Quaternary Sedimentary Environments

Syllabus

Department of Earth and Environmental Sciences

ERTH/GEOG 3302 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
John Gosse	John.Gosse@dal.ca	Fridays 10-11, or by appt, O-4616
Lauren MacLellan	Lauren.MacLellan@dal.ca	By appt, O-4612

Course Description

The student is exposed to fluvial, alluvial, subglacial, glaciolacustrine, hillslope, eolian, coastal, shallow marine, rift, wedge top, retroarc, and foreland basin environments. Field trips and labs provide experience in methods used to distinguish the environments, including sedimentology, geomorphology, geochronology and thermochronology, and analysis of soils, cores, pebble fabrics, and section-scale non-petroleum sedimentary facies. Quaternary paleoclimatology and tectonic controls on weathering and deposition are discussed and debated. Quantitative assignments will provide experience in interpreting isotopic, geochronologic, paleoclimatic, and sedimentologic data.

Course Prerequisites

ERTH 2203 or similar introductory sedimentology course

Student Resources

Links for important student resources are provided at the end of this syllabus. For field trips we will be using field equipment provided by your fees, including excavation tools to dig soil pits, clear colluvium from important cliff exposures, and safety equipment including helmets and safety vests (see tables of equipment for each field trip). The lectures and laboratory exercises will be held in the new sedimentology and geochemistry lab B-2030.

Course Structure

Course Delivery

This course will be taught in-person, and no synchronous or recorded online sessions are planned. Lectures, field trips, and exams require your attendance. In the case of the impacts of unfavorable weather, field trips may need to be postponed or cancelled, but will be substituted with a different experiential learning exercise. In the case of a pandemic, building closure, or other factors, the lectures and experiments can be modified to be accessed online.

Lectures

M, W, F 12:35 to 1:25. Room B-2030. Note that on days where the laboratory will be a field trip, the field trip will start at 12:35.

Laboratories

Field trips: W, 12:35 – 5:30, meet in parking lot between the Biology Wing and Kings College at 12:30. Some field trips may run a little longer if traffic is slow. We will do our best to have you back between 5:30 and 6:00 pm on those days.
Experiments: W, 1:25 – 5:30, B-2030.

There is NO lab or field trip on Sep 6.

Course Materials

No single available textbook contains the range of topics we cover. However, you will be expected to come to lecture prepared by reading the assigned articles.

For the field trips, there will be a personal gear list provided prior to each trip, but in general bring your notebook, pencil, hand lens, compass, water, boots, rain jacket (check weather). We will provide a printed copy of the field trip or lab assignment during the lab period, and a digital copy before the field trip or exercise, so please skim through the exercise prior to coming.

Assessment

Mid Term Test (req'd)	**25%**
Field trips and Experiments	**25%**
Assigned readings and short assignments	**20%**
Final Exam (cumulative) (req'd)	**30%**
Total	**100%**

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)	

Mid-Term Test [25/100]

The mid-term test is required and will be a combination of short and long answer questions, designed to be completed in 50 minutes in our usual meeting time and place. It covers all lectures (mostly climatogenic sedimentary records), readings, assignments, and laboratory (field and experiment) exercises prior to the test. **If** a particular assignment or laboratory report has not been graded, the questions on the mid-term regarding that assignment or lab will relate to the scientific question or methodology, and not to your observations. A mid-term test review will be held in the last half of the preceding lecture.

Final Exam [30/100]

The final exam will be scheduled by the Registrar's Office for sometime during exam week. It likely will be held in the LSC instead of DalPlex.

While the 2-hour final exam will emphasize the tectonogenic sedimentary environments material covered after the mid-term test, the exam is cumulative, and we expect you to be able to use your knowledge of climate and tectonics to interpret sedimentary records.

