

Biological Oceanography Syllabus

Department of Oceanography

OCEAN 4140/5140, BIOL 4661/5661, MARI 4661

Winter 2025

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
Christopher Algar	chris.algar@dal.ca	Tuesdays 2-4 pm LSC Oceanography, Room# 2616
Antonia Kotliarov (TA)	an384413@dal.ca	By appointment

Course Description

The goal is to describe how physical, chemical, and biological processes interact to determine the species composition, biogeochemical activities, and trophic structure of marine communities. Outstanding problems currently facing biological oceanographers and earth systems scientists are discussed, as are current attempts and methodologies to address them.

Course Prerequisites

OCEA 2000.06 (OCEA 2001.03/2002.03); OCEA 2020.03; OCEA 2021.03; or permission of instructor

Student Resources

The instructor will generally be available during office hours, but other commitments may occasionally affect availability during this time, therefore it is advised to make an appointment by email ahead of time. If your schedule does not permit you to meet during the regular office hours, we will do our best

to accommodate meetings outside of this time as well, but it is not guaranteed. You may also email the TA for help or questions if you prefer, but their time is more limited.

Course Structure

Course Delivery

Course content will be delivered in person. Lecture notes will be posted to Brightspace following the lecture. Video recordings of the lectures will not be posted to Brightspace.

Cancellation of lectures: If a lecture must be cancelled for reasons other than campus closure, you will be informed by email and an announcement will be posted to Brightspace.

Lectures

Tuesday-Thursday 10:05 am – 11:25am AST, LSC Common Area C208

Course Materials

There is no required textbook for this class. However, Millar, C. and Wheeler, P.A. *Biological Oceanography 2nd Edition* is a very good resource. A copy of the textbook is on reserve in the library. Key readings from this textbook will be provided in class.

Lecture notes and supplemental reading will be posted on Brightspace prior to each lecture.

Assessment

Assessment	Weight (% of final grade)	Date
Tests/quizzes		
Weekly quizzes*	5%	Weekly
Midterm (1.5 hrs)	15%	Feb. 27 th , 2025
Final exam (3 hrs)	20%	(scheduled by the registrar)
Assignments		
Assignment #1	20%	Feb. 3 th , 2025
Assignment #2	20%	April 1st, 2025
Research Proposal	20%	April 7th, 2025

Due dates are tentative and may be subject to change, any changes if they occur will be announced in class and posted to Brightspace.

Assignments

Assignments will typically have 4-5 questions. Graduate students will answer all questions, while undergraduates will have a choice. Typically, the assignments will involve calculations and potentially require researching primary scientific literature that may go beyond what is provided in the course material.

Research Proposal

For the final assignment of the course, students will write a research proposal on a topic of their own choosing related to the subject matter of the course. The proposal must present a clear scientific question/hypothesis and a method for answering it. Additional details on the format of the proposal will be provided in class.

Tests/quizzes

Weekly quizzes will be made available on Brightspace the evening after the Thursday lecture is posted online and students will have one week to complete the quiz. Each quiz will be 3-5 short questions on the week's lectures and readings and are meant to serve as a review of key concepts. There will not be a quiz during the week of the midterm.

Midterm

The midterm will consist of 8-10 short answer questions. You will have 1.5hrs to complete the midterm and it will be held in person during the regular lecture period.

Final exam

The time and location of the final exam will be scheduled by the registrar. The exam will consist of a mix of long and short answer questions. More specific details of the format will be discussed in class.

Other course requirements

Different expectations are placed upon graduate and undergraduate students. Graduate students will be required to answer additional questions on midterms, exams, and assignments. These will be clearly indicated.

Two field trips to Bedford Basin are tentatively planned for early February and late March, weather permitting. Due to the class size and boat capacity, the course will be split into two groups, with each attending one of the field trips. A signup sheet will be provided on Brightspace. The field trips will be approximately half a day in length. Details will be organized in class. The field trips are optional but those who attend at least 1 of the days will receive 1 bonus point on their final mark. We will discuss the data collected during the field trips in class and it may be used for assignment or exam questions.

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

Assignments must be uploaded to Brightspace as a PDF by the due date indicated. The file name of the PDF should include the assignment number and the student's name.

Late assignments will lose 5% a day.

If you are sick or have extenuating circumstance that cause you to miss an assignment due date or evaluation you must contact the instructor before the due date and upload a Student Absence Declaration form to bright space. If you contact the instructor after the due date, at least a minimum 1-day late penalty will be applied even if an extension is ultimately granted. The form and Dalhousie policies regarding the declaration can be found at the following link

<https://dalu.sharepoint.com/sites/shw/SitePages/SDA-Student-FAQ.aspx>

and accommodation will be determined based upon the circumstances. Note that a Student Absence Declaration does not automatically guarantee an extension, but we will be reasonable and exercise common sense when assessing your situation.

Course Policies related to Academic Integrity

It is fine to discuss the assignments amongst yourselves, in fact it is encouraged, but your work must be your own. If you discussed or collaborated with anyone else extensively on an assignment, I ask that you indicate with who and for what questions.

If you use generative AI and large language models (e.g., ChatGPT), they are a tool but are not meant to do your work for you. If you have used generative AI at any point for your assignment for an assignment (including the research proposal) you must include a statement indicating how AI was used in your work and provided an appendix at the end of the assignment listing the prompts that were used to generate any content, including citations that were used in your assignment. Failure to disclose how generative AI was used in an assignment may be considered a case of academic dishonesty and plagiarism.

Learning Objectives

Students will understand the structure of marine ecosystems, the flow of matter and energy through them, and their interaction with physical and chemical processes.

Course Content

This schedule outlines the material that will be presented in this course. This is not a strict schedule and may be subject to change. Emphasis is placed on understanding underlying oceanographic principles, rather covering all topics or adhering to a rigid schedule.

Unit 1: Fundamentals
Unit 2: Origin and characteristics of ocean life
Unit 3: Survey of marine phytoplankton
Unit 4: Light
Unit 5: Phytoplankton growth and primary production
Unit 6: Zooplankton
Unit 7: Marine microbes
Unit 8: NPZ modelling
Unit 9: Marine biomes
Unit 10: Carbon fluxes
Unit 11: Benthic processes
Unit 12: Global biogeochemical cycles
Unit 13: Human Impacts
Review

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/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.