THE UNIVERSITY OF TORONTO SCARBOROUGH
Neuroscience Program
NROD98: Thesis in Neuroscience, Fall 2023/Winter 2024

1.0 CALENDAR DESCRIPTION

This course offers the opportunity to engage in a year long research project under the supervision of an interested member of the faculty in Neuroscience. The project will culminate in a written report in the form of a thesis and a poster presentation. During the course of the year, at appropriate times, students will meet to present their own research proposals, to appraise the proposals of others, and to discuss the results of their investigation. Students must first find a supervisor, which is usually confirmed before the start of the academic term in which the project will be initiated. Students will meet as a group with the coordinator as well as individually with their supervisor. Preference in this course is given to Specialists in Neuroscience with a cumulative GPA of 3.3 or higher. Students planning to pursue graduate studies are especially encouraged to enroll in the course. Students must obtain a permission form from the Department of Psychology's website that is to be completed and signed by the intended supervisor, and submitted to the Psychology Office. At that time, the student will be provided with an outline of the schedule and general requirements for the course. Students seeking supervision off campus will need to arrange co supervision with a faculty member in Neuroscience at UTSC.

2.0 COURSE INFORMATION

Prerequisite: BIOB10H3 and NROB60H3 and NROB61H3 and [PSYB07H3 or STAB22H3] and PSYB55H3 and PSYB70H3 and [0.5 credits from the NRO C-level courses or PSY 50-series C-level courses] and [enrolment in the Specialist Co-op, Specialist, or Major Program in Neuroscience] and [GPA of 3.3 or higher over the last 5.0 credit equivalents completed] and permission of the proposed neuroscience faculty supervisor.
Corequisite: [PSYC08H3 or PSYC09H3]
Exclusion: BIOD98Y3, BIOD99Y3, PSYD98Y3
Class meeting time: Fridays from 1 pm – 3 pm, Room AA 204 (In Person)

3.0 INSTRUCTOR CONTACT INFORMATION

Instructor: Professor Jonathan Cant (email: jonathan.cant@utoronto.ca; please put NROD98 in the subject line of any emails)
Virtual office hours: Mondays between 12 pm – 2 pm (online via Zoom), or by appointment; A Zoom link can be found below. I will admit students from the waiting room and meet with them individually in turn; thus, there may be some wait time!

4.0 ONLINE COURSE RESOURCES

Quercus: https://q.utoronto.ca/
Quercus will be used as the main online resource for this course. All important course-related information (e.g., lecture slides, announcements, syllabus, class schedule, assignment information, message boards, grades, etc.) will be available via Quercus.

Zoom: Please create a Zoom account prior to the first class by clicking on the following link and following the instructions https://act.utoronto.ca/zoom-information/

Here is the Zoom link for virtual office hours:

https://utoronto.zoom.us/j/89851748703

5.0 OBJECTIVES AND LEARNING OUTCOMES

The purpose of this course is to provide students pursuing a specialist degree in Neuroscience with an intensive research apprenticeship. The course is designed to achieve the following *Learning Outcomes:*

1. Students will develop a research question that identifies a gap in the existing literature, and that is informed by a current review of the published literature in the relevant area of research.

2. In collaboration with their faculty supervisor, students will design an experiment and implement the necessary procedures to conduct the research and complete the data collection, while always adhering to approved ethical standards in data collection.

3. Students will analyze their data using appropriate statistical techniques, and interpret their data based on the outcome of those analyses.

4. Students will become proficient in distinguishing between types of research articles, conducting a literature search using specialized databases, and using a citation management system.

5. Students will develop critical writing skills, including how to review a piece of literature for quality and pertinence, and then synthesize, paraphrase, and evaluate to produce a coherent piece of writing.

6. By the end of the course, students will have written a thesis that includes a review of the relevant literature, a clearly articulated research question and statement of rationale, a clearly articulated set of hypotheses, a detailed description of materials and methods, a plan for data analysis, a description of results, and a discussion of results within the framework of the published literature.

7. Students will develop oral presentation skills and have opportunities to practice them.

8. Students will become trained in research ethics for conducting research with both human and non-human animal subjects.

