Marine Plants in the 21st Century Syllabus

Department of Biology

MARI 4215/5215 Winter 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(s)

Name	Email	Office Hours
Heike Lotze (Instructor)	Heike.Lotze@dal.ca	After class or by appointment
Reid Sutherland (TA)	Reid.Sutherland@dal.ca	After class or by appointment

Course Description

This course focuses on the growing importance of habitat-forming marine plants, including mangroves, saltmarshes, seagrass meadows, kelp forests and other seaweed beds. We cover issues around wild harvesting, aquaculture, blue carbon storage, bioprospecting, habitat restoration, ecosystem-based management, conservation efforts, and climate change. Class format includes overview lectures, case-studies, discussions, and interactive work.

Course Prerequisites for undergraduate students

BIOL 2060.03 and OCEA 2000X/Y.06 (or OCEA 2001.03 and OCEA 2002.03) and two of any of the following: MARI/BIOL 3063.03 or BIOL 3065.03 or MARI/BIOL 3221.03 or MARI 3602.03 or MARI/BIOL/ENVS 3623.03 or MARI/BIOL/ENVS 3664.03 or BIOL/MARI 3761.03.

Course Prerequisites for graduate students

None.

Course Exclusions

For graduate students only: MARI 4215

Student Resources

All necessary information for this course will be posted on Brightspace:

Homepage - MARI4215 MARI5215 - Marine Plants 21-century - Sec: 01 - 2023/2024 Winter (brightspace.com)

Please read the Class Schedule and this Course Syllabus before the first class.

See also the Faculty of Science "Student Resources and Support" section below (page 8-12).

Course Structure

Course Delivery

Lectures & Tutorials will be in-person and often interactive and interspersed, thus in-class attendance is required for the entire 1.5-hour sessions:

- Attendance is required, sessions will not be recorded.
- Lecture slides will be posted as pdfs on Brightspace after each session.
- For some Tutorials, students will need to prepare activities beforehand, which will be announced and posted ahead of time.
- Assignments and their instructions will be introduced in class and posted on Brightspace.

Contact with instructors and TA:

- There is time after each session to ask questions in-person.
- Use the discussion board on Brightspace to ask questions.
- Email us with any other questions or concerns, or to schedule an individual meeting.

Lectures & Tutorials

Tuesdays & Thursdays: 14:35-15:55, Killam Room 2622

Course Materials

All relevant materials and information will be posted and can be accessed via Brightspace website: Homepage - MARI4215 MARI5215 - Marine Plants 21-century - Sec: 01 - 2023/2024 Winter (brightspace.com)

There is no textbook. All lecture slides will be available as pdf files that can be accessed on any laptop or personal computer.

Scientific literature to be reviewed can be accessed via the Killam library.

Assessment

Assignments

To account for different knowledge levels of undergraduate and graduate students but have all contribute similarly to the various lecture and tutorial components, we will have different major assignments for each group (mini-lecture on case study vs overview lecture), yet similar contributions to common components (discussions, exams).

MAJOR COURSE ASSIGNMENT for Undergraduate Class:

Undergraduate students will review the current literature and applied issues for a selected case-study, that will be limited in scope: e.g. a certain species, topic, and location, and then prepare:

(1) a **15 minutes Mini-Lecture** to present the case study to the class, including an introduction of the background, methods used, main results, and a discussion of its implications, knowledge gaps and next steps;
(2) up to **3 questions for a guided class discussion** to engage critical thinking and evaluating the topics importance for science and society, which can cover knowledge gaps, next steps, and management, conservation or policy issues.
(3) a brief 2-page (max) **written critical evaluation** of the main issues around the case-study that should inform decision makers about management or conservation issues, knowledge gaps and next steps (this can be part of the lecture).

Each week in the tutorial section, we will cover 2-3 case studies that align with the topic of the overview lecture (see Content below), so each student will be assigned a pre-defined date for presenting. The assignments will be graded according to the below rubrics.

