

## **UNDERGRADUATE THESIS IN NEUROSCIENCE (NROD98)**

*Instructor:* Suzanne Erb

*Classroom:* AC-332

*Office:* SW-427H

*Office hours:* Monday 12-2 pm, by appointment (please e-mail [epulickeel@utsc.utoronto.ca](mailto:epulickeel@utsc.utoronto.ca) and enter “NROD98 thesis student: Appointment request” in the subject line).

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### **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.
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.

## **PREREQUISITES AND COURSE RESTRICTIONS**

Enrolment in this course is restricted to students in the Neuroscience Specialist Program who have secured the support of a supervisor. Students in the major program may be permitted, if space permits and if they have secured the support of a supervisor. In order to enrol in the course, students will normally have a cumulative GPA of at least 3.3, and have completed: PSYB01, PSYB07 (or the equivalent STA courses) and PSYC08.

## **COMPONENTS OF EVALUATION**

The overall breakdown of your evaluation for the course is:

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

The breakdown of your evaluation for the class component is:

1. Attendance and participation in scheduled meetings	10%
2. Ethics requirement	8%
3. Research Proposal	10%
3. Draft Introduction and Methods	12%
4. Oral presentation	30%
5. 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 made available to your supervisors. The opportunity the class time affords 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 in order to receive any of this portion of this component of the grade. 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 24 in order to achieve any of the 8%.* That said, as part of the completion of the class requirements, ALL students must as a minimum complete the form that documents their meeting with their supervisor (item 1 below), and the component of the ethics training corresponding to the type of research they are doing (human or laboratory animal; item 2 or 3 below):

1. *Meeting with supervisor to determine ethics requirements; submission of form documenting meeting **due in hard copy in class October 24.*** 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.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 (due October 24).

2. *Completing Introductory Tutorial for the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2); **due in hard copy in class Oct 24.*** All students are required to complete this tutorial online (<http://www.pre.ethics.gc.ca/eng/education/tutorial-didacticiel/>), and obtain a certificate of completion to submit to Prof Erb on October 24. 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.

3. *Training in Ethical Research with Animals; **to be completed by October 24.*** 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.

### **3. Proposal**

You will submit a brief (300-500 word) proposal/plan for your research project in class in hard copy on **October 24**. 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).

### **3. First draft of Introduction and Methods**

Please bring to class on **February 6**, two copies of a well-developed first draft of your introduction and methods; one copy will be submitted to me at the start of class and the second copy you will work with in a peer review exercise during class.

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).

### **4. Oral Presentation**

Students will give a 20-25 min oral presentation of their thesis project, followed by a 5-10 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 Oct 24.

A grading rubric for the presentations will be provided by Oct 24.

### **5. Poster Presentation**

Students will present posters of their projects during a thesis day on April 6. This is a great opportunity to present your final work and receive feedback from professors and peers. More details about what should be included in the content of the posters, and the structure of the poster session, will be provided in class on March 5.

## QUERCUS

You can access the course website through Quercus at <http://q.utoronto.ca> using your UTORid. Please check the course website frequently so that you don't miss important updates about the course. Quercus will be used in this course to post announcements and any relevant course materials.

## FINAL THESIS SUBMISSION

Students are required to submit their final thesis, including to Turnitin.com (see Page 6 of the syllabus), by **Monday April 6 at 4 pm**. Further instructions for submitting documents will be provided later in the year. Late submissions will be subject to a penalty of 5% per day.

## SCHEDULE OF CLASS MEETINGS

DATE:	TOPICS:
Sept 5	Introductions and overview
Sept 12	No class scheduled
Sept 19	Research workshop (with Sarah Guay; Rm AC-286a)
Sept 26	Applying for graduate school
Oct 3	CV/resume writing workshop (with Kyle Danielson)
Oct 10	No Class scheduled
Oct 17	READING WEEK
Oct 24	Ethics in science and the peer review process/ Giving Effective oral presentations <i>Ethics and Proposals due in class</i>
Oct 31	No class scheduled
Nov 7	Oral presentations
Nov 14	Oral presentations
Nov 21	Oral presentations
Nov 28	Oral presentations
	....WINTER BREAK.....
Jan 9	No class scheduled
Jan 16	Writing workshop (with Nancy Johnston)
Jan 23	No class scheduled
Jan 30	No class scheduled
Feb 6	Peer review session <i>Draft introduction and methods due in class</i>

<b>Feb 13</b>	No class scheduled
<b>Feb 20</b>	READING WEEK
<b>Feb 27</b>	No class scheduled
<b>Mar 5</b>	<b>Poster Workshop</b>
<b>Mar 12</b>	No class scheduled
<b>Mar 19</b>	<b>Writing Support; drop-in (SW-427H, optional)</b>
<b>Mar 26</b>	<b>Writing Support; drop-in (SW-427H, optional)</b>
<b>Apr 2</b>	<b>Writing Support; drop-in (SW-427H, optional)</b>
<b>April 6</b>	<i><b>Theses due by 4:00 pm</b></i>
<b>April 6</b>	<i><b>Poster Day</b></i>

## TURNITIN

Students will be required to submit their theses to Turnitin.com 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 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.

