

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

**Instructor:** Suzanne Erb

**Classes by Zoom:** Zoom links for each class will be posted as an announcement in Quercus by noon of a scheduled class. 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/>

**Virtual office hours:** Monday 12-2 pm (A Zoom link will be provided by 11 am each Monday morning; I will admit students from the waiting room and meet with them individually in turn; thus, there may be some wait time!)

**E-mail:** [suzanne.erb@utoronto.ca](mailto:suzanne.erb@utoronto.ca)

### **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 enroll 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***

All classes this year will be held on Zoom, with synchronous delivery (to create an account, please go to the following link and follow the instructions:

<https://act.utoronto.ca/zoom-information/>) 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 that 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 28 in order to achieve any of 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 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; **Upload to Quercus by class-time October 28.*** 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 28). 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.

2. *Completing Introductory Tutorial for the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2); **Upload to Quercus by class-time October 28.***

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 28. 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; **Upload to Quercus by class-time October 28.*** 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 28.

### **3. Proposal**

You will submit a brief (300-500 word) proposal/plan for your research project, **uploaded to Quercus by October 28**. 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 **upload to Quercus by class-time February 3**, a well-developed first draft of your introduction and methods; also, please have a copy available during class-time to work with on 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).

### **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 28.

A grading rubric for the presentations will be provided by Oct 28.

## 5. Poster Presentation

A virtual poster conference is planned for April 6, in place of the in-person poster session that we would normally hold at the end of the winter term. 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 3**. Below are preparation guidelines of your poster e-presentations.

### **Poster e-presentations**

In order to give you a chance to disseminate your research findings and present your poster, you will be asked to record a short video presentation of your electronic poster to be judged by faculty or graduate students in the Psychology and Neuroscience programs. These are the same individuals who would have judged your poster presentation on Thesis Day in person.

The presentation will take the form of a **screen recording on your computer**. You are not required to record your face while speaking. Instead, you will simply record what is on your computer screen while narrating. Technical details are below.

### **In your presentation:**

- You should provide a description of your study's background, methods, findings, and interpretation of the results, much as you would do during a live poster session.
- While speaking, you should point out specific areas of your poster, much as you would do during a live poster session.
- You should highlight any future directions or methodological limitations to your work.
- More details about how to make an effective poster presentation can be discussed with your thesis course instructor and/or thesis supervisor.

### **Technical details:**

- Your video presentation should last **no more than five minutes**. Please be respectful of the judges' time and do not exceed this time limit.
- To complete your video, you should use screen capture software that simultaneously records what is shown on your screen and your voice. There is no need to use your webcam to record your face.
- While recording, your poster should be in **full screen mode** to ensure maximal visibility.
- The University of Toronto subscribes to TechSmith Snagit, software that allows you to record your screen and voice simultaneously. **This software is the best tool for this project**. Information about downloading and licensing Snagit can be found here:
  - <https://q.utoronto.ca/courses/46670/pages/lecture-capture/>

- Once the video is completed, you may edit its length using Snagit or another video editing tool. You should then save the video, and upload it to the University's MyMedia site. There it will be converted to a link that you can submit on Quercus for the judges. Please do not attempt to upload the actual video file to Quercus.

<https://mymedia.library.utoronto.ca/login>

## **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 5**. 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

| <b>DATE:</b>   | <b>TOPICS:</b>  |
|----------------|---|
| <b>Sept 9</b>  | <b>Introductions and overview</b>   |
| <b>Sept 16</b> | No class scheduled  |
| <b>Sept 23</b> | <b>CV/resume writing workshop (with Prof. Kyle Danielson)</b>                                 |
| <b>Sept 30</b> | <b>Applying for graduate school</b>   |
| <b>Oct 7</b>   | <b>Research Workshop (with Sarah Guay, librarian, UTSC)</b>                                   |
| <b>Oct 14</b>  | READING WEEK  |
| <b>Oct 21</b>  | No class scheduled  |
| <b>Oct 28</b>  | <b>Ethics in science and the peer review process/<br/>Giving Effective oral presentations</b> |
| <b>Nov 4</b>   | No class scheduled  |
| <b>Nov 11</b>  | <b>Oral presentations</b>   |
| <b>Nov 18</b>  | <b>Oral presentations</b>   |
| <b>Nov 25</b>  | <b>Oral presentations</b>   |
| <b>Dec 2</b>   | <b>Oral presentations</b>   |
|                | ....WINTER BREAK....  |
| <b>Jan 6</b>   | No class scheduled  |
| <b>Jan 13</b>  | <b>Writing workshop</b>   |
| <b>Jan 20</b>  | No class scheduled  |
| <b>Jan 27</b>  | No class scheduled  |
| <b>Feb 3</b>   | <b>Peer review session</b><br><b><i>Draft introduction and methods due in class</i></b>       |

|                |   |
|----------------|---|
| <b>Feb 10</b>  | No class scheduled                                  |
| <b>Feb 17</b>  | READING WEEK  |
| <b>Feb 24</b>  | No class scheduled                                  |
| <b>Mar 3</b>   | <b>Poster Workshop</b>                              |
| <b>Mar 10</b>  | No class scheduled                                  |
| <b>Mar 17</b>  | <b>Writing Support; drop-in (SW-427H, optional)</b> |
| <b>Mar 24</b>  | No class schedule                                   |
| <b>Mar 31</b>  | <b>Writing Support; drop-in (SW-427H, optional)</b> |
| <b>April 5</b> | <b><i>Theses due (Upload to Quercus)</i></b>        |
| <b>April 6</b> | <b><i>Thesis Day</i></b>                            |



## **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.

## **Rights and Responsibilities**

Recordings of Course Materials:

Course videos and materials belong to your instructor, the University, and/or other sources

depending on the specific facts of each situation and are protected by copyright. Do not download, copy, or share any course or student materials or videos without the explicit permission of the instructor.

Copyright in Instructional Settings:

If a student wishes to tape-record, photograph, video-record or otherwise reproduce lectures, course notes/slides, or other similar materials provided by instructors, he or she must obtain the instructor's written consent beforehand. Without consent, all such reproduction is an infringement of copyright and is absolutely prohibited. In the case of private use by students with disabilities, the instructor's consent will not be unreasonably withheld.

**On 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 teaching team in this course (Dr. Dere and the TAs) will work to establish an environment that is informed by principles of equity, diversity, and inclusion, where everyone feels comfortable sharing their perspectives, questions, and feedback with one another.

**Religious Accommodation:**

The University provides reasonable accommodation of the needs of students who observe religious holy days other than those already accommodated by ordinary scheduling and statutory holidays. Students have a responsibility to alert members of the teaching staff in a timely fashion to upcoming religious observances and anticipated absences and instructors will make every reasonable effort to avoid scheduling tests, examinations or other compulsory activities at these times. Please reach out to me as early as possible to communicate any anticipated absences related to religious observances, and to discuss any possible related implications for course work.

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**Family Care Responsibilities:**

The University of Toronto strives to provide a family-friendly environment. Challenges related to family responsibilities are all the more salient in the context of the COVID-19 pandemic. You

may wish to inform me if you are a student with family responsibilities. If you are a student parent or have family responsibilities, you also may wish to visit the Family Care Office website at [familycare.utoronto.ca](http://familycare.utoronto.ca).