NROB60H3 F

Neuroanatomy Laboratory

Fall 2024 Syllabus

Course Meetings

NROB60H3 F

Section	Day & Time	Delivery Mode & Location
LEC01	Tuesday, 11:00 AM - 1:00 PM	In Person: HW 216
PRA0001	Thursday, 9:00 AM - 11:00 AM	In Person: SW 330
PRA0002	Thursday, 11:00 AM - 1:00 PM	In Person: SW 330
PRA0003	Thursday, 1:00 PM - 3:00 PM	In Person: SW 330
PRA0004	Thursday, 3:00 PM - 5:00 PM	In Person: SW 330
PRA0005	Thursday, 5:00 PM - 7:00 PM	In Person: SW 330
PRA0006	Thursday, 7:00 PM - 9:00 PM	In Person: SW 330
PRA0007	Friday, 9:00 AM - 11:00 AM	In Person: SW 330
PRA0008	Friday, 11:00 AM - 1:00 PM	In Person: SW 330
PRA0009	Friday, 1:00 PM - 3:00 PM	In Person: SW 330

Refer to ACORN for the most up-to-date information about the location of the course meetings.

Course Contacts

Instructor: Junior Steininger
Email: junior.steininger@utoronto.ca
Office Hours and Location: Office TBA. Office hours by appointment.

Course Overview

This course focuses on functional neuroanatomy of the brain at both the human and animal level. Topics include gross anatomy of the brain, structure and function of neurons and glia, neurotransmitters and their receptors, and examples of major functional systems. Content is delivered through lecture and laboratories.

Neuroscience is the scientific study of nervous systems. It is the study of the nature and functioning of the nervous system at all levels, from the molecules that make up individual nerve cells and the transfer of information from one nerve cell to another, to the complexities of how

thoughts, emotions, and behaviours are produced.
Neuroscience is at the interface between biology and psychology. It is unique in that it makes use of a variety of methods and investigations from a wide range of traditional disciplines. To understand the nervous system and how it works requires knowledge of anatomy, molecular biology, biochemistry, pathology, physiology, pharmacology, psychology and zoology.
The lecture part of this course deals with the anatomy of the nervous system. In this component, you will learn about the anatomy of the brain, as well as the structure and function of the cells of the nervous system. You will also develop an understanding of how neurons communicate, with a focus on their physiological properties. We will examine specific brain regions which you will also identify in the lab component of this course and discuss their functions and connections. Learning neuroanatomy is like learning both a new language and a map of a new world, so be patient, practice the nomenclature, and your hard work will be rewarded. Weekly lab sessions will cover gross and systems anatomy of the nervous system. Students will dissect sheep brains to examine a wide variety of nervous system structures in 3D. Basic dissecting equipment will be provided, but if you plan to continue in other science labs you may wish to purchase a dissecting kit. Lab coats are required to be worn at all times when in the lab and safety glasses are also required for the dissections. Disposable gloves will be provided. Proper safety procedures, as discussed within the first lab must be followed at all times.
Altogether, this course lays the framework for understanding subsequent neuroscience courses. We will begin to understand how the activity of even small groups of neurons can lead to the activity of circuits specialized for all our sensations, movements, specific goal-directed behaviours, emotions, and ultimately, we hope, cognition.

Course Learning Outcomes

By the end of the course students should be able to:

1. Demonstrate a basic understanding of the techniques used to investigate morphology and
   connections of neurons to provide the basis for further research into the nervous system
2. Understand the structural features that make neurons and their supporting cells unique, emphasizing the correlation of structure and function.
3. Summarize the topography and structural organization of the brain, reinforced through laboratory exercises.
4. Explain the essential chemical, physical and molecular properties that enable neurons to conduct electrical signals.
5. Describe specific neurotransmitter chemistry and transmitter-gated channels and receptors.
6. Demonstrate the ability to work effectively and respectfully with peers in the laboratory and
   when providing and responding to constructive feedback.

