

Faculty of Science Course Syllabus
Department of Biochemistry & Molecular Biology
Laboratory Research Techniques in Biomedical Sciences
BIOC 4501 & 5501
Fall 2023

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. Paola A. Marignani, pmarigna@dal.ca Twitter: @pmarignani
Lectures:	Tuesday and Thursday at 10:05- 11:25 a.m. Collaborative Health Education Building, C266.
Laboratories:	N/A
Tutorials:	N/A
Course delivery:	In person

Course Description

This course covers fundamental principles of biotechnology from a medical perspective. Relevant topics are discussed, such as gene silencing technology, fundamental signal transduction, production of transgenic mouse models, single cell transcriptomics, and machine learning 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	Weight (% of final mark) for BIOC 5501	Date
MCQ	40%	40%	October 5, 2023
Oral Exam	20%	30%	October 26-31, 2023 15 minutes/UG 30 minutes/Grad
Undergrad Presentations	20% (15% Dr. Marignani, 5% class evaluation)	10% (8% Dr. Marignani, 2% class evaluation)	November 2, 7, 9, 2023 November 28, 30, 2023
MCQ	20%	20%	December 5, 2023

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)

- The **two MCQ exams** will cover material from the lectures and 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.

The **Oral exam**, requires two different dates to assess students' knowledge of topics presents in class. October 26 and October 31 have been allocated for the exam. At the start of the class on September 26th 2023, oral exam time slots will be randomly allocated. For each time slot, five-six students will be examined simultaneously.

- October 19th, 2023, 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 by a notetaker and tape recorder to ensure accuracy of assessment. Video recording will be deleted at the end of term. Please see University Policy for recordings.
 - Each student will have 15 minutes to answer one question. 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 30 minutes to answer questions and will be expected to provide significantly more detail.
- **Travel for holidays and/or leisure will not be accommodated.**
 - 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. **Independent study:** In addition to lecture attendance, this course will require diligent independent study of the material in order to develop broadly based and in-depth knowledge of the methods and concepts covered. There are no books associated with this course. Please access [PubMed](#) directly.
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: All lectures will be held in the CHEB 266

BIOC 4501 Fall 2023		
Date	Lecturer	Topic
Sept 5	PM	Overview of course and ask students to identify tech topics they want to learn about (for Oct 10, 2023 lecture).
7	MB	Gene silencing overview (shRNA)
12	MB	CRISPR History/Controversy
14	PM	Polymerase chain reaction
19	PM	Transcriptomics
21	PM	Proteomics
26	PM	Principles of Signal Transduction I- Domains and Kinases; Select time slots for Oral exam
28	PM	Principles of Signal Transduction II-Tumour Suppressors and Oncogenes
Oct 3	PM	Principles of Sign Transduction III- Cytoskeleton and Metastasis
5	PM	EXAM #1 MCQ 40% of final grade (8 Lectures-70 questions)
10	PM	Student-selected topics of interest
12	PM	Student-selected topics of interest or Science Communication (SciComm)
17	PM	Ethics in Biomedical research (animal and human)
19	PM	Artificial intelligence 101
24	PM	Interface between humans and AI in biological sciences and healthcare
26	PM	EXAM #2 Oral 20 % of final grade (UG), 30% of final grade (Grad) (5 Lectures)
31	PM	EXAM #2 Oral 20 % of final grade (UG), 30% of final grade (Grad) (5 Lectures)
Nov 2	Class pres	Student presentatons 12 minute presentations with 3 minutes questions; up to 5 students per class
7	Class pres	-up to 5 students per class
9	Class pres	-up to 5 students per class
21	JK	Transcriptome-Single Cell microfluidics
23	JK	Basic ML platforms for scRNA seq analysis
28	Class pres	Student presentatons 12 minute presentations with 3 minutes questions; up to 5 students per class
30	Class pres	-up to 5 undergradsstudents per class
Dec 5	PM	EXAM #3 MCQ 20% of final grade (7 lectures-60 questions)

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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 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>

Dalhousie COVID-19 information and updates: <https://www.dal.ca/covid-19-information-and-updates.html>

Class Recording Protocol

Class recording can be a valuable teaching and learning tool. Instructors may choose to record class activities. Students who have received prior written permission from the instructor or with an approved Accommodation Plan in place can also make a recording for personal use.

Whether it is instructor or student initiated class recording, it is important to protect intellectual property and maintain the privacy rights of individuals. The following Protocol governs the use of class recordings by instructors and students. The creation of class recordings by instructors is supported by Instructional Technologists in Academic Technology Services (ATS), a unit within the Dalhousie Libraries. Supporting guidelines have been developed by the Centre for Learning & Teaching and ATS.

Definitions

- Class recordings refers to the recording of in person or online, live class lectures and activities.
 - Class recordings may include a combination of any or all of these: 1) audio of instructor or students, 2) data projected on the screen, and/or 3) video of the instructor or students.

