

Neuroanatomy Laboratory Syllabus (**tentative**)

NROB60H3 Fall 2019

Professor/Lecturer: Dr. Janelle LeBoutillier

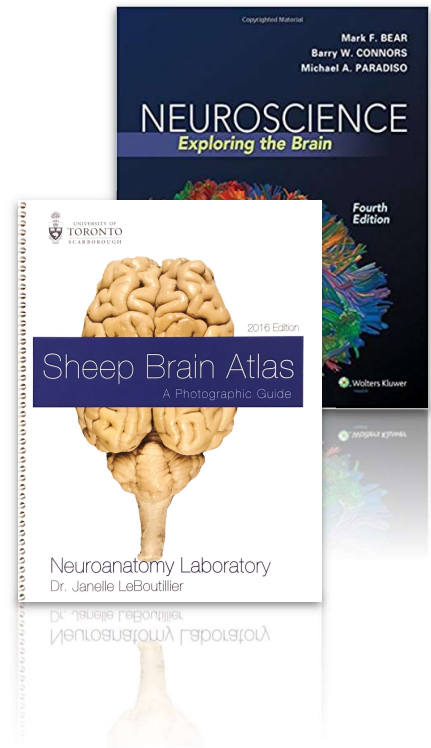
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Textbook: **Neuroscience: Exploring the Brain. 4th edition by Bear, Connors and Paradiso.** We will be covering the first 7 chapters and the appendix in this text. Several options are available to purchase the text (e.g., you may purchase only the required chapter readings, an electronic version of the entire text or a hard copy of the text through the bookstore).



Lab Text: Sheep Brain Atlas: A Photographic Guide, 2016 Edition (available at the UTSC bookstore)

Course Material: **Quercus** (<https://q.utoronto.ca/>)

Lectures: **Wed 11:00 AM to 1:00 PM in SW319**

Labs: You are expected to attend your scheduled lab section each week.
Any lab section changes must be made through ACORN/ROSI.
Labs start Thursday, September 5th and are conducted in SW242.

COURSE DESCRIPTION:

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.

GRADING SCHEME:

Lecture Component – Total 50%

Midterm Exam (17.5%)

- TBA by Registrar's Office (90 minutes)
- Tests lecture material and textbook chapters 1, 2, 3, plus the content of chapter 7 + Appendix that has been covered in lecture to date.

Final Exam (32.5%)

- Held during final exam period (120 minutes); date TBA by Registrar's Office.
- Tests lecture material covered since the midterm, and textbook chapters 4, 5, 6, plus ***all of the content*** of chapter 7 + Appendix unless specifically excluded in lecture.

Note: Lecture tests may include multiple choice, short answer, diagrams/labelling, and matching questions. Dates for the midterm exam and the final exam will be assigned by the Office of the Registrar. When this information is available it will be posted to Quercus.

Lab Component – Total 50%

Midterm Bell Ringer Test (15%)

Final Bell Ringer Test (25%)

Written Bell Ringer Test (5%)

Dissection Protocol Quizzes (5%)

Bonus Lab Participation Marks (up to 3%)

COURSE SCHEDULE:

LECTURE SCHEDULE:

The topics and readings **highlighted in yellow** will be included on your first lecture midterm exam. You are responsible for all content in the assigned text readings, unless otherwise noted during lectures.

WEEK	DATE	TOPIC	CHAPTER(S)
1	4-Sept	Course Introduction <i>Neuroscience: Past, Present and Future</i>	Ch 1
2	11-Sept	Structure of the Nervous System <i>Gross Organization</i> <i>Anatomical References</i> <i>CNS/PNS</i> <i>Video</i>	Ch 7 (partial) and Appendix (partial)

3	18-Sept	Development of the Nervous System <i>Meninges</i> <i>BBB & Ventricular system</i> <i>Cranial nerves</i>	Ch 7 (partial) and Appendix (partial)
4	25-Sept	Cortical Function & Brain Cells <i>The prototypical neuron</i> <i>Glia</i>	Ch 7 (partial) and Appendix (partial) Ch 2
5	2-Oct	Resting Membrane Potential	Ch 3
6	9-Oct	Midterm Requested (TBA) Lab Test requested Tentative Oct 9 during lecture	
		Reading Week Oct 12-16. No Classes	
7	23-Oct	Action Potential	Ch 4
8	30-Oct	Principals of Synaptic Integration and Chemical Synaptic Transmission	Ch 5
9	6-Nov	Neurotransmitter Systems <i>Cholinergic neurons</i> <i>Catecholamine neurons</i> <i>Dopaminergic neurons</i>	Ch 6
10	13-Nov	Hippocampus	7 and Appendix
11	20-Nov	Cerebellum & Basal Ganglia	7 and Appendix
12	27-Nov	Tying it all Together	7 and Appendix

The assigned readings for the final exam (**highlighted in blue**) include Chapters 4, 5, and 6 along with all of Chapter 7 and the Appendix.

LABORATORY COMPONENT:

The lab schedule will be discussed in the first week of labs which start the week of Sept 3. Any changes in your assigned lab section may only be made through ROSI/ACORN. The instructor and TAs cannot make such changes.

Colour printed copies of the *Sheep Brain Atlas: A Photographic Guide* will be available for purchase through the bookstore (**the 2016 edition of the atlas is required**). All students will be able to utilize the

online sheep atlas and dissection videos posted on Quercus. Details and a demonstration regarding the use of this atlas will be presented in your first lab.

During the lab, students are required to wear a lab coat at all times, wear closed toed shoes and to follow all lab rules and regulations, which will be discussed at your first lab. You will not be permitted to attend labs if you do not adhere to these rules.