Prerequisites: BIOA01H3 and BIOA02H3 and CHMA10H3 and [CHMA11H3 or CHMA12H3] and PSYA01H3 and PSYA02H3
Corequisites: None
Exclusions: CSB332H, HMB320H, PSY290H, PSY391H, (ZOO332H)
Recommended Preparation: None
Credit Value: 0.5

Course Materials

Textbook: Neuroscience: Exploring the Brain. 4th edition by Bear, Connors and Paradiso. We will be covering the first 7 chapters and the appendix in this text. Several options are available to purchase the text (e.g., you may purchase a custom electronic version of the required chapter readings through the bookstore: ISBN# 978-1-284-01668-0). Used copies should also be available through different sources.

Lab Text: Sheep Brain Atlas: A Photographic Guide, 2022 Edition. Posted online and printed copies can be ordered through the bookstore.

Course Material: Quercus page will have lecture slides and other resources. Please monitor the home page announcements for course updates regularly.

Lab Equipment and Safety: Proper safety procedures will be discussed during the first lab and must be followed at all times. Failure to adhere to these safety guidelines will result in being excluded from participation in lab. **Students must wear a lab coat and closed-toe shoes at all times in the lab**. Disposable gloves will be provided and must be worn during dissections and handling of specimens. Safety goggles (or glasses) are recommended during dissections. *No food or drink is allowed in the lab*. If you plan to use phones or other devices in lab, we suggest placing them in sealable plastic bags to protect from contamination. Medical masks are strongly recommended at all times.

Marking Scheme

Assessment	Percent	Details	Due Date
Midterm Written Exam	13%	The midterm exam will take place during our class time on October 8th. The exam will include all lecture content covered in Weeks 1-5, including any assigned readings or videos.	2024-10-08
Midterm Bellringer Exam	15%	Bell Ringer Test (15%) – will cover Photoseries 1-4 and consist of 15 dissection trays with 2 pins each (i.e., 30 questions). It will be scheduled by the Registrar's Office and has been requested to occur in Week 6. Times and location along with instructions will be posted on Quercus as soon as possible.	2024-10-11
Final Bellringer Exam	25%	Bell Ringer Final Exam (25%) – will be cumulative and cover Photoseries 1-6, consisting of 25 dissection trays with 2 pins each (i.e., 50 questions). It will be scheduled by the Registrar's Office and has been requested to occur in Week 10. Times and location along with instructions will be posted on Quercus as soon as possible.	2024-11-15

Assessment	Percent	Details	Due Date
Lab Exercise Quizzes	6%	Lab Exercises (1% each, or 6% of final grade) There will be 6 laboratory weeks where you will follow a provided dissection protocol and take a more hands-on approach to identifying required brain structures. To help encourage preparation for lab and keep you on pace with material, these lab exercises will have you demonstrate your understanding of the content covered within lab that week. You can collaborate with your group on the answers during lab, but all students will be responsible for submitting their final answers individually on Quercus, within 48-hrs from your lab section end time.	No Specific Date
Allen Institute Atlas Assignment 1	4%	For this assignment you will follow a provided protocol for using the Allen Institute online brain atlases. You can complete your work on a computer, and your TA will be available to answer questions via email or during any of your practical session. This assignment will have you demonstrate that you can effectively navigate the brain atlases to answer questions related to our course content. Detailed assignment guidelines will be posted on Quercus at the start of the term for this assignment and it will be due on Quercus Monday October 14th 11:59pm.	2024-10-14

Assessment	Percent	Details	Due Date
Allen Institute Atlas Assignment 2	4%	For this assignment you will follow a provided protocol for using the Allen Institute online brain atlases. You can complete your work on a computer, and your TA will be available to answer questions via email or during any of your practical session. This assignment will have you demonstrate that you can effectively navigate the brain atlases to answer questions related to our course content. Detailed assignment guidelines will be posted on Quercus at the start of the term for this assignment and it will be due on Quercus Monday November 18th 11:59pm.	2024-11-18
Final Written Exam	33%	Final Exam (33%) - Held during final exam period (110 minutes); date TBA by Registrar's Office. - The final exam is cumulative on all content covered and assigned during the lectures. More emphasis will be placed on content covered since the midterm test.	Final Exam Period

Late Assessment Submissions Policy

Late Submissions

Assignments submitted after the deadline, without being granted missed term work accommodations, will receive a -10% penalty per day late. All deadlines are based on Toronto local time. Instructors cannot accept term work any later than five business days after the last day of class, without an approved petition to the Registrar's Office.

