Quaternary Sedimentary Environments

Syllabus

Department of Earth and Environmental Sciences

ERTH/GEOG 3302 Fall 2025

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
Dr. John Gosse	John.Gosse@dal.ca	Wed 1:30-2:30 or by appt 4616-Ocean Wing LSC
Lauren MacLellan	Lauren.MacLellan@dal.ca	Grader, demonstrator By appt, Rm 4625

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 hand 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 or changes in access permissions, field trips may 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, field trips, 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: Mon, 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: Mon, 1:25 – 5:30, B-2030. Some will use microscopy, most will involve data analysis and computation (always bring your laptop for experiments).

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

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)	

Readings (not graded)

There is no textbook assigned for this class. We recommend that you read the recommended 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. You will get a lot more out of this course if you read ahead.

Term project (15%)

You will select a topic from a list, and prepare a 3-page article for an audience of Quaternary Science graduate students, plus maps, figures, and tables that will fit on a letter-sized sheet.

Mid-Term Test (25%)

The mid-term test, during regular class time, 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, readings, assignments, and laboratory (field and experiment) exercises prior to the test.

Final exam (30%)

The final exam will be scheduled by the Registrar's Office for some time during exam week. It likely will be held in the LSC instead of DalPlex. While the 2-hour final exam will emphasize 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.

Field Trips and Experiments (30%)

Field trips or Experiments occur on Monday afternoons. All field trips depart at 12:35 pm on Wednesdays from parking lot between the LSC and Kings College, returning by 6 pm. Writeups will be completed and submitted individually unless otherwise indicated.

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	Rec'd	If available	Rec'd	Fly spray, Sun screen, Water bottle, snack
Marine	Any footwear	None	Req'd	Req'd	Req'd	NONE	If available	Rec'd	Will be inside a core lab
Municipal flooding	Rec'd	Rec'd if available	Rec'd	Req'd	Req'd	Rec'd	If available	Rec'd	Optional water shoes, or pants with detachable legs, towel

Rec'd = Recommended Req'd = Required

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	26	1	8	4	4	1	all	JG has	3
Tills	no	26	1	8	4	4	no	all	JG has	3
Lakes	26	26	1	8	4	4	no	all	JG has	3

Course Policies on Missed or Late Academic Requirements

Missed or late work:

1. The Mid-Term Test and Final Exam 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 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 your lowest grade). However, please note that a significant portion of the two tests will be based on knowledge gained during the experiments and field trips. **Lab writeups are due by the following Friday at the beginning of the lecture and will not be accepted if late.**

3. For the term project, the complete draft is due at the beginning of the lecture on Dec 1 so I can provide feedback. If you do not submit a complete draft on time, no feedback will be provided. The final version is due on Dec 8 at 11:59 pm. On that day, we will have an informal discussion of your results so we all can learn, and you can make final modifications to your project. You will project your figures (maps, tables, etc.) on the screen. No need to prepare a lecture but do come ready to discuss your findings. Late submissions will be docked 10% for each late day.

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, your tests, laboratory reports, or term project shall NOT be answered using generative AI or large language models (e.g., ChatGPT). We may have a discussion on the application of AI to sciences, but no assignments will involve AI.

Collaboration

Sometimes submissions for a lab experiment or fieldtrip will require a group effort. The instructor will make clear what elements will be expected to be an individual or group effort. While students can discuss their term projects with classmates, answers are to be independently written and submitted by the student and without the use of AI.