MAJOR COURSE ASSIGNMENT for Graduate Class:

Graduate students will review the current scientific literature and applied issues on a selected course topic (see Content below) and prepare:

(1) **a 30 minutes Overview Lecture** present the topic to the class, including an introduction of the general background, the current state of research, highlights of selected hot topics, overview on methodologies and results, outline of major knowledge gaps, and a discussion of implications and next steps;
(2) an **associated in-class activity** to engage students in the presented topic, which could include a quiz, survey, research activity (e.g. with online database or topics), a group activity (e.g. debate) or other form of interactive engagement;
(3) a **guided discussion** to engage critical thinking and evaluating the topics importance for science and society, which can cover knowledge gaps, next steps, and management, conservation or policy issues.

Depending on the chosen topic, each student will be assigned a defined date for presenting in the lecture portion of the class. The assignments will be graded according to the below rubrics.

RUBRICS for grading all oral presentations and written assignments:

- Style [15%] (Clarity of speaking/writing, flow, engagement)
- Format [15%] (Organization/structure, design/format, quality of figures/graphics, length)
- Content [60%] (Depth of research; Understanding of case-study/topic; Detail of provided information; Critical evaluation of case-study/topic)
- Referencing [10%] (correct citations in presentation/text and reference list)

RUBRICS for grading in-class activities and guided discussions:

- Style [15%] (Clarity of introduction, explanation, questions)
- Format [15%] (Organization/length, Quality and design of activity/questions)
- Content [60%] (Depth of content covered, questions asked, fit with overall topic, level of critical evaluation)
- Engagement [10%] (how well did the activity/discussion work for student engagement)

Graduate students need to achieve a B- to pass the course (anything below B- is an F).

CONTRIBUTION TO DISCUSSION AND ACTIVITIES

A participation grade will be given that reflects both regular attendance in classes and regular contributions to class discussion and activities. This is a very interactive class and students are expected to actively participate in the tutorial section of the class.

Exams

There will be a **Midterm Exam** on the first half of term material and a **cumulative Final Exam** written on the collective material from all lectures given during the term. The final exam will be scheduled during the April Exam Period and contains short answer questions and written reflections.

Other course requirements

Each student will participate in an anonymous review process to evaluate and rank a sub-set of oral presentations. This will allow students to become familiar with the scientific peer-review process, objectively evaluate and learn from other's research, and provide critical yet constructive feedback. An anonymous summary of review comments and joint ranking will be revealed back to the presenting student for feedback.

Overview of Course Assessment for undergraduate students

Component	Weight (% of final grade)	Due date
Major Assignments:		
- *Mini-lecture on case study*	*20%*	*during tutorial, individual dates*
- *Questions & guided discussion*	*10%*	*during lecture, individual dates*
- *Written critical reflection on case study*	*15%*	*during tutorial, individual dates*
Contribution to discussion & activities	*10%*	*throughout term*
Midterm exam	*15%*	*mid-Feb (before reading week)*
Final exam	*30%*	*(Scheduled exam period)*

Overview of Course Assessment for graduate students

Component	Weight (% of final grade)	
Major Assignments:		
- *Overview lecture on topic*	*25%*	*individual dates*
- *In-class activity*	*10%*	*individual dates*
- *Questions & guided discussion*	*10%*	*individual dates*
Contribution to discussion & activities	*10%*	*throughout term*
Midterm exam	*15%*	*mid-Feb (before reading week)*
Final exam	*30%*	*(Scheduled exam period)*

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

- All assignments have a strict deadline; late assignments will be docked 10% per day late; missed assignments and exams will count 0%; with the following exceptions:
- In case of illness, please use the Student Declaration of Absence (SDA) form for late or missed academic requirements. Late penalties will not apply if SDA is submitted prior to the due date. Maximum 2 uses of the SDA per term. Students who are ill for an extended period and thus miss multiple requirements should be referred to Patricia Laws, Assistant Dean (Student Affairs).
- In case of technological malfunction (internet failure, power outage), please notify the instructor via email as soon as possible and provide a written explanation.
- If excused, the following alternative arrangements will be provided:
  - missed midterm exam: the % value will be shifted to the final exam.
  - missed final exam: a make-up exam will be offered on another date.
  - missed assignments: an extended deadline will be offered.
- The content of cancelled lectures or tutorials will be integrated into the following lectures and tutorials in abbreviated form; only topics presented and discussed in lectures and tutorials will be tested in exams.

