

Dalhousie Science Scholars & Leaders: Becoming a Scientist I & II

BIOL/SCIE 2111 & 2112
(Fall 2023 & Winter 2024)
Department of Biology

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

| Name | Email | Office Hours |
|---------------------|--------------------|---|
| Joseph P. Bielawski | j.bielawski@dal.ca | LSC 7056, by appointment unless specified otherwise |

Course Description

This course examines the structure of science and situates science majors in the context of the scientific process. The course de-mystifies the language and culture of science. Students will develop skills to help them progress towards a science career. The course also explores the translation of science to society.

Course Prerequisites: Successful admission to the Dalhousie Science Scholars & Leaders program, or permission of the course instructor.

Additional information: www.sciencescholars.info

Course Materials & Student Resources

There is no required textbook for this course. Lecture notes will be provided on **Brightspace**. In addition, key scientific papers and popular media articles relevant to the lecture material will be posted on-line. Students are advised to download these materials and read them in preparation for each lecture.

Course communication: Drop-in office hours will be posted on the first day of class. Please check Brightspace for updates, as depending on schedules and technology, the details for office hours might change. The posted "drop in" office hours may be held in person, or in Microsoft Teams; meetings will be private, and students may have to wait in the "Teams lobby" for a turn. As an alternative, students can make an appointment for a meeting at another time. General course communication will be made via Brightspace announcements and e-mail, depending on need.

Course Structure

| | |
|-------------------------|--|
| Course delivery: | In-person |
| Lectures: | 2:35 - 3:55, LSC Room C216, Friday (Fall and Winter terms) |
| Laboratories: | none |
| Tutorials: | none |

Assessment

This course will be graded on a **Pass/Fail** basis. The grade of Pass or Fail will be based in part on your completion of and *satisfactory performance in all of the assigned exercises* (details presented in class for each assignment). Attendance is also required, and both attendance and participation will be recorded.

"Satisfactory" status requires meeting the evaluation criteria below:

1. Complete all of the exercises to the standard defined for each exercise.
2. Have no more than two (2) "unexcused/no-contact" absences during the semester

Other course requirements:

1. The course requires attendance of *up to* 3 evening workshops in each of the Fall and Winter terms.
2. The course requires meaningful contribution to a group social media project that supports and advances historically excluded and underrepresented students in STEM (details will be provided in class)
3. Attend an advisory meeting with the course instructor at least once per term

Course Policies on Missed or Late Academic Requirements

"Satisfactory" status requires meeting the evaluation criteria below:

1. Complete all of the exercises or required activities to the standard defined for each.
2. Have no more than two (2) "unexcused/no-contact" absences during the semester

Requests for an alternative assessment due to extenuating circumstances: A student requesting an alternative time, or deadline, for an exercise or required activity will be granted that request in exceptional circumstances where notification is provided at least **1 week prior to the start of the exam**. Elective arrangements (such as travel plans) are **NOT** considered acceptable grounds for granting an alternative assessment or activity.

Special arrangements for missed exams due to illness or other exceptional circumstances: Alternate arrangements will be considered provided that a student who misses class work or a required activity because of illness/medical reason:

1. Notifies the Instructor prior to, or on, the day in question
2. Completes the Student Declaration of Absence, and/or provides other appropriate supporting documentation within three (3) days following the last day of absence. An SDA can be used once per term for absences of 3 days or less only. For more info https://www.dal.ca/dept/university_secretariat/policies/academic/missed-or-late-academic-requirements-due-to-student-absence.html.
3. For absences of 4 days or longer, students cannot submit a Student Declaration of Absence Form. Please contact the Instructor. Absences of 5 days or longer will require a physicians note.

N.B. - The decision on when special arrangements can be made, and the form of those arrangements, will be at the discretion of the instructor.

Course Policies related to Academic Integrity

CLASS CODE OF CONDUCT: We expect all classroom participants to treat each other with dignity and to conduct themselves in a proper and professional manner. Harassment and sexist, racist, homophobic, or exclusionary jokes or comments will not be tolerated.

Course Objectives & Learning Outcomes

- Explore the culture and practice of science.
- Learn about the diversity of pathways and careers in science.
- Learn about pro-social community science, and the elements of effective community outreach.
- Develop a conceptual and factual understanding of science programs and experiential learning opportunities at Dalhousie University.
- Plan and develop academic goals, set milestones, and make informed choices regarding your science major and career.
- Learn how to express and document your achievements within your CV/resume and a skills portfolio.
- Identify strategies to improve your performance in science courses.
- Learn peer-to-peer mentoring techniques that will enhance your success (and your peer's) in science courses.
- Develop your communication skills.
- Become a more effective participant in the scholarly community at Dalhousie.
- Learn strategies to increase your happiness as a science student and build more productive academic habits
- Learn to integrate the university experience with other aspects of your non-academic life.

Course Content

On the following page is an outline of the lecture topics delivered over the FALL and WINTER terms within seven modules. The outline provides an approximate (tentative) schedule of the lecture delivery. A full course schedule with both lecture and exam dates will be provided in the first week of class (posted on Brightspace). **Note that all schedules are tentative and subject to change, so please re-check the course schedule on Brightspace throughout the term for updates and changes.**

Course Outline

1. Background & Historical context (Fall)

- History & brief introduction to philosophy of science
- Diversity & the future of science
- STEM culture at Dalhousie and beyond
- Social context of science (people of colour & climate change, developing nations, etc.)

2. Science as a process (Fall)

- What is science? Different ways of knowing (e.g., “two-eyed seeing”).
- Essentialism vs. population thinking (and its effects on society)
- Hypothesis testing: “cartoons” vs reality
- Reading science texts (formal structures; e.g., Meyer & Poon, 2001)
- Vetting sources of data/information
- Peer review
- Best practices for “Open Science”
- Science translation & impact: education, policy, medicine & beyond

3. Personal goals and development (Fall and Winter)

- Personal statements
- CV/Resume; skills portfolio; personal website
- Modes of science communication, and science communication skills
- Networking and conferences
- Interacting with profs & grad students; How to request reference letters
- “Working smart”

- Stress management, happiness, and the science of well-being (*i.e., how to increase your own happiness as a student and build more productive habits*)

4. Diversity & the future of science (Fall and Winter)

- Reflections on personal progress
- Staying engaged and supporting the community through science outreach

5. STEM careers and research (Winter)

- Overview & example science contributions in society
- Graduate school and other pathways into science
- Personal success stories

6. Science in the news (Winter)

- Science in mainstream media & social media
- Intellectual honesty & accurate reporting
- Sensationalizing & politicising science
- Spotting fake science news and post hoc rationalizations
- Elements of good popular science writing

7. Undergraduate science at Dalhousie (Winter)

- Overview of undergraduate research
- STEM resources & support at Dalhousie (including career planning)
- Experiential learning: courses, volunteering, fieldwork
- Certificate programs
- NSERC USRA: Why, when & how?
- Honours programs

All course content will be distributed as slides and notes in PDF format via the course website.

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.