6.0 CLASS SCHEDULE
Note: I will be posting lecture slides by 11 am the day of a scheduled class.
Fall 2023:

Date	Topic	Items Due
September 15	• **Introduction and overview**	
September 22	• No class scheduled	• **Research survey due by 11:59 pm**
September 29	• **Research workshop (with Sarah Guay, Librarian, UTSC)**	
October 6	• No class scheduled	
October 9 – 13	READING WEEK, NO CLASS	
October 20	• **Applying for graduate school**	
October 27	• No class scheduled	• **Form documenting ethics meeting with supervisor due by 1 pm** • **TCPS2 certificate due by 1 pm** • **Ethics in animal research certificate due by 1 pm** • **Thesis proposal due by 1 pm**
November 3	• **CV/resume writing workshop (with Prof. Debra Bercovici)**	
November 10	• **Ethics in science and the peer review process** • **Giving effective oral presentations**	
November 17	• **Oral presentations**	
November 24	• **Oral Presentations**	
December 1	• **Oral Presentations**	

Winter 2024:

Date	Topic	Items Due
January 12	• No class scheduled	
January 19	• **Writing workshop**	
January 26	• No class scheduled	
February 2	• **Peer review session**	
February 9	• No class scheduled	• **Draft introduction and methods due by 1 pm**
February 16	• Data analysis workshop	
February 19 – 23	READING WEEK, NO CLASS	
March 1	No class scheduled	
March 8	• **Poster workshop**	
March 15	• No class scheduled	
March 22	• **Writing support drop in**	
March 29	• No class scheduled	
April 5	• **Writing support drop in**	
April 2		• **Thesis poster due by 11:59 pm**
April 8		• **Thesis paper due by 11:59 pm**
April 9		• **Thesis Day, 10 am – 4 pm**

7.0 EVALUATION

Supervisor grade: 60%
Second reader grade: 15%
Class grade: 25%

The breakdown of your evaluation for the class component is as follows:

1. Attendance and participation in scheduled meetings: 10%
2. Ethics requirement: 8%
3. Research proposal: 10%
4. Draft introduction and methods: 12%
5. Oral presentation: 30%
6. Poster presentation: 30%

1. Attendance/participation
The class will not meet every week during the year. For scheduled classes, however, attendance is mandatory (except where indicated). Attendance will be taken at each meeting, and information about your contributions to the class will be available to your supervisors. The opportunity during class for students to develop public speaking skills and to engage in discussion about research with peers is an important part of the overall research experience. Students must attend at least 50% of classes to receive any of this portion of this component of the grade (e.g., you will get a grade out of 10 proportionate to the number of classes you attended). A student may miss one class without penalty; however, any additional missed classes will be reflected in the final assessment of this component of the evaluation.

2. Ethics
All research in the University that involves living animals, human or non-human, must be approved by the appropriate ethics review board before the research can begin. There are 3 components to the ethics assignment for this course, and all students, regardless of whether they are doing human or animal research, are expected to complete each component. *The 8% that comprises this component of the evaluation is all-or-nothing; ALL components must be completed by October 27 to achieve the 8%.* That said, as part of the completion of the course requirements, ALL students must as a minimum complete the form that documents their meeting with their supervisor (item 'a' below), and the component of the ethics training corresponding to the type of research they are doing (human or laboratory animal; item 'b' or 'c' below):

a. *Meeting with supervisor to determine ethics requirements; submission of form documenting meeting (**available on Quercus under the "Ethics Materials" module; Upload to Quercus by class-time October 27**. All students must consult with their supervisor first thing in the term to determine what review procedures have been followed for their projects and whether additional review proceedings are required before the work can be carried out. Many students will need to submit an "Undergraduate Ethics Review Protocol Form - Student-Initiated Projects" for approval by the Psychology "Delegated Ethics Review Committee" (DERC). The protocol form is available at http://www.utsc.utoronto.ca/psych/experiential-learning. Please speak with me, Ainsley Lawson, and/or your supervisor about the procedures for submitting these protocols for review. Ultimately, it is the responsibility of your supervisor to ensure that

your projects have met the necessary ethics review requirements; however, it is an important part of your education to know and understand what those requirements are. For this reason, you are asked to have a conversation with your supervisor about the ethics requirement for your particular project as early in the term as possible (form documenting meeting due October 27). Please discuss with your supervisor what, if any, special considerations apply to the approval of ethics for your project due to COVID-19, and whether these will affect your timeline for data collection.

b. *Completing Introductory Tutorial for the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2);* ***Upload to Quercus by class-time October 27****.* All students are required to complete this tutorial online (https://tcps2core.ca/welcome), and obtain a certificate of completion to submit to Prof Cant (i.e., upload via Quercus) on October 27. If you already have a certificate of completion, dated within the past two years, you may submit this certificate and be exempt from repeating the course.

c. *Training in Ethical Research with Animals;* ***Upload to Quercus by class-time October 27****.* All students, regardless of whether they are working with live animals this year or not, must complete the University of Toronto's Division of Comparative Medicine short course on ethics in animal research. The course comprises its own Quercus page, to which all thesis students will be invited in mid-September. The course must be completed in its entirety by the deadline of October 27 (If you have already completed the course, within the past two years, you just need to upload proof of completion to Quercus and are exempt from repeating the course).

