Neuronal Organization Laboratory Syllabus

Department of Psychology and Neuroscience

PSYO/NESC 3371 Fall 2026

Dalhousie University operates in the unceded territories of the Mi'kmaw, Wolastoqey, and Peskotomuhkati Peoples. These sovereign nations hold inherent rights as the original peoples of these lands, and we each carry collective obligations under the Peace and Friendship Treaties. Section 35 of the Constitution Act, 1982, recognizes and affirms Aboriginal and Treaty rights in Canada.

We recognize that African Nova Scotians are a distinct people whose histories, legacies, and contributions have enriched the part of Mi'kma'ki known as Nova Scotia for over 400 years.

Course Instructor(s)

Name	Email	Office Hours
Janusz Borycz	jborycz@dal.ca	By appointment
Jolanta Borycz	jaborycz@dal.ca	By appointment

Course Description

Introduction to several laboratory techniques used in contemporary neuroscience. Students work under supervision individually or in groups of 2 or 3 in regular labs that introduce neuroanatomical analyses using the following: Golgi impregnation, immunocytochemistry, dye-tracing of connections, electron microscopy of the retina, and neurotransmitter determinations using HPLC.

Course Prerequisites

PSYO 2000.03 or NESC 2007.03, PSYO 2470.03/NESC 2470.03 and PSYO 2570.03/NESC 2570.03

Course Structure

Course Delivery

In-person lab class

Lectures

No lectures – lab only course

Laboratories

3-hour lab weekly; 2 separate sections (Mon 14:35-17:25; Wed 14:35-17:25) Location - Psychology 4245

Course Materials

No textbook(s) – the manual will be provided. Additional material e.g., Power Points, notes, demonstrations of lab procedures and pdf copies of scientific articles will be posted on Brightspace.

Assessment

Assessment	Percent of final grade	Date
In-lab Quiz 1	15%	Mon, Oct 19, Wed, Oct 21
Presentation 1	15%	Mon, Oct 26, Wed, Oct 28
In-lab Quiz 2	15%	Mon, Nov 30, Wed, Dec 2
Presentation 2	15%	Mon Dec 7, Wed, Dec 9
Final Exam	35%	TBA (exam period)
Attendance and work quality	5%	Ongoing

The In-lab quizzes will be 45 min long and contain about 20 questions. Presentations will be held in class during the following week. Each student will have 10 mins for the presentation, which will be followed by a 5 min discussion. The presentation grade will be judged based on presenting the results (50%) and ability to answer questions related to the subject (50%). Exceptions from presentation can be obtained and the student will write a full report instead (introduction, methods, results, and discussion) by the presentation due date. There are no alternative dates for quizzes and presentations.
Other course requirements:
Watching/reading material that will be posted on Brightspace is essential for writing in-lab quizzes, preparing the presentations as well as for writing the final exam.

Conversion of numerical grades to final letter grades follows the Dalhousie Grade Scale

A+ (90-100)	B+ (77-79)	C+ (65-69)	D (50-54)
A (85-89)	B (73-76)	C (60-64)	F (0-49)
A- (80-84)	B- (70-72)	C- (55-59)	

Course Policies on Missed or Late Academic Requirements

Obligatory are two in-lab quizzes, two presentations and a final exam. Without these components an "Incomplete" grade will be issued. **Only one of all lab classes can be missed** if the Declaration of Absence is sent no later than 24 hours from the beginning of missed lab. Missing more than one lab class will result in an ill or fail grade. There are no lab makeups.

Students who miss their presentation are required to submit the Student Declaration of Absence no later than 24 hours after their presentation time. They are required to write a full lab report instead. Students who miss the quiz will have the weight of that quiz transferred into the final exam. The deadline for reports will be decided in person on a case-by-case basis. There is a penalty for late report submission: 10% for the first day and 5% for each following day.

Missed final exam: Refer to the calendar.

Course Policies related to Academic Integrity

When collecting your data, you will frequently work in teams. However, the presentation should be done independently. Using generative AI (e.g., ChatGPT) is permitted when preparing your presentations but you should have a solid knowledge of material for answering the questions.

