

# Deep-Sea Biology Syllabus

## Department of Oceanography

OCEA/BIOL/MARI4370 Fall 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
Anna Metaxas	<a href="mailto:Metaxas@dal.ca">Metaxas@dal.ca</a>	TBD
Alexis Savard-Drouin	<a href="mailto:ASavard-Drouin@dal.ca">ASavard-Drouin@dal.ca</a>	TBD

### 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

N/A

### Student Resources

N/A

## Course Structure

### *Course Delivery*

In person

### *Lectures*

McCain 2118: MWF 11:35-12:25

### *Laboratories*

N/A

### *Tutorials*

N/A

## Course Materials

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

Scientific papers for group discussions and panel presentations (on Brightspace)

## Assessment

### Assignments

- 1) Discussions in 2 groups each with ~15 students will focus on scientific papers and will be led by AM and ASD. Students are expected to have read the papers in advance and participate in the Discussions. We will have a total of 5 discussions throughout the term. For 3 of the 5 papers of your choice, you are expected to provide in advance of the in-class discussion: (i) a summary of the paper written by you; (ii) a summary of the paper produced by AI (e.g. ChatGPT); and (iii) an evaluation of (ii).
- 2) 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
- 3) Term paper: The paper will be used to evaluate: (i) the student's critical thinking and ability to synthesize the scientific literature on a topic of their interest; and (ii) the performance of AI by the student in assisting them with producing a synthesis on the same topic.
  - a. The topic will be selected by the student in consultation with AM (student may use AI for assistance in topic selection) by **23 Sep 2024**.
  - b. In class: the student will use learned library research skills to generate a list of 10 references, relevant to the selected topic (**27 Sep 2024**). The work will be submitted at the end of the class period or by **4 pm ADT**.
  - c. In class: The student will produce an outline for their paper (**11 October 2024**) to be submitted by **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.

### Evaluation

#### Class discussions

Participation:	5%
Summaries:	10%

#### Panels:

Presentation:	15%
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/outline:	10%	<u>Due: 27 Sep/11 Oct 2024 (4 pm ADT)</u>
Final Paper(s):	30%	<u>Due: 4 Dec 2024 (4 pm ADT)</u>

*Tests/quizzes*

There are no tests or quizzes

*Final exam*

There is 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**

Students are expected to work together to produce the panel presentations. A single grade will be assigned to all members within a panel.

URKUND will be used in cases where plagiarism is suspected

Policy on Artificial Intelligence (from resource material created by Lance Eaton - <https://www.lanceeaton.com/>)

This policy covers any generative AI tool, such as ChatGtP, Elicit, etc. The policy includes text and artwork/graphics/video/audio.

It is likely that these types of tools like will become part of an important skill for careers in the not distant future

(<https://www.theguardian.com/commentisfree/2023/jan/07/chatgpt-bot-excel-ai-chatbot-tech>). However, there are still shortcomings with their use:

(1) Work created by AI tools may not be considered original work and instead, considered automated plagiarism. It is derived from previously created texts from other sources that the models were trained on, yet doesn't cite sources.

(2) AI models have built-in biases (i.e. they are trained on limited underlying sources; they reproduce, rather than challenge, errors in the sources)

(3) AI tools have limitations (i.e. they lack critical thinking to evaluate and reflect on criteria; they lack abductive reasoning to make judgments with incomplete information at hand)

There are situations and contexts within this course where you will be asked to use AI tools to explore how they can be used. Outside of those circumstances, you are discouraged from using AI tools to generate content (text, video, audio, images) that will end up in any student work (assignments, activities, responses, etc) that is part of your evaluation in this course. Any student work submitted using AI tools should clearly indicate what work is the student's work and what part is generated by the AI. If any part of this is confusing or uncertain, please reach out to me for a conversation before submitting your work.

The university's policy on plagiarism still applies to any uncited or improperly cited use of work by other human beings, or submission of work by other human beings as your own.

### **Learning Objectives**

- 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

- Assessment of the scientific literature

## 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	6	Introduction to the course	
	9	Physical and chemical properties	
	11	The benthic boundary layer and the nepheloid layer	
	13	Library research skills	
	16	Vertical patterns in abundance	
	18	Vertical patterns in diversity	
	20	Paper discussion	
	23	Seasonality, episodicity	
	25	Food resources	
	27	In class- literature search for paper	
	30	National Day for Truth and Reconciliation - no class	
	October	2	Energetics and metabolism
		4	Paper Discussion
7		PANEL: The meso- and bathypelagic zones	
9		Larval biology, dispersal, recruitment	
11		In class: paper outline	
14		Thanksgiving – no class	
16		PANEL: Deep-Sea Fisheries (growth, reproduction)	
18		PANEL: Climate change (seamounts)	
21		PANEL: Deep-sea mining (abyssal plains)	
23		Marine Animal Forests	
25		Geological formation, physical and chemical environment	
28		PANEL: Marine Litter	
			Part II: Hydrothermal vents, cold seeps, seamounts: special habitats
November	30	Energy flow, food webs	
	1	Paper Discussion	
	4	PANEL: Origins of life (physiological adaptations)	
	6	Spatial patterns in distribution	
	11	Remembrance day – no class	
	12-15	Study Break – no class	
	18	Temporal patterns of variability	
	20	PANEL: Marine Genetic Resources	
	22	Paper Discussion	

	25	Larval dispersal and recruitment
	27	PANEL: Oil and gas (cold seeps)
	29	Paper Discussion
December	2	PANEL: Designing MPAs in the deep sea
	4	PANEL: Research priorities in the deep sea

## 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](mailto:elders@dal.ca). Additional information regarding the Indigenous Student Centre can be found at: [https://www.dal.ca/campus\\_life/communities/indigenous.html](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](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](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](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](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.