Assigned readings and assignments [20/100]

Readings

- There is no textbook assigned for this class. You are expected to read the assigned readings before the class. I will indicate if you should focus on one particular element of the reading, otherwise you are responsible for reading the entire paper and understanding the figures. While you may not understand everything you read, you are expected to know the general ideas expressed in the papers. If a paper piques your interest, and you want more information beyond what is provided in the cited references list, please send me an email and I'll be happy to give suggestions.
- To achieve the full grade for reading, you need to email John.Gosse@dal.ca **before** the class with the answer to at least the questions ending with (email Gosse). Note that not every paper will have assigned questions. Only one late answer will be forgiven for the semester. Your answers to be emailed to Gosse will be worth a total of 10 of the 20% of your *Assigned Readings and Assignments Grade*. Check the class *Brightspace* page for uploaded material that I am permitted to share, or download the copyright journal article via one of many methods, e.g.: Scholar Google or http://libraries.dal.ca/

  Example, For Monday, Sep 18:
  Molnar, P., & England, P. (1990). Late Cenozoic uplift of mountain ranges and global climate change: chicken or egg?. *Nature*, *346*(6279), 29-34.
  Reading Assignment for Friday:
  Q1. Distinguish: Rock uplift, surface uplift, isostasy, exhumation, erosion (email Gosse)
  Q2. Briefly explain Figure 2
  Q3. What is the chicken and egg?

Assignments

Throughout the semester, there will be assignments to help aid in learning (worth 10/20%). Some of these are in-class assignments, others are take home. The lowest score will be dropped (e.g. if you miss a class during which there was an assignment). Some in-class assignments include:
(i) subduction zone depositional environments, (ii) cosmogenic isotope data reduction and interpretation, and (iii) class debate.

Field trips and laboratory experiments [25/100]

Student Equipment and Personal Gear Request for the Field Trips

Date	Boots	Compass	Hand lens	Field notebook	Colored pencils	GPS	Trowel or similar hand tool	Camera	other
Soils	Rec'd (Steel toe and rubber if avail)	Rec'd if available	Req'd	Req'd	Req'd	Rec'd	If available	Rec'd	Fly spray, Sun screen, Water bottle, snack
Glacial	Rec'd	Rec'd if available	Req'd	Req'd	Req'd	Rec'd	If available	Rec'd	Fly spray, Sun screen, Water bottle, snack
Lakes	Req'd: **Steel toe** and rubber if available	Rec'd if available	Req'd	Req'd	Req'd	--	If available	Rec'd	Fly spray, Sun screen, Water bottle, snack
Marine*	shoes	--	Req'd	Req'd	Req'd	--	--	Rec'd	Water Snack Lab glasses

Earth Environmental Science Department Equipment Request for the Field Trips

Date	Helmets	Safety Vest	Small first aid kit	Shovels Long handle	Shovels-D-handle	Picks	Axe	Trowels	Tablet/white board w markers	100' Tape
Soils	no	14	1	8	4	4	1	all	JG has	3
Tills	no	14	1	8	4	4	no	all	JG has	3
Lakes	14	14	1	8	4	4	no	all	JG has	3
Marine*	no	no	1	no	no	no	no	no	JG has	no

*We may not have an opportunity to access the GSC marine sediment core lab at Bedford Institute of Oceanography in 2023 owing to renovations to the facility. We are currently attempting to find a substitute field trip that is within 45 minutes drive, for fluvial or coastal sedimentary environments.

Course Policies on Missed or Late Academic Requirements

Missed or late work:

1. Both tests are mandatory. Please make every effort to take the test at the time indicated. However, in the case of significant illness or death in the immediate family, I will provide a different makeup test. There are no re-attempts for tests.

2. You shall participate in all labs. If you miss a lab experiment (mostly calculation) owing to significant sickness or death in the immediate family, it is possible to check with the TA to get an extension and you can do the experiment on your own. If you miss a field trip, most of these will not be able to be repeated as permissions are required for access to the sites. We will ignore one missed field trip or experiment (we drop that score or your lowest grade). However, please note that a significant portion of the two tests will be based on knowledge gained during the lab periods and field trips. **Lab writeups are due by the following Monday and will not be accepted if late.**

3. **For readings and assignments, the answers must be submitted by the deadline.** We will drop the lowest score for the readings and the assignments.

4. Based on these policies, it is not necessary to use the Student Declaration of Absence for this class.

Course Policies related to Academic Integrity

Generative AI and large language models

In this course, none of the assignments, tests, laboratory reports, or reading questions shall be answered using generative AI or large language models (e.g., ChatGPT).

Collaboration

Sometimes submissions for a lab experiment or fieldtrip will require a group effort. The TA will make clear what elements will be expected to be an individual or group effort. For the reading assignments, while students can discuss the questions with classmates, answers are to be independently written and submitted by the student.