Course Schedule

Lecture Schedule

Week	Description
Week 1 Date: Sept 3	Course Introduction Neuroscience: Past, Present and Future Readings: Textbook Ch 1
Week 2 Date: Sept 10	Structure of the Nervous System • Gross Organization • Anatomical References • CNS/PNS Readings: Textbook Ch 7 and Appendix (Partial)
Week 3 Date: Sept 17	Development of the Nervous System • Meninges • BBB & Ventricular system • Cranial nerves Readings: Textbook Ch 7 and Appendix (Partial)
Week 4 Date: Sept 24	Cortical Function & Brain Cells • The prototypical neuron • Glia Readings: Textbook Ch 7 and Appendix (Partial) & Ch 2
Week 5 Date: Oct 1	Resting Membrane Potential Readings: Textbook Ch 3
Week 6 Date: Oct 8	Written Midterm in Class
Week 7 Date: Oct 15	Action Potential Readings: Textbook Ch 4
Week 8 Date: Oct 22	Principals of Synaptic Integration and Chemical Synaptic Transmission Readings: Textbook Ch 5
Week 9 Date: Nov 5	Neurotransmitter Systems • Cholinergic neurons • Catecholamine neurons

	• Dopaminergic neurons Readings: Textbook Ch 6
Week 10 Date: Nov 12	Hippocampus Readings: Textbook Ch 7 and Appendix (Partial)
Week 11 Date: Nov 19	Cerebellum & Basal Ganglia Readings: Textbook Ch 7 and Appendix (Partial)
Week 12 Date: Nov 26	Tying it all Together Readings: Textbook Ch 7 and Appendix (Partial)
Week 13 Date: Dec 3	Final Exam Review

Policies & Statements

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 web site (https://uoft.me/pdt-faq).

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.

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 Acknowledgement

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.

Accommodations

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the AccessAbility Services Office 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 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.

Use of Generative Artificial Intelligence Tools

Students may use artificial intelligence tools, including generative AI, in this course as learning aids or to help produce assignments. However, students are ultimately accountable for the work they submit.

Students may not use artificial intelligence tools for taking tests, writing research papers, creating computer code, or completing major course assignments. However, these tools may be useful when gathering information from across sources and assimilating it for understanding.

The knowing use of generative artificial intelligence tools, including ChatGPT and other AI writing and coding assistants, for the completion of, or to support the completion of, an

examination, term test, assignment, or any other form of academic assessment, may be considered an academic offense in this course.

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.

Missed Term Work

DEPARTMENT OF PSYCHOLOGY POLICIES

Note: This policy is NOT built into the Syllabus Builder tool in CIS.

Missed Term Work Policy (OPTIONAL, IF YOU HAVE YOUR OWN ALTERNATE VERSION)

Using the Missed Term Work policy below is **optional**. You may prefer to develop your own system (ex. you could create your own online form instead of using our MTW form), but you must account for the following:

- Instructors are not obliged to accept late work, **except where there are legitimate, documented reasons beyond a student's control**. In such cases, **a late penalty is normally not appropriate.** (as per the Academic Handbook, 6.6)

- If you intend to accept and apply penalties for late submissions, you must state this clearly in your course syllabus/outline.

