**Faculty of Science Course Syllabus**

*NESC / PSYO 3165*

*Neuroethology*

*Fall term 2024*

**Instructor:** Dr. S. Adamo (sadamo@dal.ca) *Office hours*: *By appointment, LSC 3324*

**TA:** Dylan Miller (dy882407@dal.ca) *Office hours: by appointment*

**Class Times**: Tuesdays 2.35 pm – 5.25 pm LSC P5257

Note that attendance during labs is mandatory.

*Before emailing, please check the syllabus and Brightspace announcements to see if the information you are seeking is already posted.*

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**1. Course Description**

Neuroethology explores how assemblies of neurons work together to produce behaviour. We will examine this question in simpler invertebrate animals.

NOTES: Some experiments involve live invertebrates. Students are required to handle invertebrates during these labs. If you are uncomfortable handling invertebrates, this is not the class for you.

**2. Course Prerequisites**

Nesc2570.03/Psyo2570.03 and either Psyo2000.03 or Nesc2000.03 or Biol2020.03.

The best preparation for this class is cellular neuroscience (Nesc 2570) and high school physics

**3. Learning Outcomes**

* Learn how to observe behaviour to produce reliable measurements
* Learn how to record the electrical activity of neurons
* Learn proper invertebrate handling techniques
* Learn basic data analysis
* Learn basic robotics
* Improve your writing skills by learning how to organize information and data while preparing your lab reports.

**4. Course Materials**

Neurons in Action (Simulation program from Oxford University Press)

 **Must be purchased online from Oxford University Press**

See: <https://learninglink.oup.com/access/neurons-in-action-2#tag_all-resources>

Lab Manual - (electronic, found on course website)

Assigned readings and videos from the web.

**Students are required to provide a bound lab notebook.**

**Brightspace**: This site will be used for making announcements regarding the class, posting grades and the lab manual, etc. You are expected to check the class web page regularly for information updates. *If you have difficulties accessing or using Brightspace, please contact the help desk.*

**5. Course Organization**

**5.1 Labs:**

**1. Computer simulations**

Use computer simulations to study neural function

**2. Neuroethology.**

Learn how to quantify behaviour

Record electrical potentials from the nervous system of an Earthworm

**3. Robotics**

 Use robots to understand the problems nervous systems must solve

**5.2 Course Schedule:**

Sept. 3: Lab introduction and Lecture 1 (Principles of Neuroethology)

Sept. 10: Lecture 2 (How to Observe Behaviour+Basic Data Analysis) + Outdoor Lab

Sept. 17. Lecture 3 (Electrophysiology Lecture) - virtual

Sept. 24: Earthworm 1

Oct. 1: Earthworm 2 (Planning session)

Oct. 8: Earthworm 2 (Experiments)

Oct. 15: Neurons in Action 1

Oct. 22. Lecture 4 – Neural Circuits and Connectomes. Robotics Assignment.

Oct. 29. Neurons in Action 2. Robotics Assignment Due.

Nov. 5: Robotics (Group A)

Nov. 19: Robotics (Group B)

Nov. 26 (Group A)/Dec. 3 (Group B): Robotics Report Due

*NB*: No final exam

**5.3 Course Due Dates:**

Sept. 10. Behavioural Data Graph(s)

Sept. 24: Quiz 1 due (by noon)

Oct. 8. Earthworm 1 Report Due

Oct. 22: Earthworm 2 Report Due

Oct. 29: Robotics Assignment Due

Nov. 5. Neurons in Action 1 Problem Set due.

Nov. 5(A)/19(B). Quiz 2 due (by noon)

Nov. 19. Neurons in Action 2 Problem Set Due

Nov. 26: Robotics Lab Report Due (Group A)

Dec. 3: Robotics Lab Report Due (Group B)

***NB*: No final exam**

**6. Course Grading Scheme**

5% Quiz 1 (on-line multiple choice) Sept. 24

5% Quiz 2 (on-line multiple choice) Nov 5 (Group A)/Nov 19 (Group B)

10% Behavioural Data Graph(s) Sept. 10

10% Earthworm 1 Lab Report Oct. 8

15% Earthworm 2 Lab Report Oct. 22

10% Robotics Assignment 1 Oct. 29

10% Neurons in Action Problem Set 1 Nov. 5

10% Neurons in Action Problem Set 2 Nov. 19

15% Robotics Lab Report Nov. 26 (Group A)/Dec 3 (Group B)

10% Lab Skills

Students must obtain 70% or better on Quizzes to participate in the associated lab.