Learning Objectives

This course focuses on the architectural components of sedimentary environments, i.e. larger-scale than the sedimentary-structures you investigated in *Sedimentology*, and overlapping or finer than the elements of facies and large-scale stratigraphy. The emphasis is on developing skills in analysing Quaternary sedimentary records to quantify and interpret surface processes and responses to climate and tectonic changes. A combination of field and theoretical experiments provide experiential opportunities to describe, classify, and analyse glacial, glaciofluvial, glaciomarine, fluvial, lake, coastal, marine, and eolian sediments and records contained within them, to address ongoing questions regarding tectonics and climate controls on sedimentation. Experiments and field trips will include fabric analyses, power spectral analyses, geomorphometry, and geochronology and exposure to regional examples of Quaternary sedimentary environments.

Tentative Schedule for ERTH/GEOG 3302 in 2023F

Lec	Date	Topic	Tentative topic	Reading <u>before</u> the lecture/lab
0	09-06W	Climate and sediment production	Course overview and Definition of the Quaternary	No reading answers due
1	09-08F		NO CLASS: Read Wysocki et al. soils chapter, submit answers Monday	No reading answers due
2	09-11M		Regolith, saprolitization, soil development, soil descriptions	Wysocki et al, 2000
3	09-13W		***Field Trip: Soils*** *(or Plan B-Modeling of Sed Flux with B=QART)*	*Stea&Gosse,2004 (or Syvitski&Milliman)*
4	09-15F		Sediment flux, measuring erosion, and Klondike Placer Gold system	Belmont et al, 2007
5	09-18M		Quaternary Paleoclimatology	Berger et al. 2010
6	09-20W		*Quaternary Clocks* ***Expt: Geochronology-Radiocarbon, TCN Lab Tour***	No reading answers due
7	09-23F	Subglacial Environ.	Terrestrial glacial environments and sediments	No reading answers due
8	09-26M		Subglacial environment, recognizing till types and ice sheet dynamics	Staiger et al. 2006 Baffin Island tills
9	09-28W		***Field Trip: Sub glacial processes, West Lawrencetown coastal section***	Stea and Gosse 2004
10	09-30F	Sediment delivery to Lakes and oceans	Glacial lake environments and the Younger Dryas Cooling Event	Ridge et al 2012 Norris et al 2021
11	10-02M		National Day for Truth and Reconciliation	No reading answers due
12	10-04W		**Field Trip: Glacial Lake Shubenacadie**	Stea and Mott, 1998
13	10-06F		Heinrich events, turbidites, MTDs of Canada's east coast and shelf	TBA
14	10-9M		NO CLASS-Thanksgiving Day	None
15	10-11W		***Field Trip: Marine Sediments, GSC-Bedford Institute Oceanography***	None
16	10-13F		Glaciomarine deltas, and the uplift of Nova Scotia	Swift and Borns, 1967
17	10-16M		Deltas and Why are deltas drowning?	Syvitski on sinking delta
18	10-18W		Hemipelagic and pelagic marine sediments; ***Expt Creating strat columns***	Data provided
19	10-20F	Tectonic Basins	*Review for Mid-Term*	
20	**10-23M**		**Mid-Term Test**	None
21	10-25W		*Tectonic Envs* ***Subduction Assignment; Expt Correlating foreland strat***	Pazzaglia et al handout
22	10-27F		Tectonic Env-Sediments and stratigraphy of tectonically active basins	Ingersoll, 2012 overview
23	10-30M		Tectonic Env-Recognizing tectonic processes in a foreland basin	DeCelles 2012 Chap 20; Baker 2008
24	11-01W		Thermochronology, ***Expt: Detrital thermochronology of foreland basin***	Coutand et al Alti Plano
25	11-03F		Climate vs Tectonic controls on relief and erosion; M'Clure Strait	Molnar&England 1990
26	11-06M	Fluvial and Alluvial Environments	Stream Environments Overview	Excerpts from Miall
27	11-08W		Stream sediment maturity, ***Expt: Recog tect basins from seds***	Sediments provided, microscopy
28	11-10F		Meandering streams	
29	11-13M		Reading Week	
30	11-15W		Reading Week	
31	11-17F		Reading Week	
32	11-20M		Meandering Streams	
33	11-22W		Braided streams, ***Expt: Interpreting a Quat sediment dataset***	Data provided
34	11-24F		Braided streams, Beaufort Formation	PoLAR-FIT
35	11-27M		Rift Settings, alluvial fans	McDonald et al 2003;
36	11-29W	Wrap up	***Debate (In Class Assignment)***	
37	12-01F		Rates in Quaternary Sedimentary Environments	Review Miall's table, method to meas.
38	12-04M		TBA	
39	12-05T		**Review for Final Exam**	
40	12-06W		TBA	

