OCEA 4110/5110 ERTH 4110:
Geological Oceanography
Syllabus Winter 2023

January 2023

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.

Welcome
This course provides a survey of geology and geophysics as they apply to the oceans. The course covers methods, observations and quantitative applications used in marine geology, geophysics and paleoceanography. Topics include the origin of ocean basins, isostacy, plate tectonics, gravity, and magnetics; patterns and processes of sediment transport and deposition, and the paleoceanographic reconstruction of past climates.

Prerequisites: OCEA 2001 and OCEA 2002, ERTH 1080, OCEA 2021, OCEA 2022

Lectures: Tuesdays and Thursdays, 10:05 - 11:25 am (Atlantic Time)

Delivery: in-person (no recording)

Instructors
Dr. Stephanie Kienast (primary instructor)
stephanie.kienast@dal.ca
room 5616, Life Science Center, Oceanography Wing

Dr. Markus Kienast
March 7-23 (approximately)
room 5637, Life Science Center, Oceanography Wing
markus.kienast@dal.ca

TA/Demonstrator:
Claire Haar
clairehaar@dal.ca

Office Hours: arrange by email

Attendance
In person-attendance is important, and active student participation in class activities, discussions, and coding workshops is greatly encouraged. The lecture slides are generally posted on-line, but keep in mind that these files may not contain everything we covered in class (e.g., in-class discussions, notes on the white board). Some classes contain exercises that are useful to complete assignments. It is your responsibility to find out what you missed from classmates and the course website if you are unable to be in class.

Technology Requirements
Brightspace, R (mandatory for assignments), Excel (optional).
Students are required to download the free coding software R. If you have not worked with R before, instructions for downloading can be found in the *Start Here* Section on the course website.

Learning Objectives
1) Determine the mass and size of the Earth.
2) Infer the internal structure of the Earth.
3) Derive the absolute age of the Earth using radioactive isotopes.

4) Apply knowledge of plate tectonics to explain the formation of ocean basins and their change through time.
5) Calculate, to a good approximation, the isostatic balance between the continents and the sea floor.
6) Distinguish the sources of sediment accumulating on the modern sea floor.
7) Explain the distribution of sediments and link it to large-scale oceanographic and geologic processes.
8) Quantify sedimentation rates and accumulation rates on the sea floor with information from radioactive isotopes and other evidence.
9) Increase proficiency in coding with R.
10) Communicate scientifically on a course-related topic of your choice (grad students)

Assessments	**undergraduate (%)**	**graduate (%)**	**due date***
Assignments (4 to 6)	40	30	tba
Mid-Term	20	10	Feb 16
Presentations	-	30	Apr 04, Apr 06
Final	40	30	Exam Period

Assignments (4-6)
The purpose of the assignments is to reinforce the scientific concepts learned in class and to practice coding in R. Assignments will be introduced in class and due dates will be communicated clearly in class and on Brightspace. You will typically have 5-7 days to complete an assignment. Assignments include calculations and scientific reasoning (i.e., writing), both of which need to be completed satisfactorily in order to pass. Note that assignments may be in two parts. The first part must be completed by all students; the second part must be completed by the graduate students only. If you are confused by an assignment, the instructors will give guidance. It is recommended that you look at the assignments soon after getting them, so that you have enough time to solve them and to get assistance if needed. **Questions asked 24 hours before the due date may not get answer**. Assignments are submitted on the course website on or before the due date. Pay attention to specific submission instructions.

Mid-Term Exam
The mid-term is scheduled for Thursday, February 16, 10:05-11:25 am and will be in-person. The emphasis will be geologic concepts (not coding).

Graduate Student Presentations
Graduate students will choose a topic in consultation with the instructor by February 28, and then prepare a presentation (ca 20 min) for the class. Presentation days are Tuesday, April 04 and Thursday, April 06. Attendance by all is expected.

Final Exam
The final exam will be in person during the official exam period between April 13-25. Do not make travel plans until the exam schedule is posted by the registrar's office early in February. The emphasis will be geologic concepts (not coding).

Course Policies
Academic Integrity
Academic integrity is seen as a foundation of all Universities and Research Institutions in the world. This means we are all guided in our work by 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. In practical terms, this means that while students are allowed to discuss their coding assignments with each other, **each student must pass in their own assignment, reflecting their own wor**k, **speaking in their own voice (written answers)**. Copying the code from others to succeed in the assignments will not help you in the mid-term and final exam. Similarly, cheating and plagiarism will not be tolerated during the exams.

Grade Items
All individual course components must be completed and receive a passing grade in order to pass the course.

Late work
Assignments: 10% off for each day late (24 hours). Late submissions will be accepted until the marking process is completed, which generally takes 1 week. After that, late submissions will no longer be accepted and result in 0%. Assignments can generally not be made up. Students have one *"Get out of jail free card",* meaning one late submission goes without penalty for the first 24 hours. If you wish to use the card with a given submission, you must indicate so on Brightspace when uploading your assignment. Use wisely.

Illness and Emergencies
Re-weighing of course components or make-up opportunities for the mid-term and final exam will be considered rarely and on a case-by case basis only. If you are ill for an extended period of time, or find yourself in extenuating circumstances beyond your control, please let one of us know as soon as possible, and also contact Dr. Patricia Laws, Assistant Dean of Student Affairs at Scieasst@Dal.Ca.

Grade conversion
Numerical results will be converted to letter grades according 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 (0-49)
A- (80-84)	B- (70-72)	C- (55-59)	

For undergraduate students, a letter grade of D is a passing grade. For graduate students, a letter grade of B- is a passing grade.

Definition of Letter grades
Excellent: A+, A, A-
Considerable evidence of original thinking; demonstrated outstanding capacity to analyze and synthesize; outstanding grasp of subject matter; evidence of extensive knowledge base.

Good: B+, B, B-
Evidence of grasp of subject matter, some evidence of critical capacity and analytical ability; reasonable understanding of relevant issues; evidence of familiarity with the literature.

Satisfactory: C+, C, C-
Evidence of some understanding of the subject matter; ability to develop solutions to simple problems; benefitting from his/her university experience.

Marginal Pass: D
Evidence of minimally acceptable familiarity with subject matter, critical and analytical skills (except in programs where a minimum grade of 'C' is required).

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

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

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

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).
Information: https://www.dal.ca/campus_life/communities/indigenous.html

Important Dates in the Academic Year (including add/drop dates)
https://academiccalendar.dal.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=117&chapterid=-1&topicgroupid=31821&loaduseredits=False

University Grading Practices

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

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

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

International Centre: 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

Studying for Success: 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

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

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