

Faculty of Science Course Syllabus
Department of Biochemistry & Molecular Biology
Laboratory Research Techniques in Biomedical Sciences
BIOC 4501
Fall 2026

*Dalhousie University is located in Mi'kma'ki, the ancestral and unceded territory of the
Mi'kmaq. We are all Treaty people.*

*We acknowledge the histories, contributions, and legacies of the African Nova Scotian
people and communities who have been here for over 400 years.*

Instructor(s):	Dr. Marignani, paola.marignani@dal.ca X: @pmarignani
Lectures:	Tuesday and Thursday at 10:05- 11:25 a.m.
Location:	Tupper Medical Building, Rm 3H
Laboratories:	N/A
Tutorials:	N/A
Course delivery:	In person and asynchronous self-study (no recordings)

Course Description

This course covers fundamental principles of biotechnology from a medical perspective. Relevant topics are discussed, Ethics in research, artificial intelligence in biomedical research and medicine, such as gene silencing technology, fundamental signal transduction, production of transgenic mouse models, single cell transcriptomics in biological sciences

Course Prerequisites

BIOC 3400.03 or instructor's permission.

Course Exclusions

N/A

Learning Objectives

Technologies that facilitate the identification of disease processes are rapidly moving fields of science. The course provides a combination of fundamental knowledge and cutting-edge developments along with consideration of ethical, and legal aspects of biotechnology endeavors.

Course Materials

There is no textbook purchase required for this course. Study materials (PDF lecture notes) will be provided on Brightspace. Emails will be responded to between the hours of 9 am -4:30 pm, Monday to Friday. Please allow 24 hours from the time you email for a response.

Course Assessment

Evaluation will include the following components:

Component	Weight (% of final mark) for BIOC 4501	Date
MCQ Exam #1	30%	October 6, 2026
Oral Exam #2	20%	November 3,5, 2026
Essay	30%	November 26, 2026
Graduate Student Presentations	na	December 1, 3 2026
MCQ Exam #3	20%	December 8, 2026

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)		

Course Policies (General, Regarding Missed or Late Academic Requirements and Regarding Academic Integrity)

Multiple Choice Question Exams

- The **two MCQ exams** will cover material from the lectures and graduate student presentations. The questions will be taken directly from the PowerPoint presentations.
- If a student is unable to complete an exam at the scheduled time due to illness or for other valid reasons*, the student must submit a **Student Declaration of Absence** form (available on Brightspace) either electronically or in printed form within 3 days of the event. A maximum of 1 declarations of absence will be accepted per student.
 - The student will be able to write the exam at a time and date suitable to both the student and Dr. Marignani. Students will only be able to make-up one MCQ exam.
 - Missed exams will be scored with a zero grade, no exceptions.

***Travel for holidays and/or leisure will not be accommodated. Do not schedule holidays or events during exam dates. A score of 0% will be issued. In the event of direct family death, provide letter from hospital/coroner or funeral home.**

Oral Exam

- The **Oral exam** requires two different dates to assess students' knowledge of topics presented in class between October 8-Oct 29. November 3rd and November 5th have been allocated for the exam. At the start of the class on October 22nd, the exam time slots will be randomly selected. For each time slot, eight-ten students will be examined sequentially. In the event there are less than 10 students in the class, the second date with a lecture.
- October 22th, 2026, students will be provided with a list of possible questions for the oral exam. On the day of the exam, each student will randomly select one question from which they will be examined.
- The oral exams will be recorded to ensure accuracy of assessment. Acknowledgement of recording will be documented. Recordings will not be shared with other students and will be deleted at the end of term
- Each **student** will have 15 minutes to answer one question they randomly selected at the start of the exam. They will be able to use a whiteboard to facilitate their answer.
- No questions will be repeated; thus, each student will get a unique question.
- Questions will be derived directly from the lecture PowerPoint notes.
- **Graduate students** will have 20 minutes to answer questions and will be expected to provide significantly more detail.
 - There will be **no food allowed** in the classroom during this course. If a student has food, it must be stored in a backpack or other suitable case. Water and covered beverages may be brought into the classroom.

