

Chemical Oceanography Syllabus

Department of Oceanography

OCEA4130/5130 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
Carolyn Buchwald	cbuchwald@dal.ca	TBD, LSC Ocean Wing Rm 4676
William Nesbitt	william.nesbitt@dal.ca	TBD, Reading Room LSC Ocean Wing 5th floor

Course Description

This course covers the major and minor constituents of sea water, the controls on its chemical composition, nutrient cycling, gas exchange and the influence of the oceans on atmospheric chemistry. Other topics included are chemical tracers, and radiochemical dating methods, stable isotope studies, chemical speciation and chemical models of sea water.

Course Prerequisites

OCEA 2001.03 and OCEA 2002.03 (or OCEA 2000.06), and OCEA 3002.03, or instructor's consent

Student Resources

The instructor and TA will be available during office hours and by appointment. Students are encouraged to work with each other as well and get help from their peers when needed.

Course Structure

Course Delivery

Most lecture videos will be watched asynchronously prior to class time. Students are expected to attend the in-person classes, where we will review lecture material, do activities and work through problems. The in-person classes may be intermittently moved online at the discretion of the professor, depending on health of students/instructor and or travel.

Class Time

Tues and Thurs 1:05-2:25pm LSC Common Area C244

Course Materials

Most materials for this class will be available on the Course Brightspace Page

There is no assigned textbook for this course. **Recommended textbook(s):**

- Emerson and Hedges: Chemical Oceanography and the Marine Carbon Cycle. Cambridge University Press
- Tracers in the Sea by Wallace Broecker
- Pilson: An Introduction to the Chemistry of the Sea. Cambridge University Press.

Most textbooks are available in PDF. Excerpts or links will be posted on the Course Brightspace page. Additional reading material will be posted on Brightspace.

Assessment

Assignments/Exams

Students will be evaluated on participation, quizzes, problem sets, a mid-term exam, and a final exam. Students should be prepared to work independently and as a group. The problem sets include 4 to 5 multi-part word problems, which include short answer questions and quantitative calculations. In-class quizzes on the reading material will be given regularly. The in-class mid-term will consist of multiple choice, short answer questions and quantitative problems. The final exam will be scheduled by the registrar and have multiple choice, short answer questions, and quantitative problems. As graduate and undergraduate students are completing the same assignments, undergraduates' final marks will be scaled by 10%.

Component	Weight (% of final grade)	Date
Participation	5%	throughout
Quizzes	20%	Most class times
Midterm Exam	15%	Oct 31
Problem Sets*		
1		Sept 21
2		Oct 5
3	45%	Oct 19
4		Nov 9
5		Nov 23
Final Exam	15%	(Scheduled by registrar)
* the lowest problem set grade will be dropped		

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

Students are expected to use the Student Declaration of Absence form for late or missed requirements during the term. [Student Declaration of Absence Form](#)

Late assignments- *Students will lose 5% per day an assignment is handed in late. An assignment is considered late if handed in after 5pm the day it is due. Exception: mutual agreement of professor and student(s).*

Missed mid-term exam- *There is no additional mid-term exam. In case of illness or other extenuating circumstances, the instructor should be notified and if applicable SDA should be provided, and only in such a case the final exam will count for 30% of the final grade.*

Missed quizzes: *There is no additional quizzes. In case of illness or other extenuating circumstances, the instructor should be notified and if applicable SDA should be provided. Only in this case will that quiz be dropped, and quiz grade for the semester will be averaged from the other quizzes they were in attendance for.*

Course Policies related to Academic Integrity

University regulations on plagiarism and cheating will be strictly enforced.

http://www.dal.ca/dept/university_secretariat/academic-integrity.html

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.

Plagiarism

https://www.dal.ca/dept/university_secretariat/academic-integrity/plagiarism-cheating.html

Dalhousie University defines plagiarism as "the submission or presentation of the work of another as if it were one's own."

Plagiarism is a serious academic offence. A finding of plagiarism may result in a **failing grade** of an assignment or course or, if very serious **suspension** or **expulsion** from the university. In fact, if plagiarism is discovered after a student has completed his or her studies, and the penalty results in that student no longer meeting the requirements of a degree that has been awarded, the university may **rescind** that degree.

Some examples of plagiarism:

- **Failure to attribute authorship** when using sources such as written or oral work, computer codes/programs, artistic or architectural works, scientific projects, performances, web page designs, graphical representations, diagrams, videos, and images.
- Downloading all or part of the work of another from the Internet and **submitting as one's own**.

- **The use of a paper** prepared by any person other than the individual claiming to be the author.

