Deep-Sea Biology Syllabus

Department of Oceanography

OCEA/BIOL/MARI4370 Fall 2023

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	Metaxas@dal.ca	TBD
Sarah de Mendonça	Sarah.De.Mendonca@Dal.Ca	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

LSC 206: MWF: 10:35-11:25

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 or data obtained from scientific cruises and will be led by AM and SdM. 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: (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. 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 to the on Brightspace, and the panel will have 36 hours after that to respond in writing also on Brightspace

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 **27 Sep 2023**.
    b. In class: the student will use learned library research skills to generate a list of 10 references, relevant to the selected topic; a separate list will be requested by AI on the same topic (**29 Sep 2023**). The work will be submitted at the end of the class period
    c. In class: The student will produce an outline for their paper based on their own literature and will request an outlined from AI on the same topic using its selected references (**13 October 2023**). Both outlines will be submitted at the end of the class period. If the student is not finished on their own outline, they can submit an updated version by **16 October 2023, 4 pm ADT**.
    d. The student is expected to produce: (i) a paper 8 pages in length (double spaced, and excluding cover page, figures and cited literature; ~ 2,000 words) based on their own outline and references: (ii) generate, using AI only, a paper 8 pages in length (double spaced, and excluding cover page, figures and cited literature; ~ 2,000 words) based on the references and outline that AI produced; and (iii) an evaluation by the student of the document produced by AI.

Evaluation

Class discussions	
Participation:	5%
Summaries:	10%
Panels:	
Presentation (10 min):	15%
Oral response to questions:	5%
Written response to questions:	10%
Extra literature:	10%
Panel Questions:	
Oral:	1%

Written submissions:	4%	
Term paper:		
Literature/outline:	10%	**In class: 29 Sep, 13 Oct 2023**
Final Paper(s):	30%	**Due: 6 Dec 2023 (4 pm ADT)**

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 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 ars 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

Month	Day	Lecture	Lecturer
		Part I: The deep-sea environment	
September	6	Introduction to the course	AM, SdM
	8	Physical and chemical properties	AM
	11	The benthic boundary layer and the nepheloid layer	AM
	13	Vertical patterns in abundance	AM
	15	Library research skills	GM
	18	Vertical patterns in diversity	AM
	20	Seasonality, episodicity	AM

	22	Paper discussion	AM, SdM
	25	Food resources	AM
	27	Energetics and metabolism	AM
	29	In class- literature search for paper	AM, SdM
October	2	No class	
	4	PANEL: The meso- and bathypelagic zones	Students
	6	Paper Discussion	AM, SdM
	9	Thanksgiving – no class	
	11	Larval biology, dispersal, recruitment	AM
	13	In class: paper outline	
	16	PANEL: Deep-Sea Fisheries (growth, reproduction)	Students
	18	TBA	
	20	No class	
	23	TBA	
	25	PANEL: Deep-sea mining (abyssal plains)	Students
	27	Paper discussion	AM, SdM

Part II: Hydrothermal vents, cold seeps, seamounts: special habitats

	30	Geological formation, physical and chemical environment	AM
November	1	Energy flow, food webs	AM
	3	Spatial patterns in distribution	AM
	6	Temporal patterns of variability	AM
	8	Larval dispersal and recruitment	AM
	10	Paper discussion	AM, SdM
	13-17	Study Break – no class	
	20	PANEL: Origins of life (physiological adaptations)	Students
	22	PANEL: Marine Genetic Resources	Students
	24	Paper Discussion	
	27	PANEL: Marine Litter	Students
	29	PANEL: Oil and gas (cold seeps)	Students
December	1	PANEL: Climate change (seamounts)	Students
	4	PANEL: Designing MPAs in the deep sea	Students
	6	PANEL: Research priorities in the deep sea	Students

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/dept/university_secretariat/policies/academic/student-submission-of-assignments-and-use-of-originality-checking-software-policy-.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.