Course content

Course material will be covered in the classroom. The Brightspace learning environment will be used to upload PowerPoint lecture slide decks just prior to class. Students are encouraged to read materials related to topics prior to lecture.

In all, the course will involve several components.

1. **Lectures:** There will be lectures at 10:05 a.m. on Tuesdays and Thursdays. Some will involve substantial student participation including discussions, debates, presentations, etc.
2. **Self-study:** For self-study, students are expected to use the lecture time slot to give students the opportunity to study the material at their own pace.
3. **Communication and assistance:** Appointments for consultation can be set up by email and these can be held in person or by MS Teams. Any appointment, whether in -person or via Teams will be arranged within regular working hours (9 am to 4:30 pm, Monday to Friday).

Course schedule:

BIOC 4501/5501 Fall 2026		
Date	Lecturer	Topic
Sept 8	PM	Overview of course
10	PM	Proteomics and Metabolomics
15	PM	Self- Study; Polymerase chain reaction
17	PM	Self-Study; Transcriptomics
22	PM	Gene-editing I - mouse models Discuss short-list of student-directed lecture requests (select 3)
24	PM	Gene Editing II- CRISPR-Cas9
29	PM	Open for student-directed lecture request
Oct_1	PM	Open for student-directed lecture request
6	PM	MCQ
8	PM	Ethics-Cell lines
13	PM	Ethics-Animal Ethics
15	PM	Ethics-Indigenous People
20	PM	Multomics Integration and Computational Pathology
22	PM	Cancer Metabolism and Radiogenomics Hand out Oral exam questions and Time slots
27	PM	Treatment Response Prediction, drug discovery and Nanomedicine
29	PM	Neurodegenerative Early Detection and Neuroimaging
03-Nov	PM	Oral Exam
5	PM	Oral Exam
17	JK	Transcriptome-Single Cell microfluidics
19	JK	Basic ML platforms for scRNA seq analysis
24	JK	Practical Application for scRNAseq in cancer
26	PM	Open for student-directed lecture request Undergraduate Student Essay due date
Dec_1	PM	Grad Student presentations
3	PM	Grad Student presentations
8	PM	MCQ

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University Policies and Statements

This course is governed by the academic rules and regulations set forth in the University Calendar and by Senate

Academic Integrity

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of 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.

Information: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility

The Advising and Access Services Centre is Dalhousie's centre of expertise for student accessibility and accommodation. The advising team works with students who request accommodation as a result of a disability, religious obligation, or any barrier related to any other characteristic protected under Human Rights legislation (Canada and Nova Scotia).

Information: https://www.dal.ca/campus_life/academic-support/accessibility.html

Student Recording of Lectures

Students are not permitted to record professors lecturing, not videotaping. Permission must be granted by the Professor.

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.

Code: https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

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

Statement: <http://www.dal.ca/cultureofrespect.html>

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 (1321 Edward St) (elders@dal.ca).

Information: https://www.dal.ca/campus_life/communities/indigenous.html

Important Dates in the Academic Year (including add/drop dates)

<https://academiccalendar.dal.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=117&chapterid=-1&topicgroupid=31821&loaduseredits=False>

University Grading Practices

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

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Student Resources and Support

Advising

General Advising https://www.dal.ca/campus_life/academic-support/advising.html

Science Program Advisors: <https://www.dal.ca/faculty/science/current-students/undergrad-students/degree-planning.html>

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

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

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

Academic supports

Library: <https://libraries.dal.ca/>

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

Studying for Success: https://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html

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

Fair Dealing Guidelines <https://libraries.dal.ca/services/copyright-office/fair-dealing.html>

Other supports and services

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

Student Advocacy: <https://dsu.ca/dsas>

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

Safety

Biosafety: <https://www.dal.ca/dept/safety/programs-services/biosafety.html>

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

Radiation Safety: <https://www.dal.ca/dept/safety/programs-services/radiation-safety.html>

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