3. Proposal
You will submit a brief (300-500 word) proposal/plan for your research project, **uploaded to Quercus by October 27, 1 pm**. This proposal should include: a clear rationale for the research, a research question, hypotheses, and a brief description of the methodology. You should construct this short proposal in collaboration with your research supervisor.
This proposal will be graded on a 4-point scale: 1 = unsatisfactory (incomplete, poor development and writing); 2 = satisfactory (complete, poor development or writing); 3 = good (complete, development and writing meet expectations); 4 = excellent (complete, development and writing exceed expectations), with decimal values possible (e.g., 2.7, 3.4, etc.).

4. First draft of Introduction and Methods
Please **upload to Quercus by class-time** *February 9,* a well-developed first draft of your introduction and methods; also, please have a copy available during class-time to work with in a peer-review exercise during class time. This draft will be graded on a 4-point scale: 1 = unsatisfactory (incomplete, poor development and writing); 2 = satisfactory (complete, poor development or writing); 3 = good (complete, development and writing meet expectations); 4 = excellent (complete, development and writing exceed expectations), with decimal values possible (e.g., 2.7, 3.4, etc.).

5. Oral Presentation
Students will give a 10 min oral presentation of their thesis project, followed by a 5 min discussion period. Presentations must include a well-developed background of current literature in the relevant research area that provides a sound rationale for the research question under study. A clear statement of the research question and hypotheses must be provided, as well as detailed description of the methodology, research design, and data analysis techniques. Because presentations are scheduled for relatively early in the year, it is

not expected that most students will have data to present. If, however, a student has preliminary results that they wish to share, they may do so. In all cases, a discussion and interpretation of anticipated (or obtained) results, within the context of the published literature, must be provided. Tips on giving effective oral presentations will be provided in class on November 10, and presentations are scheduled for November 17, 24, and December 1. You will find out the specific date your presentation is scheduled for well in advance of this date.

A grading rubric for the presentations will be provided by October 27.

6. Poster Presentation
A poster conference (i.e., 'Thesis Day') is planned for April 9, in-person. This session will provide a valuable opportunity to present your final work and receive feedback from professors and peers. More details about poster content and layout will be provided in class on **March 8**. You will need to submit your final poster to Quercus **by Tuesday April 2, 11:59 pm. Please set aside time from 10 am to 4 pm on Tuesday April 9 for Thesis Day.**

FINAL THESIS SUBMISSION

Students are required to submit their final thesis to Quercus by **Monday April 8, 11:59 pm**. Further instructions for submitting documents will be provided later in the year. Late submissions will be subject to a penalty of 10% per day.

Important Dates

September 22: Research survey due by 11:59 pm
October 27:   Form documenting ethics meeting with supervisor due by 1 pm
                   TCPS 2 certificate due by 1 pm
                   Ethics in animal research certificate due by 1 pm
                   Thesis proposal due by 1 pm
November 17: Oral presentations
November 24: Oral presentations
December 1:   Oral presentations
February 9:   Draft introduction and methods due by 1 pm
April 2:   Thesis poster due by 11:59 pm
April 8:   Thesis paper due by 11:59 pm
April 9:   Thesis Day, 10 am – 4 pm

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, and/or missed term work accommodations form). Please note, according to UTSC policy, I am not permitted to extend the deadline for any assignment beyond 5 days past the last day of classes for the year (April 8).

Masks in the classroom

While the mask mandate has been paused as of 1 July 2022, the use of medical masks continues to be strongly encouraged at U of T Scarborough in indoor settings where physical distancing is not possible. We ask everyone to respect each other's decisions, comfort levels, and health needs. Masks are available at all building entrances at U of T Scarborough and in all classrooms.

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 procedures 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 jonathan.cant@utoronto.ca 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		**PREFERABLY IN ADVANCE of the missed work, or as soon as possible**

	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. 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.

NOTE: Assignments due at end of term
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).

8.0 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
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.

University's 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).

Use of Generative AI in Assignments
• The knowing use (e.g., copying, paraphrasing material) 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 assignment, or any other form of academic assessment, may be considered an academic offense and is prohibited in this course.

• Representing as one's own an idea, or expression of an idea, that was AI-generated may be considered use of an unauthorized aid, which is a form of cheating and may be considered an academic offense in this course.

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.

University Land Acknowledgment
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.

Access*Ability* 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 AA142, Arts and Administration Building) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations (call 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.

Recording of classroom material by 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.

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