## STATEMENT REGARDING 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.

## STATEMENT REGARDING 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 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 or email [ability@utsc.utoronto.ca](mailto: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.

## MISSED TERM WORK DUE TO MEDICAL ILLNESS OR OTHER EMERGENCY

All students citing a documented reason for missed term work must submit their request for accommodations **within three (3) business days** of the deadline for the missed work.

Students must submit **BOTH** of the following:

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

**Appropriate documentation:**

For missed **TERM TESTS** due to **ILLNESS**:

- Submit the Request for Missed Term Work Accommodations form (<http://uoft.me/PSY-MTW>), along with an **original** copy of the official UTSC Verification of Illness Form ([uoft.me/UTSC-Verification-Of-Illness-Form](http://uoft.me/UTSC-Verification-Of-Illness-Form)) or an **original** copy of the record of visitation to a hospital emergency room. 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.
- Note: If an end date of "ongoing" is specified, the medical note will be assumed to cover a period of two weeks. If no end date / an "unknown" end date is specified, the note will be assumed to cover a period of three business days (starting from illness start date.)

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

- Meet with your **AccessAbility consultant** and have them email Keely ([keely.hicks@utoronto.ca](mailto:keely.hicks@utoronto.ca)) detailing the accommodations required.

For missed **ASSIGNMENTS** due to **ILLNESS**:

- Submit the Request for Missed Term Work Accommodations form (<http://uoft.me/PSY-MTW>), along with a **hardcopy** of the Self-Declaration of Student Illness Form ([uoft.me/PSY-self-declare-form](http://uoft.me/PSY-self-declare-form)).

For missed **ASSIGNMENTS** due to **ACCESSABILITY REASONS**:

- If your desired accommodation is **within the scope** of your Accommodation Letter (ex. your letter includes "extensions of up to 7 days" and you need 3 days), submit the Request for Missed Term Work Accommodations form (<http://uoft.me/PSY-MTW>) and attach a copy of your letter. **Specify how many days extension you are requesting** on the request form.
- If your desired accommodation is **outside the scope** of your Accommodation Letter (ex. your letter includes "extensions of up to 7 days" but you need more time than that) you will need to meet with your **AccessAbility consultant** and have them email Keely ([keely.hicks@utoronto.ca](mailto:keely.hicks@utoronto.ca)) detailing the accommodations required.

For missed term tests or assignments in **OTHER CIRCUMSTANCES**:

Submit the Request for Missed Term Work Accommodations form (<http://uoft.me/PSY-MTW>), along with:

- In the case of a **death of a family member or friend**, please provide a copy of a death certificate.
- For U of T varsity-level or professional **athletic commitments**, an email from your coach or varsity administrator should be sent directly to Keely Hicks ([keely.hicks@utoronto.ca](mailto:keely.hicks@utoronto.ca)) **well in advance** of the missed work, detailing the dates and nature of the commitment.
- For **religious accommodations**, please email ([keely.hicks@utoronto.ca](mailto:keely.hicks@utoronto.ca)) **well in advance** of the missed work.
- For circumstances **outside of these guidelines**, please email Keely ([keely.hicks@utoronto.ca](mailto:keely.hicks@utoronto.ca)) on or before the date of the test / assignment deadline to describe your circumstances and ask what documentation would be appropriate

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

### **Procedure:**

Submit your (1.) [request form](#) and (2.) [medical/self-declaration](#)/other documents in person **WITHIN 3 BUSINESS DAYS** of the missed term test or assignment.

**Submit to:** Keely Hicks, Room SW420B, Monday – Friday, 9 AM – 4 PM. (Slide forms under door if out of office.)

After submitting your documentation, within approximately one to five business days, you will receive a response from your instructor detailing the accommodations to be made (if any).

**You are responsible for checking your official U of T email and Quercus course announcements daily, as accommodations may be time-critical.**

You should continue to work on your assignments to the best of your ability, as extension accommodations may be as short as one business day, depending on the nature of the illness/emergency.

If an accommodation has been granted but you are unable to meet the conditions of the accommodation (ex. you need a longer extension, or you missed a make-up test), you will need to repeat the missed term work procedure and submit additional forms to request further accommodation. Note that in the case of a missed make-up test, an opportunity to write a second make-up test may not be provided.

Completion of this form does NOT guarantee that accommodations will be made. 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.

### **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.

(E.g.) If you miss a make-up midterm, you would need to submit another Request for Missed Term Work Accommodations form. If your original medical note / documentation included the date of the make-up midterm, then only the Request form is required. If the date of the make-up midterm fell outside of the dates indicated on your original medical note/other documentation, then a new medical note/other appropriate documentation must also be submitted.

### **Importance of Three Business Day window:**

If you are unable to submit your documents in-person within the three business day window, **you must email Keely ([keely.hicks@utoronto.ca](mailto:keely.hicks@utoronto.ca)) within the three business day window** to explain when you will be able to bring your documents in person. Exceptions to the documentation deadline will only be made under exceptional circumstances. Attach scans of your documentation, and be prepared to bring your documents to Keely in-person as soon as you are well. Late documents may not be accepted.

### **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>).

**NOTE: Final Exams**

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