Bellringer Test Format

Your TA will give a demonstration of the bellringer format during the first lab. In brief, specimen samples will be set up in dissection trays with a total of 3 neuroanatomical structures pinned per tray. You will be given **1 minute** to identify all pins at each tray. Practice bellringers will be set up during most labs.

Monitor Quercus regularly for announcements. Dates and times of lab tests will be communicate via Quercus.

- The midterm bellringer will cover all content **highlighted in purple** on the lab schedule and will consist of approximately 10 dissecting trays with 3 pins each.
- The final bellringer test will consist of approximately 17 trays with 3 pins each and will be ***cumulative on all lab content (Photoseries 1-6)***.

The use of cell phones and computers will not be permitted during bellringer tests. All you will need to complete your lab test is a pen and your lab coat. Specific details regarding the bell ringer will be posted to Quercus.

Written Bell Ringer Test

This test will be based on the content of PS 5 and 6 only and will be held in Week 8.

Dissection Protocol Quizzes

Quizzes will be given at the start of some labs, with a total of 6 administered over the term. Quizzes will be given in **Week 2, 3, 4, 6, 7 and 9**. These will be based on the study guides for the weekly lab and the dissection videos for each lab with the exception of the Week 9 quiz. Week 9 will be based on PS6. The purpose of these quizzes is to encourage you to be prepared for the lab that week. There will be no lab quiz during the first lab. There are no make-up quizzes and you will not be permitted to write the quiz if you arrive late. Only your best 4 quiz grades will count.

Bonus Lab Participation Marks

Up to 3% can be achieved by full attendance and full participation in the 2 review labs. These labs will be held in the week before your mid-term bellringer test (maximum 1% in Week 5) and your final bellringer test (maximum 2% in Week 9). These are bonus marks and there will be no make ups to receive these points if you miss either lab. These marks are offered as incentive for you to participate fully in the review session with the goal of improving you performance on the actual tests.

LAB SCHEDULE:

The content **highlighted in purple** in the following table will be included on your midterm bellringer lab test. The final bellringer test is cumulative, testing the content of Photoseries 1-6. You are responsible for knowing all neuroanatomical structures as presented in the Sheep Brain Atlas: A Photographic Guide, 2016 edition. Dates for each lab listed below correspond to the Thursday of that week.

LAB DATE	TOPIC	PHOTOSERIES
Week 1: September 5	<ol style="list-style-type: none"> 1. Lab rules 2. Basic Terminology 3. Accessing the on-line atlas 4. Demo of lab test format 5. Gross Anatomy 6. Removal of Meninges 7. Major sulci and gyri 	1
Week 2: September 12	<ol style="list-style-type: none"> 1. Ventral surface structures 2. Cranial nerves and functions 	1 and 2
Week 3: September 19	<ol style="list-style-type: none"> 1. Mid-sagittal sectioning 2. Identification of mid-sagittal structures 	3
Week 4: September 26	<ol style="list-style-type: none"> 1. Dorsal and lateral dissections 2. Hippocampal dissection 	4
Week 5: October 3	Review and Practice Quiz	1,2,3,4
Week 6 October 10	Lab Test requested (Tentative Oct 9 during lecture) Details to be posted on Quercus	
Week 6: October 17	1. Identification of Horizontal structures	5
October 16	Reading Week No Labs	
Week 7: October 24	<ol style="list-style-type: none"> 1. Rostral coronal sections 2. Caudal coronal sections 3. Bell ringer test returned 	6
Week 8: October 31	<ol style="list-style-type: none"> 1. Cerebellar coronal sections 2. Written Bell Ringer Test 	All
Week 9: November 7	Practice Bell Ringer test	All

Week 10: November 14	Lab Test Requested (tentative Nov 13) Time TBA	
Week 11: November 21	No labs	
Week 12: November 28	1. Pick-up Lab Test 2. Confirm final lab grade 3. Office hours for final lecture exam	

IMPORTANT POLICY NOTES:

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) 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) 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).

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) 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) **well in advance** of the missed work, detailing the dates and nature of the commitment.
- For **religious accommodations**, please email (keely.hicks@utoronto.ca) **well in advance** of the missed work.
- For circumstances **outside of these guidelines**, please email Keely (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) **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.uts.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.uts.utoronto.ca/registrar/missing-examination>)

If the procedure outlined above is followed, the instructor may permit the following accommodations:

Missed Midterm Lecture Test

There will be no make-up test. Your final lecture exam will be cumulative and count for 50% of your final grade in the course.

Missed Midterm Bell Ringer Lab Test

There will be no make-up test. Your final lab test will be valued at 40%.

Missed Written Bell Ringer Test

There will be no make-up test. The value of this quiz will be added to your final bell ringer ie: Your final bell ringer test will be valued at 30% instead of 25% of your final grade in the course.

Missed Final Bell Ringer Lab Test

A make-up test will be scheduled. Make-up tests may not follow the same format. The date and time of the make-up test will be posted to Quercus and will be conducted in Week 12. Your final Bellringer will be valued at 25% of your final grade in the course.

Missed Dissection Protocol Quizzes

There are no make-up quizzes. If you miss a quiz for any reason or arrive late to the lab a mark of zero will be assigned. The goal of these quizzes is to encourage you to be prepared for the weekly lab. You may only write the quiz in your assigned lab. All quizzes will be given at the start of the lab. Only your best 4 of 6 quiz marks will count towards your final grade in the course.

Missed Bonus Labs

There are no make ups for any bonus labs marks missed.

General information which you should be aware of:

The University of Toronto is dedicated to fostering an academic community in which the learning and scholarship of every member may flourish, with vigilant protection for individual human rights, and a resolute commitment to the principles of equal opportunity, equity and justice.

AccessAbility:

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](tel: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.

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.