DALHOUSIE UNIVERSITY

Faculty of Science Course Syllabus (Section A) (revised April 2022)

Department of Oceanography

OCEA 4230/5230; BIOL/MARI 4662: Biology of Phytoplankton

Winter, 2022

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): Hugh MacIntyre (hugh.macintyre@dal.ca); office hours by appointment

Lectures: Tuesday & Thursday, 16:05–17:35 in Killam Library 4106

Laboratories: *N/A*

Tutorials: *N/A*

Course delivery: In-person

Lectures will not be recorded; overheads will be posted on Brightspace prior to each lecture

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Course Description

This is an upper-division course on the phytoplankton in the context of their evolutionary history and ecological diversity. It has an emphasis on their adaptations and acclimation to different environments and their role in food webs and biogeochemical cycling.

Course Prerequisites

MATH 1000.03 and 1010.03 or MATH 1215, OCEA 2001.03 and 2002.03; or permission of Instructor

Course Exclusion

N/A

Learning Objectives

On completion of the course, students should be able to identify the major radiations of phytoplankton; interpret remotely-sensed images of phytoplankton abundance and productivity; and predict competitive success of phytoplankton with given physiological and behavioural traits under different environmental conditions.

Course Materials

The course is taught from the primary literature

Lectures, which include citations, will be posted on the course Brightspace page prior to each lecture.

DALHOUSIE UNIVERSITY

For online/blended course delivery:

N/A

Course Assessment

1. **Engagement**

   Participation in class accounts for 2% of the final grade. This will be assessed by the instructor based on recorded attendance and engagement with the material. Engagement will be assessed from participation in discussion in class. The default value is 0.

2. **Concept Mapping**

   Students will submit 7 concept maps (100– to 200–words). The concept map is a detailed analogy of a structure, concept or relationship presented in the lectures. These will follow the course unit on which they are based, tentatively Jan 31, Feb. 7 and 14, Mar. 7, 14, 21, and 28.

3. **Numerical assignments**

   Students will use the functional relationships presented in the course to calculate the effects of environmental conditions and interactions with co-occurring species on achieved growth rates in 2 modeling assignments, due on Jan 24 and Mar 2.

4. **Poster**

   Students will submit a summative assessment focusing on one species or genus of phytoplankton, based on the organizing theme of the course. The poster is due on Apr 14.

5. **Term Paper (OCEA 5230 only)**

   Students enrolled in the 5230 section of the class are required to write a short (1500-2000 word) term paper that reviews a topic of interest in the context of the material covered in the class. The subject of the paper will be chosen in discussion with the instructor. The paper is due on Apr 14.

Assessment

Component	Weight[1] (4230/4662)	Weight (5230)	Date
Engagement	2	2	Weekly
Concept Mapping[2]	28	22	See above
Numerical assignments	40	32	Jan 24 & Mar 2
Poster	30	24	Apr. 14
Term Paper	N/A	20	Apr. 14

[1] Weight is the % of the final grade.

[2] Students may drop one of the concept maps if the reweighted average improves their grade.

DALHOUSIE UNIVERSITY

Other course requirements

N/A

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 on Missed or Late Academic Requirements

With the exception of (1) above, all assignments will be available a minimum of 10 days prior to the submission date. Assignments will not be accepted after the submission deadline on Brightspace

- Students should file a Student Declaration of Absence form for missed lectures (maximum 2) to avoid penalty for the engagement grade.
- There is no make-up for missed concept maps. Students have the option to drop the score for one if the reweighted average improves their grade.
- Students who fail to submit a numerical assignment or the summative assessment (poster and/or term paper) will be given the opportunity to take a written exam c. 1 hour in duration per assignment, to be administered by the instructor during the exam period. There will be no subsequent opportunity for make-up work if the exam is missed.

Course Policies related to Academic Integrity

Students are encouraged to discuss approaches to the numerical assignments and the poster but all work submitted for evaluation must be done by the student submitting it. (Note that the data inputs for the numerical assignments and the subject organisms for the poster are unique for each student in the course.)

Spreadsheets or code submitted in support of the numerical assignments' answers that has high similarity between different students' submissions will be taken as evidence of plagiarism and will be assigned a zero and/or referred to the Senate Discipline Committee.

Students may quote the primary literature in their posters and term papers, with clear attribution. Submissions that are internally inconsistent in tone may be tested for matching with external sources using Urkund. Work showing evidence of plagiarism will be assigned a zero and/or referred to the Senate Discipline Committee

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Course Content

Date	Unit	Topic
10-Jan	1	Orientation and overview
12-Jan		Orientation and overview
17-Jan	2	Taxonomy: endosymbiosis, grazing, kleptochloroplasty and gene transfer
19-Jan		Taxonomy :cyanobacteria & the "green" lineage
24-Jan		Taxonomy: the "red" lineage
26-Jan	3	The marine environment
31-Jan	4	Detection
02-Feb		Detection
07-Feb	5	Photosynthesis and respiration: light and dark reactions
09-Feb		Photosynthesis and respiration: photoacclimation & photoprotection
14-Feb	6	Nutrient acquisition and assimilation: overview, kinetics and limitation vs starvation
16-Feb		Nutrient acquisition and assimilation: C metabolism
21-Feb		Reading Week
23-Feb		Reading Week
28-Feb		Nutrient acquisition and assimilation: N metabolism
02-Mar		Nutrient acquisition and assimilation: P and Fe metabolism
07-Mar	7	Mixotrophy
09-Mar	8	Thermal acclimation
14-Mar	9	Species interactions: grazing
16-Mar		Species interactions: mutualism and allelopathy
21-Mar	10	Cell losses: viral lysis
23-Mar		Cell losses: programmed cell death and sinking
28-Mar	11	Population dynamics: succession, bottom-up vs top-down control
30-Mar		Population dynamics: ruderal niche (r-selected taxa)
04-Apr		Population dynamics: competitive niche (r- to K-selected taxa)
06-Apr		Population dynamics: stress-tolerant niche (K-selected taxa)

DALHOUSIE UNIVERSITY

Faculty of Science Course Syllabus (Section B) (revised April-2022)

Fall/Winter 2022-23

OCE 4230/5230; BIOL/MARI 4662: Biology of Phytoplankton

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

DALHOUSIE UNIVERSITY

Faculty of Science Course Syllabus (Section C) **(revised April-2022)**

Fall/Winter 2022-23

OCE 4230/5230; BIOL/MARI 4662: Biology of Phytoplankton

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