

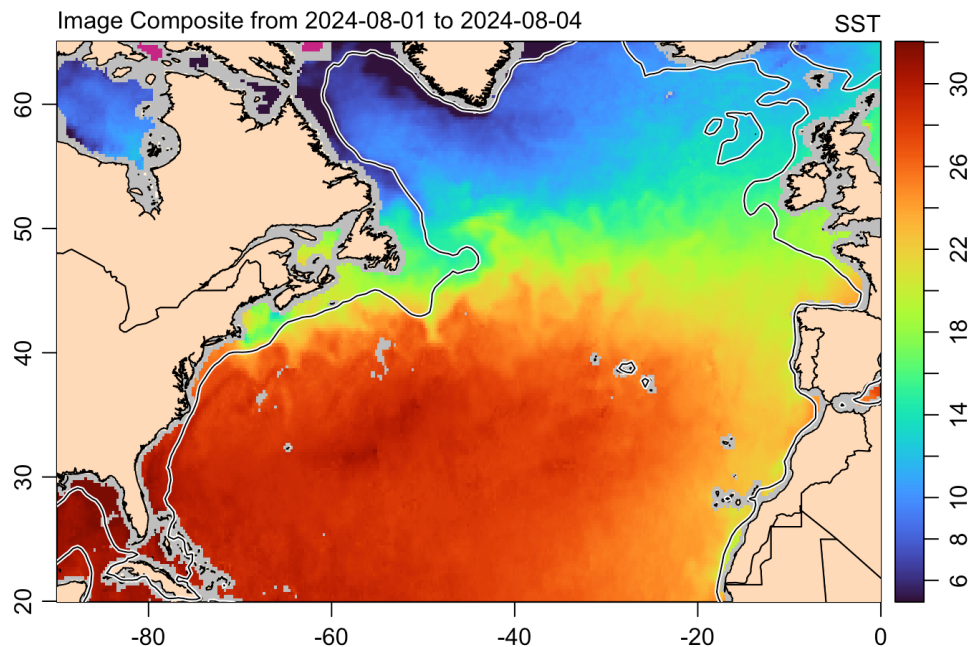
Oceanography 4120 & 5120 Syllabus

Department of Oceanography (Room 3655 LSC)

CRN 12579/13872 Fall 2024

Course Instructor(s)

Name	Email	Office Hours
Dan Kelley	Dan.kelley@dal.ca	By arrangement



Sea-surface temperature (SST) observed by a satellite. Gray indicates regions for which temperature is not computed. National boundaries are shown on land, and the 1000-metre isobath is shown at sea.

Course Description

This (cross-listed) course introduces advanced undergraduate and early postgraduate students to the physical properties and dynamics of the oceans. Topics range from the large scales of the global circulation field, all the way down to the small scales of turbulence. Fact and theory are blended throughout. Quantitative reasoning and scientific insight are emphasized. This is not a “memorize and repeat” course.

Course Prerequisites

MATH 1000.03, MATH 1010.03, classic calculus or equivalent. Students are expected to understand the principles, not just the rules, of calculus.

Course Exclusions

OCEA 5120 is an exclusion for OCEA 4120. In addition – and it seems silly to have to state this -- students must not be enrolled in any other class that has overlapping lecture times.

Student Resources

Course notes, covering ~300 pages with detailed indices and cross-references, will be made available to students on the course Brightspace page. Other materials will be provided, as appropriate.

Course Structure

Course Delivery

The course will be taught in-person unless it is forced into a remote mode again, as it was during previous waves of COVID-19. Recording of lectures is not permitted. Lectures will not rely on PowerPoint or similar tools, instead being based on a conversational, sometimes Socratic approach that involves heavy use of the whiteboard and not-infrequent demonstrations. Skipping classes is highly discouraged.

Lectures

Lectures occur from 1035 to 1125 on Mondays, Wednesdays, and Fridays.

Course Materials

See “Student Resources”, above.

Assessment

Assignments

After assignment 0 (an ungraded diagnostic assignment), there will be 2 assignments (each worth 20% of the final grade). The timing will be established in collaboration with the students, to avoid undue strain relating to other coursework, fieldwork, etc.

Tests/quizzes

There will be a mid-term test (worth 25% of the final grade), somewhat after the halfway point in the course.

Final exam

There will be a final examination (worth 35% of the final grade), during the formal examination period.

Other course requirements

Class participation is an expected part of this class, being especially valuable given the diverse nature of the students and the level of the material.

Conversion of numerical grades to 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

A late fee of 15% per working day (defined by hours of service in the departmental office, prorated by hour) is applied to assignments, unless a “time out” period is justified by a Student Declaration of Absence form or other suitable means. Assignments are intended to encourage and display the understanding of individuals, *not* of groups. Students registered in the 5120 stream of the course will be held to a higher standard than those registered in the 4120 stream, and they will also have a higher workload, as appropriate.

Course Policies related to Academic Integrity

While students may find it helpful to discuss assignments with others, all submitted work is required to have been done by the individual student. The usual rules about plagiarism and other forms of cheating apply in this course, as they do throughout Dalhousie. As a new addition for the year 2023, the use of generative AI or similar technologies (e.g. chatGPT) is strictly forbidden for assignment preparation.

Learning Objectives

Students should be able to describe the basic patterns of ocean properties (e.g. as illustrated on page 1 of this syllabus) and flow, to contextualize them in terms of physical laws, and to address research-level applications to e.g. the atmosphere-ocean system and the biology and chemistry of the seas.

Course Content

Introduction; concepts of fluid mechanics; building (and breaking) intuition; ocean measurement technology; hydrography of the sea; watermasses; momentum and mass-conservation equations; Reynolds decomposition; air-sea fluxes; 0D and 1D models of response to wind; geostrophy; potential vorticity; Rossby waves; wind-driven basin-scale circulation; global-scale thermohaline circulation; mixing; estuaries; shelf circulation; gravity waves; tides; numerical modelling; data assimilation.

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.