

**Faculty of Science Course Syllabus**  
**Department of Oceanography**  
*OCEA 4140/5140, BIOL 4661/5661, MARI4661*  
*Biological Oceanography*  
*Winter 2023*

**Instructor(s):** Christopher Algar      *chris.algar@dal.ca*      *LSC Oceanography Room 2616*

**Lectures:**      Tuesday-Thursday 8:35 am – 9:55am (AST)      *LSC Common Area C206*

**Laboratories:** There are no laboratories for this class

**Office Hours:** Tuesday 1:00 – 4:00 pm (AST) by appointment either in person or virtually (link will be provided via Brightspace).

**Tutorials:** Tutorials will be held the week before assignments are due, tutorials will be held either in person or virtually depending on method of course delivery at the time (in person or remote).

**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.

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### **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

### **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 Materials**

- Recommended text: Millar, C. and Wheeler, P.A. *Biological Oceanography 2<sup>nd</sup> Edition* (The course textbook is on reserve in the library, and there are copies for purchase at the university book store).
- Lecture notes and supplemental reading will be posted on Brightspace at the beginning of each week.

### **Course Assessment**

<b>Assessment</b>	<b>Weight (% of final grade)</b>	<b>Date</b>
<i>Tests/quizzes</i>		

<i>Weekly quizzes*</i>	<i>10%</i>	<i>Weekly</i>
<i>Midterm (1.5 hrs)</i>	<i>15%</i>	<i>March 2<sup>nd</sup>, 2023</i>
<b><i>Final exam (3 hrs)</i></b>	<i>15%</i>	<i>(scheduled by the registrar)</i>
<b><i>Assignments</i></b>		
<i>Assignment #1</i>	<i>20%</i>	<i>Feb. 3<sup>th</sup>, 2023</i>
<i>Assignment #2</i>	<i>20%</i>	<i>March 30<sup>th</sup>, 2023</i>
<i>Research Proposal</i>	<i>20%</i>	<i>April 11<sup>th</sup>, 2023</i>

### **Weekly 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 short 3-5 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 1.5 hrs to complete the midterm and it will be held in person during the regular lecture period. If there is a switch to remote learning details on the mid-term delivery will be communicated via 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.

### **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.

A field trip to Bedford Basin is tentatively planned for March 23<sup>rd</sup>, weather permitting. The field trip will be approximately half a day in length. The class will be divided into two groups due to boat capacity, a morning group and an afternoon group. 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. Data collected during the field trips may be used for assignment or exam questions.

### **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)

**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. It is fine to discuss the assignments amongst yourselves, 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.

**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

**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.

**Faculty of Science Course Syllabus (Section B)**  
**Fall/Winter 2022-23**  
*OCEA 4140/5140, BIOL 4661/5661, MARI4661*

**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](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](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](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](mailto:elders@dal.ca)).

**Information:** [https://www.dal.ca/campus\\_life/communities/indigenous.html](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&loaduserredits=False>

**University Grading Practices**

[https://www.dal.ca/dept/university\\_secretariat/policies/academic/grading-practices-policy.html](https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html)

**Faculty of Science Course Syllabus (Section C)**  
**Fall/Winter 2022-23**  
*OCEA 4140/5140, BIOL 4661/5661, MARI4661*

## **Student Resources and Support**

### **Advising**

**General Advising** [https://www.dal.ca/campus\\_life/academic-support/advising.html](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](https://www.dal.ca/campus_life/communities/indigenous.html)

**Black Students Advising Centre:** [https://www.dal.ca/campus\\_life/communities/black-student-advising.html](https://www.dal.ca/campus_life/communities/black-student-advising.html)

**International Centre:** [https://www.dal.ca/campus\\_life/international-centre/current-students.html](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](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](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](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](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>