- Students who miss a term test for an acceptable reason (e.g. illness or bereavement) **should be offered a make-up test**. For some courses it may be appropriate to allocate the value of the missed test to another test, or other piece(s) of term work, but this is **strongly discouraged** (as per the Academic Handbook, 7.3)

- For a **first absence** in a course, students may simply **declare their absence on ACORN**. They can declare absence only once per term, for a period of up to 7 days. ACORN absence declarations should be considered sufficient documentation for missed work.

- If a student is **away more than once** in the term, they cannot declare additional absences on ACORN. In these cases, you have the **option to request proof** of their second+ absence, for example:

o A University approved Verification of Illness (VOI) form

o A death certificate, funeral announcement, or other supporting document for bereavement

o A note from a university staff member (advisor, coach, residence staff, etc.) who can substantiate the student's claims, sent directly to the instructor by email

Department of Psychology Missed Term Work Policy

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

Procedure:

1. Complete the Request for Missed Term Work Accommodations Form ("MTW Form").
2. Email **BOTH** your MTW Form and Supporting Documentation to <course email> according to the instructions specified below.

Supporting Documentation Requirements and Deadlines:

Reason for Missed Work	**Documentation required for a** *first absence* **in the term**	**Documentation required for** *subsequent absences* **in the term**	**Deadline for submitting MTW form and supporting documentation**
Illness or Injury	ACORN Absence Declaration	UofT Verification of Illness Form	**within 2 business days** of the missed work
Bereavement	ACORN Absence Declaration	A death certificate or funeral announcement	**within 2 business days** of the missed work
University-sponsored athletic or artistic obligation at the varsity/provincial/national level	ACORN Absence Declaration	A note from a university staff member (advisor, coach, residence staff, etc.) who can substantiate the obligation, sent directly to the course email	**10 business days IN ADVANCE** of the missed deadline
Disability-related reasons for students registered with AccessAbility Services	For missed *TERM TESTS,* - **Contact your AccessAbility consultant** and have them write to the course email detailing the accommodations needed. For missed *ASSIGNMENTS,* - If your desired accommodation is **within the scope** of your Accommodation Letter (e.g. your letter includes "extensions of up to 7 days" and you need 3 days), send your **Accommodation Letter** to the course email and specify how many days extension you are		**PREFERABLY IN ADVANCE of the missed work, or as soon as possible**

	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.

Additional Content

Lab Schedule

Week	Description	Photoseries
Week 1 Date: Sept 4/5	1. Lab rules 2. Basic Terminology 3. Demo of lab test format 4. Gross Anatomy 5. Removal of Meninges 6. Major sulci and gyri **Lab Exercise Quiz 1**	1
Week 2 Date: Sept 12/13	1. Ventral surface structures 2. Cranial nerves and functions **Lab Exercise Quiz 2**	2
Week 3 Date: Sept 19/20	1. Mid-sagittal sectioning 2. Identification of mid-sagittal structures **Lab Exercise Quiz 3**	3

Week 4 Date: Sept 26/27	1. Dorsal and lateral dissections 2. Hippocampal dissection **Lab Exercise Quiz 4**	4
Week 5 Date: Oct 3/4	Review and Practice Bellringer	1, 2, 3, 4
Week 6 Date: Oct 10/11	**MIDTERM BELLRINGER: Date, Time, Location all requested and TBD. Details will be posted on Quercus.**	
Week 7 Date: Oct 17/18	1. Identification of Horizontal Structures 2. Rostral coronal sections **Lab Exercise Quiz 5**	5
Week 8 Date: Oct 24/25	1.Caudal coronal sections 2. Cerebellar coronal sections **Lab Exercise Quiz 6**	6
Week 9 Date: Nov 7/8	Review and Practice Bellringer Clean up lab	1, 2, 3, 4, 5, 6
Week 10 Date: Nov 14/15	**FINAL BELLRINGER: Date, Time, Location all requested and TBD. Details will be posted on Quercus.**	
Week 11 Date: Nov 21/22	No Labs	
Week 12 Date: Nov 28/29	1. Pick-up Remaining Test 2. Confirm Final Lab Grade	