Learning Objectives

After completing the course, you should have a good knowledge of mammalian brain dissection and staining, retinal organization, structure of muscles and neuromuscular junctions. The skills you will develop include tissue dissection, fixing, labeling using histochemistry and immunohistochemistry methods, tissue sectioning, using different types of light and electron microscopes. The other skills include cell counting and mapping their distribution in the retina.

Course Content

Tentative Course Schedule (Fall 2026)

Class	Date	Topic
1-1	Wed, Sep 9 Mon, Sep 14	Introduction. Dissecting and fixing crayfish muscles, then adding Phalloidin-TRITC.
1-2	Wed, Sep 16 Mon, Sep 21	Applying Hoechst Blue to muscle preparation. Mounting, viewing, and photographing stained muscles.
1-3	Wed, Sep 23 Mon, Sep 28	Sheep brain topography and rough sectioning. Photographing and labelling areas of interest.
	Wed, Sep 30	**National Day of Truth and Reconciliation**, University closed
1-4	Mon, Oct 5 Wed, Oct 7	Sheep brain sectioning using the vibratome. Staining sheep CNS sections with lipid marker. Mounting sections on slides.
	Mon, Oct 12 Wed, Oct 14	**Thanksgiving**, No classes this week
1-5	Mon, Oct 19 Wed, Oct 21	**Quiz 1.** Observing and photographing stained brain sections under the microscope.
1-6	Mon, Oct 26 Wed, Oct 28	**Presentation 1**
2-1	Mon, Nov 2 Wed, Nov 4	Watching the video of dissection of the eye to make a retinal wholemount. Dissection of sheep's eye.
	Nov 9-13	**Fall Study Break – no classes**
2-2	Mon, Nov 16 Wed, Nov 18	Nissl staining of wholemount preparations dissected in previous week. Photographing the Golgi-stained retina cells.
2-3	Mon, Nov 23 Wed, Nov 25	Performing retinal cells count. Processing the pictures of semithin retina sections stained with toluidine blue.
2-4	Mon, Nov 30 Wed, Dec 2	**Quiz 2.** Drawing the ganglion cell density map and preparing figures for Presentation 2.
2-5	Mon, Dec 7 Wed, Dec 9	**Presentation 2**
	TBA	**Final Exam (exam period Dec 11-20)**

University Policies and Statements

Recognition of Mi'kmaq Territory

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel, and support. Visit or e-mail the Indigenous Student Centre at 1321 Edward St or elders@dal.ca. Additional information regarding Mi'kmaq and Indigenous Relations (including the Elders in Residence program, Land Acknowledgements, Understanding Our Roots, and much more) can be found at: https://www.dal.ca/about/mission-vision-values/mikmaq-indigenous-relations.html

Internationalization

At Dalhousie, 'thinking and acting globally' enhances the quality and impact of education, supporting learning that is "interdisciplinary, cross-cultural, global in reach, and orientated toward solving problems that extend across national borders." Additional internationalization information can be found at: https://www.dal.ca/about/mission-vision-values/global-relations.html

Academic Integrity

At Dalhousie University, we are guided in all our work by the values of academic integrity: honesty, trust, fairness, responsibility, and respect. As a student, you are required to demonstrate these values in all the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity. Additional academic integrity information can be found at: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility

The Student Accessibility Centre is Dalhousie's centre of expertise for matters related to student accessibility and accommodation. If there are aspects of the design, instruction, and/or experiences within this course (online or in-person) that result in barriers to your inclusion, please contact the Student Accessibility Centre (https://www.dal.ca/campus_life/academic-support/accessibility.html) for all courses offered by Dalhousie with the exception of Truro. For courses offered by the Faculty of Agriculture, please contact the Student Success Centre in Truro (https://www.dal.ca/campus_life/ssc.html).

Conduct in the Classroom – Culture of Respect

Substantial and constructive dialogue on challenging issues is an important part of academic inquiry and exchange. It requires willingness to listen and tolerance of opposing points of view. Consideration of individual differences and alternative viewpoints is required of all class members, towards each other, towards instructors, and towards guest speakers. While expressions of differing perspectives are welcome and encouraged, the words and language used should remain within acceptable bounds of civility and respect.