Questions Regarding the assigned readings

(***send answer to the 'email Gosse' questions prior to the lecture, for 10 papers***)

BEWARE: I am seeking the answers according to the assigned reading, which may not be the current definition or result if others have published since on the same material, and is often different than what AI or a large language model may suggest. Note: other papers may be assigned or substituted to take advantage of visiting speakers or important current events that we may occur during the semester.

Wysocki, D.A., Schoeneberger, P.J. and LaGarry, H.E., 2000. Geomorphology of soil landscapes. *Handbook of soil science*, *1*, pp. 315-321.

Q1. Referring to Figure 29.9, and thinking of a rural landscape in Nova Scotia, what processes are changing over the next 50 years as a result of climate change, and how and why are they changing? (email Gosse)
Q2. Relate Jenny's Factors to the processes considered by Simonson (1959).
Q3. What factors control how a catena in Nova Scotia will appear?

Stea, R. and Gosse, J. 2004. GLACIATION AND LANDSCAPES OF THE HALIFAX REGION. Field trip guidebook A.3. Geological Association of Canada Annual Meeting. Halifax, NS. GAC publication. Pp 1-64. *Note, for the GLACIAL field trip the most relevant section is the first 22 pages. For the SOILS field trip, you should read pp 23-33.*

Q1. Name the six phases of ice dynamics over Nova Scotia during the Wisconsinan Glaciation, and provide their approximate times in "ka". (email Gosse)
Q2. What causes the different compositions of tills?
Q3. How is the ice flow direction measured?
Q4. What are the types of tills (names, and how they were formed)

Belmont, P., Pazzaglia, F.J. and Gosse, J.C., 2007. Cosmogenic ^{10}Be as a tracer for hillslope and channel sediment dynamics in the Clearwater River, western Washington State. Earth and Planetary Science Letters, 264(1), pp.123-135. *Don't spend too much thought on the methodology of the cosmogenic nuclide methodology.*

Q1. Which creek has the greater catchment-average erosion rate, and why? (hint, look at the total relief and mean slope data in Table 2). (email Gosse)
Q2. Why are weathering rates and erosion rates different?
Q3. What are the magnitudes and units of erosion rates for these catchments (in a temperate rainforest).

Syvitski, J.P. and Milliman, J.D., 2007. Geology, geography, and humans battle for dominance over the delivery of fluvial sediment to the coastal ocean. *The Journal of Geology*, *115*(1), pp.1-19. No questions, this will be used for Expt 1 data. PLEASE READ BEFORE THE LAB.

Berger, W.H., Schulz, M. and Wefer, G., 2010. Quaternary oceans and climate change: lessons for the future?. International Journal of Earth Sciences, 99(1), pp.171-189.

Q1. Why is the marine ∂^{18}O record saw-tooth shaped (i.e. what causes the asymmetric sea-level rise and fall pattern)? (email Gosse)
Q2. What is meant by orbital forcing and describe the mechanisms and their periods
Q3. Is the Quaternary the key to the future with respect to climate change prediction?

Staiger, J.W., Gosse, J., Little, E.C., Utting, D.J., Finkel, R., Johnson, J.V. and Fastook, J., 2006. Glacial erosion and sediment dispersion from detrital cosmogenic nuclide analyses of till. *Quaternary Geochronology*, *1*(1), pp.29-42

Q1. List three distinguishing factors IN TILL, including isotopes, that can be used to predict whether the responsible glacier was cold-based or warm-based. (email Gosse)
Q2. Where do cold-based zones occur and why?
Q3. Why was the second cosmogenic isotope necessary (^{26}Al/^{10}Be) instead of just ^{10}Be?
Q4. Did the ice sheet model agree with the geology and isotopes? Where didn't it and why?