Plagiarism is committed when you do not acknowledge using someone else's:

- words or phrases
- ideas or thoughts
- term paper
- recording
- images
- computer code
- experiment results
- lecture content
- falsified data, citations or other text
- OR your own previously submitted work

Plagiarized materials can come from:

- books
- journal articles
- CD's
- encyclopedias
- web pages
- online term papers
- email or listservs
- talks or lecture

Other Cheating

https://www.dal.ca/dept/university_secretariat/academic-integrity/plagiarism-cheating/other-cheating.html

The Academic Calendar also identifies other types of cheating including:

- **falsifying data** in reports, theses, dissertations and other presentations
- attempting to complete, by **irregular procedures**, any requirements for a class (this may include attempts to cheat)
- **collaborating** on an assignment unless specifically allowed by professor
- providing or **obtaining access**, without permission, to tests, assignments, essays or term papers
- writing an examination or test **for someone else**
- attempting to obtain or accepting assistance from any other person **during an examination** or test
- using or **having material** in an exam that is not specifically approved by the instructor
- **obtaining a copy** of an examination or test, topic for an essay or paper, or other work
- submitting any work for academic credit when one is not the **sole author** or creator
- submitting any work that has been **previously accepted** for academic credit
- **aiding** in the commission of an academic offence by lending another student an assignment knowing that he or she may copy it for submission or allowing another student to copy answers during an examination
- providing false or **misleading information** during an investigation of a suspected academic offence

Class Expectations

You're expected to attend class time and participate in the learning activities with your peers, and you'll be required to integrate relevant information discussed into your class assignments.

Students are expected to behave in an appropriate manner. Lively discussion and conflicting opinions are welcome and encouraged, but personal attacks, disrespectful comments, and gender or racial slurs **will not** be tolerated.

You're responsible for directing your learning in this course! You can be more successful by:

- Creating weekly checklists
- Familiarizing yourself with the syllabus and course schedule. Plan and set aside time in your calendar to work on course assignments.
- Asking questions!

Learning Objectives

- How chemicals are distributed in the oceans;
- What processes (biological, geological, physical) act to cause these distributions;
- How the chemistry of the oceans affects the biology and geology of the oceans;
- How to make quantitative estimates about the chemical state of seawater and the transport of matter within the oceans.

Course Content

A separate document outlining the topics discussed each class time, readings for that topic, lectures to be watched prior to that class, and due dates of each assignment, will be provided. This document will be subject to change, due to the speed we move through material and topic interests of the class.

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.

Student Resources and Support

University Policies and Programs

Important Dates in the Academic Year (including add/drop dates):

http://www.dal.ca/academics/important_dates.html

Classroom Recording Protocol:

https://www.dal.ca/dept/university_secretariat/policies/academic/classroom-recording-protocol.html

Dalhousie Grading Practices Policies:

https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html

Grade Appeal Process: https://www.dal.ca/campus_life/academic-support/grades-and-student-records/appealing-a-grade.html

Sexualized Violence Policy: https://www.dal.ca/dept/university_secretariat/policies/health-and-safety/sexualized-violence-policy.html

Scent-Free Program: <https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html>

Learning and Support Resources

General Academic Support – Advising (Halifax): https://www.dal.ca/campus_life/academic-support/advising.html

General Academic Support – Advising (Truro): <https://www.dal.ca/about-dal/agricultural-campus/ssc/academic-support/advising.html>

Student Health & Wellness Centre: https://www.dal.ca/campus_life/health-and-wellness.html

On Track (helps you transition into university, and supports you through your first year at Dalhousie and beyond): https://www.dal.ca/campus_life/academic-support/On-track.html

Indigenous Student Centre: https://www.dal.ca/campus_life/communities/indigenous.html

Indigenous Connection: <https://www.dal.ca/about-dal/indigenous-connection.html>

Elders-in-Residence (The Elders in Residence program provides students with access to First Nations elders for guidance, counsel, and support. Visit the office in the Indigenous Student Centre or contact the program at elders@dal.ca or 902-494-6803:

<https://cdn.dal.ca/content/dam/dalhousie/pdf/academics/UG/indigenous-studies/Elder-Protocol-July2018.pdf>

Black Student Advising Centre: https://www.dal.ca/campus_life/communities/black-student-advising.html

International Centre: https://www.dal.ca/campus_life/international-centre.html

South House Sexual and Gender Resource Centre: <https://southhousehalifax.ca/about/>

LGBTQ2SIA+ Collaborative: <https://www.dal.ca/dept/vpei/edia/education/community-specific-spaces/LGBTQ2SIA-collaborative.html>

Dalhousie Libraries: <http://libraries.dal.ca/>

Copyright Office: <https://libraries.dal.ca/services/copyright-office.html>

Dalhousie Student Advocacy Services: <https://www.dsu.ca/dsas?rq=student%20advocacy>

Dalhousie Ombudsperson: https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html

Human Rights and Equity Services: <https://www.dal.ca/dept/hres.html>

Writing Centre: https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html

Study Skills/Tutoring: http://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html

Faculty of Science Advising Support: <https://www.dal.ca/faculty/science/current-students/undergrad-students/degree-planning.html>

Safety

Biosafety: <http://www.dal.ca/dept/safety/programs-services/biosafety.html>

Chemical Safety: <https://www.dal.ca/dept/safety/programs-services/chemical-safety.html>

Radiation Safety: <http://www.dal.ca/dept/safety/programs-services/radiation-safety.html>

Laser Safety: <https://www.dal.ca/dept/safety/programs-services/radiation-safety/laser-safety.html>