Protocol for Instructor-Initiated Recording

Intellectual Property and Permissions

1. The class recording is treated as the intellectual property of the instructor as outlined in Article 23.04 in the Collective Agreement between the Dalhousie Board of Governors and the Dalhousie Faculty Association. This principle applies to other speakers and presenters including students.
2. For the reuse or repurposing of a class recording, the instructor and other presenters must provide written permission, except where the instructor has given contractual permission in advance to the department or Faculty.
3. It is the instructor's responsibility to ensure that any third-party intellectual property is used in accordance with the terms of the license governing the use of such intellectual property and applicable intellectual property laws. To learn more, please consult the Dalhousie Library's Copyright Office website: <https://libraries.dal.ca/services/copyright-office.html>.
4. Consent to be recorded must be obtained from all guest lecturers; confirming their consent via e-mail is adequate.

Storage and Distribution

1. Class recordings should be recorded and stored using a Dalhousie supported tools (including Panopto recordings, MS Teams recordings, and Brightspace).
2. Class recordings must be stored in a password protected environment, accessed through Dalhousie's tools or systems, accessible only by those students enrolled in the course and only for the duration of the course or future courses of the same subject. With the written permission of the instructor, class recordings may be

shared with other sections of the same course and with instructors teaching in subsequent years. If class recordings include student names, images, or voice, students will need to be notified in the syllabus at the beginning of class if the recordings will be used in other sections or in subsequent years.

3. The instructor (or designate), with the written consent of other presenters, may share class recordings outside the password-protected environment. Before sharing for other purposes, including purposes that could result in a profit for the presenter, all proprietary, confidential and personally identifiable information must be removed from the class recording. To learn more about copyright compliance, please consult Dalhousie's Fair Dealing Guidelines:
<https://libraries.dal.ca/services/copyright-office/guidelines/fair-dealing-guidelines.html>.

Student Implications

1. Students must be notified in the course syllabus if lectures and other course activities will be recorded, including recordings of students for learning or assessment purposes. For more details, please consult Dalhousie's Syllabus Policy:
https://www.dal.ca/dept/university_secretariat/policies/academic/syllabus-policy.html.
2. Students shall be permitted to request that portions of the recording containing their voice or other identifiable information be edited out of the version loaded to the learning management system or other Dalhousie tools. Upon request by the instructor, editing services are provided by ATS.
3. Video recording devices in physical classrooms and other learning environments must be directed toward the presenter, and not focused on students or other audience members, unless recording the entire learning space is required for the learning environment. In an online environment, participants have the option to turn off their camera and/or audio.
4. The instructor should be mindful of the recording while lecturing and discourage the verbal or visual disclosure of sensitive personal information such as full names, which might be captured unintentionally in the class recording. In an online recording full names of individuals are automatically displayed. If being shared for other purposes outside of the class for which it was recorded names can be blurred.

Analytics

1. The content of the class recordings, including their viewing statistics and ratings, cannot be required to be used as a tool for formal evaluation of the instructor.
2. Data about student use of the class recordings collected through Dalhousie supported tools should be accessed and used only by authorized users, in connection with assigned duties and consistent with the course syllabus and other applicable Dalhousie policies. This does not preclude the use of this data by the instructor for research within the Scholarship of Teaching and Learning, with ethics approval as documented in the Policy on the Ethical Conduct of Research Involving Humans:
https://www.dal.ca/dept/university_secretariat/policies/human-rights---equity/ethical-conduct-of-research-involving-humans-policy.html?cq_ck=1391184251453.html

Protocol for Student-initiated Class Recording

1. When a student has permission to create a class recording, or the instructor is creating the recording on a student's behalf, then:
 - a. the instructor must notify all other students and guests in the course (preferably well before the recorded course) that the event is being recorded for personal academic uses only;
 - b. the instructor should not disclose for whom the recording is being made in order to protect the privacy of the individual for whom the recording is being made;
 - c. if a student or guest wants to take steps to protect their privacy, and does not want to be recorded, the instructor must provide the individual(s) with an alternate means of participating and asking questions (e.g. by email, during office hours, or passing written notes with questions).
2. All permitted class recordings made by students are for personal academic use only. Students may not distribute or display class recordings, in full or in part, to anyone inside or outside of the course (including other students) without additional written permission from the instructor and any other presenters. Students shall not be permitted to make copies of the stored class recordings for any purpose. This includes posting to the internet or any social media or other location or on any device to which electronic/digital access can be obtained by any other person.
3. Depending on the nature of any violation of this Protocol, further action may be taken involving the Dalhousie Code of Student Conduct: https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html, the Policy on Academic Honesty https://www.dal.ca/dept/university_secretariat/academic-integrity/academic-policies.html, or any other relevant disciplinary policies.

Please direct any questions to:

Donna Bourne-Tyson
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