

Sediments and Sedimentary Rocks (ERTH 2203) Fall 2019

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Lectures: Tuesdays and Thursdays 13:05 – 14:25; LSC 2055

Labs: Thursdays 14:35 – 17:25; LSC 2055

Course Description: The course deals with physical, chemical and biological processes that generate modern sediments, and their conversion to sedimentary rocks through time. Labs provide a practical introduction to sediment analysis and to a range of sedimentary structures and rock types. Fieldwork may include description of beaches and bedrock in Nova Scotia.

Prerequisites: EARTH 1080 and EARTH 1090 / DISP. This is a required course for EARTH Majors and a prerequisite for EARTH 3303 – Stratigraphy.

Course Objectives: By the end of this class students should be able to:

- Identify and explain the nature of sediments and a variety of sedimentary rocks
- Clearly establish the link between understanding modern sediments and their depositional environments and the interpretation of sedimentary rocks and their environments as recorded in the rock record
- Identify the mineralogy of sedimentary rocks and know the most common components of a given sedimentary rock
- Identify possible sedimentary environments of deposition given a particular sediment, sedimentary rock, or sequence of sedimentary rocks
- Identify and interpret sedimentary structures in relation to possible formation and as clues to environments of deposition
- Interpret geologic maps with sedimentary sequences
- Reason and critically think like a sedimentologist
- Be familiar with professional skills and attributes associated with sedimentology-in-practice

Text: Sedimentology and Stratigraphy 2nd Edition. Gary Nichols. (Wiley).

Availability: Dal bookstore (\$123.85 to buy; \$62.02 to rent for semester), online booksellers, and Killam digital.

Brightspace: Handouts, assignments, and notes will be posted to Brightspace. Please check regularly and inform the instructor of access issues.

Organization: This course consists of two 80 minute lectures and a 3 hour lab each week.

- Lectures will cover fundamental concepts in sedimentology and will include in-class exercises and assignments designed to solidify the lecture material. **Attendance is mandatory, as I will present material that may not be found in the textbook, and because part of the grading is based on class participation and in-class assignments.** Note that I do not share lecture slides. If you miss a class, ask a classmate if they would be willing to share their notes.
- Labs will provide hands on experience with observing, describing and interpreting sediments and sedimentary rocks. Please bring the following to labs: **pens, pencils, eraser, ruler, hand lens, calculator or laptop.** Lab assignments are due at end of the lab period.

Course Policies:

- **Missed mid-term:** (unavoidable) – final exam will count for 45%.
- **Missed in-class activities:** best 80% counted, so no make-up possible.
- **Labs:** lowest lab mark dropped (excluding field trip), so you can miss one lab. Note that you are still responsible for learning the material. It may be possible to make up a lab on your own, depending on the specific lab and materials needed: if possible, the materials will be made available. Late labs will be penalized 10% per day.
- **Final Exam:** the exam is cumulative and incorporates lecture and lab material. The exam date is set by the registrar, and will occur during the period Dec 5-15. Do not make travel arrangements until the schedule is posted as it will not be possible to give you an early exam.
- **Lecture-lab connection:** the material in the lecture and the labs is carefully coordinated to maximize your learning. A lab exam will focus on material identification and problem-solving, similar to problems undertaken in lab sessions.
- **Collaboration with other students** is accepted and even encouraged; however, students must submit *their own* assignments and labs.

Grading:

Component	Weight	Date
In-class quizzes and exercises	15%	every class
Midterm Exam:	20%	Oct 24
Labs:	30%	weekly
Lab Exam:	10%	Nov 28
<u>Final Exam:</u>	<u>25%</u>	<u>TBA</u>
Total:	100%	

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)		

Class Schedule: Note: this schedule is subject to minor revision in the ordering of content; revised versions will be uploaded to Brightspace. Readings TBA.

Week	Day	Lecture	Lab
Unit 1: Formation of Sediments:			
1	3-Sep	1. Introduction; Learning to learn	
	5-Sep	2. Weathering & erosion vs. transport	No lab
2	10-Sep	3. Weathering & formation of sediments	
	12-Sep	4. Sediment texture	Lab 1: Clastic rocks
3	17-Sep	5. Sediment mineralogy	
	19-Sep	6. Controls on sediment supply	Lab 2: Clastic textures and textural maturity
4	24-Sep	7. Unit 1 Catch-up and review	
Unit 2: Transport and Sedimentary Structures:			
	26-Sep	8. Fluid flow and forces of sediment transport	Lab 3: Self-directed field trip
5	1-Oct	9. Hjulstrom diagram	
	3-Oct	10. Grain movement and bedforms	Lab 4: Erosional, depositional and diagenetic structures 1
6	8-Oct	11. Cross laminae, ripples and dunes	
	10-Oct	12. Climbing, flaser and upper flow regime	Lab 5: Erosional, depositional and diagenetic structures 2
7	15-Oct	13. Oscillatory and combined flow	
	17-Oct	14. Turbidity currents and graded bedding	No Thursday lab
	19-Oct		Lab 6: Horton Bluff field trip
8	22-Oct	15. Other structures; Unit 2 catch-up and review	
Unit 3: Facies and Depositional Environments:			
	24-Oct	16. Facies concepts: terrestrial and marine	Midterm During Lab
9	29-Oct	17. Clastic coasts and estuaries 1	
	31-Oct	18. Clastic coasts and estuaries 2	Lab 7. Carbonates and other rocks
10	5-Nov	19. Carbonate reefs and banks 1	
	7-Nov	20. Carbonate reefs and banks 2	Lab 8: Carbonate reef facies
11	12-Nov	Reading week - no classes or labs	
	14-Nov		
12	19-Nov	21. Alluvial and fluvial systems 1	
	21-Nov	22. Alluvial and fluvial systems 2	Lab 9: Core logging
13	26-Nov	23. Other depositional environments 1	
	28-Nov	24. Other depositional environments 2	Lab Exam
14	3-Dec	25. Final catch-up and review	

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

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/academic-advising.html>

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

Black 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/services-support/student-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

Research Lab Safety https://www.dal.ca/content/dam/dalhousie/pdf/dept/safety/lab_policy_manual_2007.pdf

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>