Course Policies related to Academic Integrity

- In case of group projects, each student is required to contribute to the group's work, and the group will be assigned one grade.
- Plagiarism software will be used to check for the originality of each student's written assignments.
- As all written assignments require critical thinking and evaluation, the use of generative AI and large language models (e.g., ChatGPT) is NOT recommended.

Learning Objectives

- Define marine foundation plants
- Describe the main ecological features of marine plant ecosystems
- Summarize the important ecosystem structures, functions, and services of habitat-building marine plants

- Identify the main resources uses and economic products of marine plants
- Explain the main issues around wild harvesting, aquaculture, and bioprospecting
- Outline the benefits of protecting marine plant habitats for carbon storage, biodiversity, shoreline fortification, pollution control and eco-tourism
- Differentiate the main anthropogenic and natural impacts that threaten marine plant systems
- Recommend sound conservation and management strategies for marine plant systems on local, regional, and global scales
- Review the current literature and applied issues on a selected case-study (undergraduates) or overview topic (graduate students)
- Produce and deliver a case-specific mini-lecture (undergraduates) or overview lecture (graduate students)
- Compose an infographic that summarizes the main issues around the case-study for a lay audience (undergraduates)
- Write a critical evaluation of the main issues around the case-study that should inform decision makers about existing gaps and next steps (undergraduates)
- Design an in-class activity to engage students in the overview topic and critically discuss its importance for science and society as well as existing gaps and next steps (graduate students)

Course Content

List of the approximate course content and schedule for delivery. Note that this is an interactive class that requires a bit of flexibility, so topics and schedule may change.

Class schedule

Week	/ Day	Lecture / Tutorial Topics
1	T - 9 Jan	Lecture 1 – Introduction to class
	Th - 11 Jan	Tutorial: Selection of Case Studies for Mini-Lectures
2	T - 16 JAN	Lecture 2 – Marine plants overview
	Th - 18 JAN	Tutorial: Reproduction & Genetics (guest lecture)
3	T- 23 JAN	Lecture 3 – Ecosystem functions and services
	Th - 25 JAN	Tutorial: Blue carbon mapping and shifts (guest lecture)
4	T - 30 JAN	Lecture 4 – Habitat structure and functions
	Th - 1 Feb	Tutorial: Restoration & Indigenous initiatives (guest lecture)
5	T - 6 Feb	Lecture 5 – Impacts and threats
	Th - 8 FEB	Tutorial: Resource use & products
6	T - 13 FEB	Lecture 6 – Wild harvesting & management
	Th - 15 FEB	**Midterm Exam**
	--- STUDY BREAK ---	
7	T - 27 FEB	Lecture 7 – Aquaculture & farming (guest lecture)
	Th – 29 FEB	Tutorial: Mini Lectures / Case studies 1
8	T - 5 MAR	Lecture 8 – Conservation efforts
	Th - 7 MAR	Tutorial: Mini Lectures / Case studies 2
9	T - 12 MAR	Lecture 9 – Blue carbon storage
	Th - 14 MAR	Tutorial: Mini Lectures / Case studies 3
10	T - 19 MAR	Lecture 10 – Spatial planning & Remote sensing (guest lecture)
	Th - 21 MAR	Tutorial: Mini Lectures / Case studies 4
11	T - 26 MAR	Lecture 11 – Tourism & recreation
	Th - 28 MAR	Tutorial: Mini Lectures / Case studies 5
12	T - 2 APR	Lecture 12 – Future outlook: Climate and global change
	Th - 4 APR	Tutorial: Feedback, Q&A, extra time

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.

Faculty of Science

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

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