Ridge, J.C., Balco, G., Bayless, R.L., Beck, C.C., Carter, L.B., Dean, J.L., Voytek, E.B. and Wei, J.H., 2012. The new North American Varve Chronology: A precise record of southeastern Laurentide Ice Sheet deglaciation and climate, 18.2-12.5 kyr BP, and correlations with Greenland ice core records. *American Journal of Science*, *312*(7), pp.685-722.
Q1. What is a varve (describe the sediments) and where does it form? (email Gosse)
Q2. Why do varve thicknesses vary?
Q3. Can varve time-series be correlated over hundreds or more km?

Norris, S.L., Garcia-Castellanos, D., Jansen, J.D., Carling, P.A., Margold, M., Woywitka, R.J. and Froese, D.G., 2021. Catastrophic drainage from the northwestern outlet of glacial Lake Agassiz during the Younger Dryas. *Geophysical Research Letters*, *48*(15), p.e2021GL093919. No Questions for this reading, just the Ridge et al paper above.

Stea, R. and Mott, R., 1998. Deglaciation of Nova Scotia: stratigraphy and chronology of lake sediment cores and buried organic sections. *Géographie physique et Quaternaire*, *52*(1), pp.3-21. PLEASE READ BEFORE THE LAB.

Syvitski, J.P., Kettner, A.J., Overeem, I., Hutton, E.W., Hannon, M.T., Brakenridge, G.R., Day, J., Vörösmarty, C., Saito, Y., Giosan, L. and Nicholls, R.J., 2009. Sinking deltas due to human activities. *Nature Geoscience*, *2*(10), pp.681-686.
Q1. What are the five factors (AND their timescales) that control the vertical motion of a delta top relative to sea level? (email Gosse)
Q2. Which is the most important for most populated deltas?

Swift, D.J. and Borns Jr, H.W., 1967. A raised fluviomarine outwash terrace, north shore of the Minas Basin, Nova Scotia. The Journal of Geology, 75(6), pp.693-710.
Q1. Describe the kind of Pleistocene deltas or fans are deposited on the north shore of the Minas Basin? (there may be more than one type, email Gosse)
Q2. How are these deltas useful, if at all, for paleo-sea level or isostatic uplift history of Nova Scotia?

Molnar, P., & England, P. (1990). Late Cenozoic uplift of mountain ranges and global climate change: chicken or egg?. *Nature*, *346*(6279), 29-34.
Q1. Explain Figure 2 (email Gosse)
Q2. Distinguish: Rock uplift, surface uplift, isostasy, exhumation, erosion
Q3. What is the chicken and egg?

Ingersoll, R.V., 2012. Tectonics of sedimentary basins, with revised nomenclature. *Tectonics of Sedimentary Basins: Recent Advances*, pp.1-43. ASK ME FOR A COPY IF YOU CANNOT GET ONE.
Q1. In your own words, explain how four of the seven mechanisms for subsidence work, and indicate an example of the basin types that would subside with each of the four mechanisms. (email Gosse)
Q2. What is the difference between a collisional retroforeland and a proforeland?
Q3. Why do wedgetop basins have a lower probability of preservation than continental rift basins?

DeCelles, P.G., 2012. Foreland basin systems revisited: Variations in response to tectonic settings. *Tectonics of sedimentary basins: Recent advances*, pp.405-426. ASK ME FOR A COPY IF YOU CANNOT GET ONE.
Q1. DeCelles describes four depozones in an ideal foreland. What are they? (email Gosse)
Q2. What controls the amplitude and wavelengths during flexural wave migration?

Coutand, I., Carrapa, B., Deeken, A., Schmitt, A.K., Sobel, E.R. and Strecker, M.R., 2006. Propagation of orographic barriers along an active range front: Insights from sandstone petrography and detrital apatite fission-track thermochronology in the intramontane Angastaco basin, NW Argentina. Basin Research, 18(1), pp.1-26.
No questions, this will be used for Expt 4 data. PLEASE READ BEFORE THE LAB.

McDonald, E.V., McFadden, L.D. and Wells, S.G., 2003. Regional response of alluvial fans to the Pleistocene-Holocene climatic transition, Mojave Desert, California. *SPECIAL PAPERS-GEOLOGICAL SOCIETY OF AMERICA*, pp.189-206.

Q1. What techniques were used to correlate alluvial fans across the Mojave? (email Gosse)

Q2. How many different fans units are recognized in the field area?

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.