Diversity and Inclusion – Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness (Strategic Priority 5.2). Additional diversity and inclusion information can be found at: https://www.dal.ca/about/mission-vision-values/equity-diversity-inclusion-and-accessibility/about-office-equity-inclusion.html

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner - perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution. The full Code of Student Conduct can be found at: https://www.dal.ca/content/dam/www/about/leadership-and-governance/governing-bodies/code-student-conduct.pdf

Fair Dealing Policy

The Dalhousie University Fair Dealing Policy provides guidance for the limited use of copyright protected material without the risk of infringement and without having to seek the permission of copyright owners. It is intended to provide a balance between the rights of creators and the rights of users at Dalhousie. Additional information regarding the Fair Dealing Policy can be found at: https://www.dal.ca/content/dam/www/about/leadership-and-governance/university-policies/fair-dealing-policy.pdf

Student Use of Course Materials

Course materials are designed for use as part of this course at Dalhousie University and are the property of the instructor unless otherwise stated. Third party copyrighted materials (such as books, journal articles, music, videos, etc.) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law. Copying this course material for distribution (e.g. uploading to a commercial third-party website) may lead to a violation of Copyright law.

Student Resources

University Policies and Programs

Important Dates in the Academic Year (including add/drop dates): http://www.dal.ca/academics/important_dates.html

Classroom Recording Protocol: https://www.dal.ca/dept/university_secretariat/policies/academic/classroom-recording-protocol.html

Dalhousie Grading Practices Policies: https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html

Grade Appeal Process: https://www.dal.ca/campus_life/academic-support/grades-and-student-records/appealing-a-grade.html

Sexualized Violence Policy: https://www.dal.ca/dept/university_secretariat/policies/health-and-safety/sexualized-violence-policy.html

Scent-Free Program: https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html

Learning and Support Resources

General Academic Support – Advising (Halifax): https://www.dal.ca/campus_life/academic-support/advising.html

General Academic Support – Advising (Truro): https://www.dal.ca/about-dal/agricultural-campus/ssc/academic-support/advising.html

Student Health & Wellness Centre: https://www.dal.ca/campus_life/health-and-wellness.html

On Track (helps you transition into university, and supports you through your first year at Dalhousie and beyond): https://www.dal.ca/campus_life/academic-support/On-track.html

Indigenous Student Centre: https://www.dal.ca/campus_life/communities/indigenous.html

Indigenous Connection: https://www.dal.ca/about-dal/indigenous-connection.html

Elders-in-Residence (The Elders in Residence program provides students with access to First Nations elders for guidance, counsel, and support. Visit the office in the Indigenous Student Centre or contact the program at elders@dal.ca or 902-494-6803: https://cdn.dal.ca/content/dam/dalhousie/pdf/academics/UG/indigenous-studies/Elder-Protocol-July2018.pdf

Black Student Advising Centre: https://www.dal.ca/campus_life/communities/black-student-advising.html

International Centre: https://www.dal.ca/campus_life/international-centre.html

South House Sexual and Gender Resource Centre: https://southhousehalifax.ca/about/

LGBTQ2SIA+ Collaborative: https://www.dal.ca/dept/vpei/edia/education/community-specific-spaces/LGBTQ2SIA-collaborative.html

Dalhousie Libraries: http://libraries.dal.ca/

Copyright Office: https://libraries.dal.ca/services/copyright-office.html

Dalhousie Student Advocacy Services: https://www.dsu.ca/dsas?rq=student%20advocacy

Dalhousie Ombudsperson: https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html

Human Rights and Equity Services: https://www.dal.ca/dept/hres.html

Writing Centre: https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html

Study Skills/Tutoring: http://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html

Faculty of Science Advising Support: https://www.dal.ca/faculty/science/current-students/undergrad-students/degree-planning.html

Safety

Biosafety: http://www.dal.ca/dept/safety/programs-services/biosafety.html

Chemical Safety: https://www.dal.ca/dept/safety/programs-services/chemical-safety.html

Radiation Safety: http://www.dal.ca/dept/safety/programs-services/radiation-safety.html

Laser Safety: https://www.dal.ca/dept/safety/programs-services/radiation-safety/laser-safety.html