**6.1 Lab Report Grading Scheme**

Introduction 2/10

Methods 1/10

Results 2/10

Discussion 3/10

Conclusions 1/10

References 1/10

Please see class website (contents section) for a discussion of what is expected in each section of the lab report.

Labs can be submitted electronically or as a hard copy.

* 1. **Missed Lab Policy**

Missing a lab period requires a declaration of absence form. Regardless of the reason for the absence, the lab report for that lab must still be written up. Under these circumstances, students will be allowed to borrow results from another student or from the TA.

There are no make-up labs.

* 1. **Missed Quizzes**

To ensure proper handling of the earthworms, students cannot participate in Earthworm 1 and 2 without completing the Quiz 1. To ensure safe use of the robots, students cannot participate in the robotics lab without completing Quiz 2. The quizzes, based on the lab manual, will be opened at the start of class, giving students multiple weeks to complete the on-line quizzes. Labs missed due to an incomplete quiz will result in a 2 mark deduction from the Lab Skills mark (for each lab missed, to a maximum of 5 marks) and a 0 on the quiz. The student will need to borrow data to write up the lab they missed.

**6.4 Late Labs Reports and Neurons in Action problem sets.**

Students have 3 days after the due date to hand in lab reports without penalty. Late penalties are 2% per day for the first 5 days after the grace period, then 1% per day thereafter to a maximum of 25%. Late lab reports will be accepted until the end of the first week of final exams for the fall term.

Students have 3 days after the due date to hand in their Neurons in Action problem sets without penalty. Late penalties are 2% per day. Answers will be posted 2 weeks after the problem set due date – late problem sets cannot be accepted after the answers are posted.

**6.5 Lab Skills Mark**

 The Lab Skills mark will be determined by weekly performance during the lab class. Students will be graded for organization and completeness of their lab notebook, data collection, ability to focus during the lab, and technical skill.

**6.6 Course Grading Scheme**

**Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale**

 **A+** (90-100) **B+** (77-79) **C+** (65-69) **D** (50-54)

 **A** (85-89) **B** (73-76) **C** (60-64) **F** (<50)

 **A-** (80-84) **B-** (70-72) **C-** (55-59)

**7. Course Policies**

**7.1 Recording Lectures**

Students must seek permission from the instructor before recording any portion of a lecture or lab in any format - audio, audio-visual, visual, transcription, etc. Even if permission is given, under no circumstances are such recordings to be shared, posted online, or distributed in any other way; recordings must be destroyed by the end of term. Permission to record lectures/labs will generally only be granted in cases of documented disability that explicitly requires this form of assistance.

**7.2 Distributing Course Materials**

Students do not have permission to revise, modify, share, post on-line, or redistribute in any manner - electronic or otherwise - any of the lecture or lab materials.

**7.3 Texting/Email During Labs**

* Students sometimes don't realize how distracting their texting/E-mailing can be to those around them. You are requested to put away your phones, turning off your email, etc. during the lectures and labs. The labs, in particular, require your complete attention.
* Because of animal care regulations and safety concerns, students who are distracted by electronics during the lab will be asked to leave. Students who are asked to leave will be required to make an appointment to meet with me in person before being allowed to resume lab attendance. Missed labs for this reason will result in a loss of marks for lab participation.

**7.5 Academic Integrity**

* Students are expected to work independently on their assignments, unless they are told explicitly that they can work together as part of a group. Otherwise, the assignments should be entirely the student’s own work (e.g. the use of large language models is not allowed).

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| Conversion of numerical grades to final letter grades follows the [Dalhousie Grade Scale](https://www.dal.ca/campus_life/academic-support/grades-and-student-records/grade-scale-and-definitions.html) |
| 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) |  |
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University Policies and Statements

*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, and the many other cultures that have contributed to Nova Scotia.*

**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/about/leadership-governance/academic-integrity/faculty-resources/ouriginal-plagiarism-detection.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.

Student Resources and Support

**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>

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>