

Methods in Neurobiology Laboratory Syllabus

Department of Psychology and Neuroscience
PSYO/NESC 3370 Fall 2024

Dalhousie University acknowledges that we are in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq People and pays respect to the Indigenous knowledges held by the Mi'kmaq People, and to the wisdom of their Elders past and present. The Mi'kmaq People signed Peace and Friendship Treaties with the Crown, and section 35 of the Constitution Act, 1982 recognizes and affirms Aboriginal and Treaty rights. We are all Treaty people.

Dalhousie University also acknowledges the histories, contributions, and legacies of African Nova Scotians, who have been here for over 400 years.

Course Instructor and TA

| Name | Email | Office Hours |
|----------------|-----------------|--|
| Jolanta Borycz | jaborycz@dal.ca | Monday, 10:00 – 11:00 AM or by appointment |
| Brooke Cramer | bccramer@dal.ca | By appointment |

Course Description

Introduction to several neurophysiological techniques used in contemporary neuroscience, employing extracellular and intracellular electrical recording and stimulation methods on nervous system preparations, both sensory and motor. After introductory instruction, students in groups of 2 or 3 get to perform quite sophisticated practical experiments themselves, enabled by computer-based data acquisition.

Course Prerequisites

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

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>

Course Structure

Course Delivery

In-person lab class

Lectures

No lectures – lab only course

Laboratories

3-hour lab weekly; 2 separate sections (Tue 8:35-11:25 AM; Wed 2:35-5:25 PM) Location - Psychology P5269

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 and Presentation 1 | 10%+15% | Tue-Wed, Oct 1-2 |
| In-lab Quiz and Presentation 2 | 10%+15% | Tue-Wed, Nov 5-6 |
| Final Exam | 40% | TBA (exam period) |
| Attendance and work quality | 10% | Ongoing |

In-lab Quiz will be carried out before presentation and will contain 10-12 questions from the section presented. The questions will be of multiple choice, fill-in-the-gap, multi-select, true or false, matching and short answer type. The quiz time is 30 minutes.

Presentations will be held in class using the class monitor/projector. Each student will have 10 min for the presentation which will be followed by a 5 min (max) 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 presentations.

Other course requirements

Watching/reading of material that will be posted on Brightspace is essential for writing in-lab quizzes, preparing the presentation 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 and presentations and an 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 decreasing the final grade by 15% for each next lab. Classes are full so there is no possibility of making up the class on a different day of the week.

There is no makeup for presentations. Students who miss their presentation are required to submit the Student Declaration of Absence no later than 24 hours after their presentation time. Instead of presentation they are required to write a full lab report. The deadline for reports will be decided in person on a case-by-case basis. Forgetting to submit the Declaration of Absence will result in grade 0 assigned for that presentation. 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. The makeup for the final exam will be announced at a later date.

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 sheep brain, both the topography and microscopic observations which show the neuronal organization.

We will also dissect blowfly larva and stain the CNS for neuronal and glial markers.

The skills you will develop include tissue dissection, fixing, labeling using histochemistry and immunohistochemistry methods, tissue sectioning, using different types of microscopes.

Course Content

Tentative Course Schedule (Fall 2024)

| Class | Date | Topic |
|--------------|------------------------|---|
| 1-1 | Tue-Wed, Sep 3-4 | Introduction. Watching the video of dissecting insect larva. Dissecting and fixing larvae of <i>Lucilia sericata</i> . |
| 1-2 | Tue-Wed, Sep 10-11 | Staining larval fillet preparations with neuronal and glial markers and application of primary antibodies. |
| 1-3 | Tue-Wed, Sep 17-18 | Completing immunocytochemistry by adding secondary antibodies. Adult fly brain anatomy. |
| 1-4 | Tue-Wed, Sep 24-25 | Mounting, viewing, and photographing preps stained by immunocytochemistry. |
| 1-5 | Tue-Wed, Oct 1-2 | Quiz + Presentation 1 |
| 2-1 | Tue-Wed, Oct 8-9 | Sheep brain topography and rough sectioning. Photographing and labelling areas of interest. |
| 2-2 | Tue-Wed, Oct 15-16 | Sheep brain sectioning using the vibratome. Photographing and labelling areas of interest. |
| 2-3 | Tue-Wed, Oct 22-23 | Nissl staining of sheep brain sections followed by photographing them and analysis under the light microscope. |
| 2-4 | Tue-Wed, Oct 29-30 | Staining of sheep slices with lipid markers e.g. Sudan black. Observing the brain slices under the microscope and comparing with Nissl. |
| 2-5 | Tue-Wed, Nov 5-6 | Quiz + Presentation 2 |
| | Nov 11-15 | Fall Study Break – no classes |
| 3-1 | Tue-Wed, Nov 19-20 | Introduction to testing some basic human reflexes. |
| 3-2 | Tue-Wed, Nov 26-27 | Discussion and interpretation of results from previous week. Classes wrap-up. |
| | Tue, Dec 3 | Classes end |
| | To be announced | Final Exam (exam period Dec 6-17) |

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 the Indigenous Student Centre can be found at: https://www.dal.ca/campus_life/communities/indigenous.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-dal/internationalization.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/about-dal/agricultural-campus/student-success-centre.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: <http://www.dal.ca/cultureofrespect.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/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

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/dept/university_secretariat/policies/academic/fair-dealing-policy-.html

Originality Checking Software

The course instructor may use Dalhousie's approved originality checking software and Google to check the originality of any work submitted for credit, in accordance with the Student Submission of Assignments and Use of Originality Checking Software Policy. Students are free, without penalty of grade, to choose an alternative method of attesting to the authenticity of their work and must inform the instructor no later than the last day to add/drop classes of their intent to choose an alternate method. Additional information regarding Originality Checking Software can be found at:

https://www.dal.ca/dept/university_secretariat/policies/academic/student-submission-of-assignments-and-use-of-originality-checking-software-policy-.html

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.