

Deep Sea Biology Syllabus

Department of Oceanography

OCEA4370/BIOL4370/MARI4370/OCEA5370 Fall 2025

Dalhousie University operates in the unceded territories of the Mi'kmaw, Wolastoqey, and Peskotomuhkati Peoples. These sovereign nations hold inherent rights as the original peoples of these lands, and we each carry collective obligations under the Peace and Friendship Treaties. Section 35 of the Constitution Act, 1982, recognizes and affirms Aboriginal and Treaty rights in Canada.

We recognize that African Nova Scotians are a distinct people whose histories, legacies, and contributions have enriched the part of Mi'kma'ki known as Nova Scotia for over 400 years.

Course Instructor(s)

Name	Email	Office Hours
Anna Metaxas	Metaxas@dal.ca	Individually arranged
Kylee Lightbody	kylee.lightbody@dal.ca	Individually arranged

Course Description

We focus on the biology of organisms inhabiting the deep sea: physiological adaptations to the physicochemical and geological environment; spatial and temporal distributions of biological assemblages; and regulatory factors of these assemblages, such as currents, food availability, reproduction and recruitment. Also, we delve into unique habitats, such as hydrothermal vents.

Course Prerequisites

BIOL 2060.03 and OCEA 2000.06/OCEA2001.03 and OCEA2002.03

Course Exclusions

NA

Student Resources

NA

Course Structure

Course Delivery

In person

Lectures

LSC 332: MWF 11:35-12:25

Laboratories

NA

Tutorials

NA

Course Materials

Notes and lecture slide shows provided on Brightspace, prepared by A. Metaxas

Assessment

Assignments

- 1) Panel presentations will be led each by a group of 3 students. The group will receive guidance on the topics to be covered and a few initial readings. They are expected to augment the literature they will use to inform themselves on the topic. If the panel includes a graduate student, they will be responsible for providing the guidance of the literature. Non-members of the panel will be assigned a presenter and will ask questions after the presentation; they will also have 24 h to post written questions on Brightspace, and the panel will have 36 hours after that to respond in writing also on Brightspace; the student who asked the question will need to acknowledge the answer
- 2) Term paper: The paper will be used to evaluate the student's critical thinking and ability to synthesize the scientific literature on a topic of their interest.
 - a. The topic will be selected by the student in consultation with AM (student may use AI for assistance in topic selection) by **15 Oct 2025**.
 - b. In class: the student will use learned library research skills to generate a list of 10 references, relevant to the selected topic (**17 Oct 2025**). The work will be submitted by **4 pm ADT**.
 - c. In class: The student will produce an outline for their paper (in class - **24 Oct 2025**) to be submitted by **29 Oct at 4 pm ADT**.
 - d. The student is expected to produce: (i) a paper 15-20 pages in length (double spaced, and excluding cover page, figures and cited literature; ~ 4,500 words) Graduate students enrolled in OCEA5370 are expected to produce a ~ 5,500-word paper.

EvaluationPanels:

Presentation:	25%
Oral response to questions (in class):	5%
Written response to questions (on line):	10%
Extra literature:	10%

Panel Questions:

Oral (in class):	1%
Written submissions (on line):	4%

Term paper:

Literature:	5%	<u>Due: 17 Oct 2025 (4 pm ADT)</u>
Outline	5%	<u>Due: 29 Oct 2025 (4 pm ADT)</u>
Final Paper(s):	35%	<u>Due: 8 Dec 2025 (4 pm ADT)</u>

Tests/quizzes

- No tests or quizzes

Final exam

- No final exam

Other course requirements

See above

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

Penalty for late submissions, 10% per day

Students are expected to use the Student Declaration of Absence form for late or missed requirements no more than twice during the term.

Course Policies related to Academic Integrity

For panels, students are expected to work together. For term papers, students are expected to work on their own

Learning Objectives

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- Knowledge of the environmental conditions in the deep-sea and at chemosynthesis-based habitats
- Ecosystem characteristics such as species composition and abundance, diversity, carbon flux
- Knowledge of ecological processes such reproduction, dispersal, recruitment, competition and predation in the deep-sea
- Measurement of spatial and temporal patterns in abundance
- Teamwork
- Scientific presentations
- Scientific writing

Course Content

List the lecture topics along with an approximate schedule of their delivery.

(Optional but encouraged) Fill out the tentative course schedule to provide students with an expectation for all lessons and assessments throughout the term. Include the week and date the lesson or assessment takes place, the lesson topics or assessment type along with the reading associated with each date.

Month	Day	Lecture
		Part I: The deep-sea environment
September	24	Introduction to the course
	26	Physical and chemical properties
	29	The benthic boundary layer and the nepheloid layer
October	1	Library research skills
	3	Vertical patterns in abundance
	6	Vertical patterns in diversity
	8	Seasonality, episodicity
	10	Food resources
	15	Energetics and metabolism
	17	In class- literature search for paper
	20	Marine Animal Forests
	22	Monitoring deep-water corals in conservation areas
	24	In class: paper outline
	27	PANEL: The meso- and bathypelagic zones
	29	Larval biology, dispersal, recruitment
	31	PANEL: Deep-Sea Fisheries (growth, reproduction)
November	3	PANEL: Climate change (seamounts)
	5	PANEL: Deep-sea mining (abyssal plains)
	7	PANEL: Marine Litter
		Part II: Hydrothermal vents, cold seeps; chemosynthetic habitats
	17	Geological formation, physical and chemical environment
	19	Energy flow, food webs

	21	PANEL: Origins of life (physiological adaptations)
	24	Spatial patterns in distribution
	26	Temporal patterns of variability
	28	Larval dispersal and recruitment
December	1	PANEL: Marine Genetic Resources
	3	PANEL: Oil and gas (cold seeps)
	5	PANEL: Designing MPAs in the deep sea
	8	PANEL: Research priorities in the deep sea
	10	Additional PANEL, if necessary

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 Mi'kmaq and Indigenous Relations (including the Elders in Residence program, Land Acknowledgements, Understanding Our Roots, and much more) can be found at: <https://www.dal.ca/about/mission-vision-values/mikmaq-indigenous-relations.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/mission-vision-values/global-relations.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/campus_life/ssc.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: <https://www.dal.ca/about/mission-vision-values/equity-diversity-inclusion-and-accessibility/about-office-equity-inclusion.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/content/dam/www/about/leadership-and-governance/governing-bodies/code-student-conduct.pdf>

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/content/dam/www/about/leadership-and-governance/university-policies/fair-dealing-policy.pdf>

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.