to 14 days in the future).**

Missed Accommodations

If an accommodation is granted but a continued illness/emergency prevents you from meeting the requirements of your accommodation, 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**. For example, if you are given an extension but are still sick and need more time, or if you miss a make-up midterm, you must submit another request ‘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 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 **10% 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.

Accessibility

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. I will work with you and AccessAbility Services to ensure you can achieve your learning goals in this course. Enquiries are confidential. The UTSC AccessAbility Services staff (located in S302) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations. Contact at (416) 287-7560 or ability@utsc.utoronto.ca.

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/policies/behaveac.htm>) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences include, but are not limited to:

On tests and exams:

- Using or possessing unauthorized aids.
- Looking at someone else's answers during an exam or test.

- Misrepresenting your identity.

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.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from your instructor or from other institutional resources (see <http://www.utoronto.ca/academicintegrity/>).