

**Faculty of Science Course Syllabus** (revised April 2022)  
**Department of Oceanography**  
**Introduction to Chemical Oceanography**  
**OCEA3002 Fall 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):** Dr. Carolyn (Carly) Buchwald [cbuchwald@dal.ca](mailto:cbuchwald@dal.ca) LSC Ocean Wing Rm 4676

**Lectures:** Tues and Thurs 1:05-2:25pm LSC Common Area C202

**Course delivery:** In-person

**Office Hours:** (TBD after discussion on the first day of class) or by appointment, virtual (Zoom, MS Teams) and in-person.

---

### Course Description

*This course provides students with a basic understanding of the composition of seawater and the processes that lead to this composition. This understanding is both qualitative and quantitative through the use of thermodynamic, kinetic and box models to describe the balances that produce the observed chemical distributions.*

### Course Prerequisites

CHEM 1011.03 and CHEM 1012.03 (or equivalent), OCEA 2001.03 and OCEA 2002.03 (or OCEA 2000.06); OCEA 2020.03 and OCEA 2021.03

### 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 Materials

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. Exerts or links will be posted on the Course Brightspace page. Additional reading material will be posted on Brightspace.

## Course Assessment

Component	Weight (% of final grade)	Date
Participation/ Activity sheets/Quizzes	20%	weekly
Midterm Exam	15%	Nov 1
<b>Problem Sets*</b>		
1		Sept 22
2	40%	Oct 13
3		Nov 17
4		Dec 1
Final Exam	25%	(scheduled by registrar)

**\* the lowest problem set grade will be dropped**

### 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

Due dates are firm. Late assignments will incur a penalty of 2% per day. Exception: mutual agreement of professor and student(s).

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

### 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](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](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](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



# DALHOUSIE UNIVERSITY

- 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

## Course Content

Our course is organized into **9 modules**. Not all modules will take the same amount of time.

1. Review of basic chemistry/kinetics/box models
2. Properties of water
3. Composition of seawater
4. The physical setting
5. Biogeochemical cycles
6. Inputs and outputs to the ocean
7. Gases/Atmospheric interactions
8. Ocean climate response and feedbacks
9. Tools for studying Chemical Oceanography: Isotopes

Modules will include:

- Lectures
- weekly discussion questions and quizzes
- in class learning activities and worksheets
- graded problem set assignments
- midterm and a final exam

## Class Expectations

You're expected to attend lectures 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 to ensure you're finishing each module component.
- Familiarizing yourself with the syllabus and course schedule. Plan and set aside time in your calendar to work on course assignments.
- Asking questions! If you're unsure about anything, ask an anonymous question in the Questions discussion board, send me an email, or come to my office hours!

## 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](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](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](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](mailto:elders@dal.ca)).

**Information:** [https://www.dal.ca/campus\\_life/communities/indigenous.html](https://www.dal.ca/campus_life/communities/indigenous.html)

**Important Dates** in the Academic Year (including add/drop dates) [Important Dates](#)

### University Grading Practices

[https://www.dal.ca/dept/university\\_secretariat/policies/academic/grading-practices-policy.html](https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html)

## Student Resources and Support

### Advising

**General Advising** [https://www.dal.ca/campus\\_life/academic-support/advising.html](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](https://www.dal.ca/campus_life/communities/indigenous.html)

**Black Students Advising Centre:** [https://www.dal.ca/campus\\_life/communities/black-student-advising.html](https://www.dal.ca/campus_life/communities/black-student-advising.html)

**International Centre:** [https://www.dal.ca/campus\\_life/international-centre/current-students.html](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](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](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](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](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>