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 2025F

Lec	Date	Topic	Tentative topic	Reading before the lecture/lab
1	09-24W		Course overview and Intro to the Quaternary	
2	09-26F	Clocks and climate	Quaternary clocks-methods	*Hajdas et al., 2021*
3	09-29M		Quaternary clocks ***Expt Cosmogenic nuclide exposure dating***	*Lab Tour*
4	10-01W		Quaternary paleoclimatology methods: fossil, chemical, isotopes, eDNA	
5	10-03F		Quaternary paleoclimatology feedbacks, transitions, records	
6	10-06M	Sediment production	Regolith, saprolitization, soils ***Expt Modeling of Sed Flux with B=QART***	*Syvitski and Milliman, 2007*
7	10-08W		Erosion, uplift, isostasy	*Molnar&England 1990*
8	10-10F		Erosion vs. weathering limited systems-Klondike Placer Gold Fields	
	10-13M		***Happy Thanksgiving (no lecture or lab)***	
9	10-15W	Glacial environment	Quaternary Glaciations and Sea Level change	*Berger et al. 2010*
10	10-17F		Subglacial environment, recognizing till types and ice sheet dynamics	*Staiger et al. 2006*
	10-20M		***Field Trip: Sub glacial processes, West Lawrencetown coastal section***	*Stea and Gosse 2024*
11	10-22W		Ice sheet models and deglaciation of Atlantic Canada	
12	10-24F		Sub-orbital records: Heinrich events, Dansgaard-Oeschger cycles	*Schannwell et al. 2024*
	10-27M	Marine environment	***Field Trip: GSC-Atlantic-Strata on Canada's eastern shelf***	
13	10-29W		Marine hemipelagic and pelagic sediments	
14	10-31F		Glaciomarine deltas, and the recent uplift of Nova Scotia!	*Swift and Borns, 1967*
15	11-03M		The Younger Dryas and ocean circulation ***Expt will incl review***	*Norris et al 2021*
	11-05W		Mid-term test	
16	11-07F	Glaciolacustrine environment	Glaciolacustrine environments and varves	*Ridge et al 2012*
	11-10M		Fall break	
	11-12W		Fall break	
	11-14F		Fall break	
17	11-17M		***Field Trip: Glacial Lake Shubie***	*Stea and Mott, 1998*
18	11-19W	Fluvial environment	Stream environments	
19	11-21F		Meandering streams	
	11-24M		***Field Trip or experiment on stream flooding and paleofloods***	
20	11-26W		Alluvial systems	*McDonald et al 2003*
21	11-28F	Applied Quaternary Sciences	Quantifying active tectonics	
22	12-01M		Arid region environments, ***Complete draft of term project***	
23	12-03W		Why are modern deltas sinking?	*Syvitski et al., 2009*
24	12-05F		Environmental methods in Quaternary sediments	
	12-08M		**Class term project presentations**	
	12-10W		Review for final	

Field trips may need to be postponed owing to weather or other factors

Recommended readings

Hajdas, I., Ascough, P., Garnett, M.H., Fallon, S.J., Pearson, C.L., Quarta, G., Spalding, K.L., Yamaguchi, H. and Yoneda, M., 2021. Radiocarbon dating. *Nature Reviews Methods Primers*, *1*(1), p.62.
Q1. What is the maximum age that Radiocarbon can be used to date, and why?
Q2. What methods are used to measure the C-14 activity or concentration in a sample?
Q3. What is the difference between *calibration*, the *marine reservoir effect*, and the hard water effect?

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?
Q2. Relate Jenny's Factors to the processes considered by Simonson (1959).
Q3. What factors control how a catena in Nova Scotia will appear?

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, used for B=QART Lab. **PLEASE READ BEFORE THE LAB**.

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

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 $d^{18}O$ record saw-tooth shaped (what causes the asymmetric sea-level rise and fall pattern)? (Brightspace)
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. (Brightspace)
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?

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, while you can skim the entire fieldtrip guidebook, for the field trip on Sep 9 the most relevant section is the first 22 pages. For the field trip on Sep 23, you should also read pp 23-33.*
Q1. Name the six phases of ice dynamics over Nova Scotia during the Wisconsinan Glaciation, and provide their approximate times.
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)

Schannwell, C., Mikolajewicz, U., Kapsch, M.L. and Ziemen, F., 2024. A mechanism for reconciling the synchronisation of Heinrich events and Dansgaard-Oeschger cycles. *Nature Communications*, *15*(1), p.2961.
Q1. What are HE's and D-O events?
Q2. What constraints and inputs were needed for the Ice Sheet Model?
Q3. Why did ice thickening happen during the warm interstadials?

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. What are outwash deltas?
Q2. What does the elevation of the topset-foreset contact represent?
Q3. Why are the topset-foreset contacts at different elevations?

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.

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?
Q2. Why do varve thicknesses vary?
Q3. Can varve time-series be correlated over hundreds or more km?

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.

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

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?
Q2. Which is the most important for most populated deltas?

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/about/leadership-governance/academic-integrity/faculty-resources/ouriginal-plagiarism-detection.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.

Faculty of Science

Student Resources and Support

University Policies and Programs

Important Dates in the Academic Year (including add/drop dates): http://www.dal.ca/academics/important_dates.html

Classroom Recording Protocol: https://www.dal.ca/dept/university_secretariat/policies/academic/classroom-recording-protocol.html

Dalhousie Grading Practices Policies: https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html

Grade Appeal Process: https://www.dal.ca/campus_life/academic-support/grades-and-student-records/appealing-a-grade.html

Sexualized Violence Policy: https://www.dal.ca/dept/university_secretariat/policies/health-and-safety/sexualized-violence-policy.html

Scent-Free Program: https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html

Learning and Support Resources

General Academic Support – Advising (Halifax): https://www.dal.ca/campus_life/academic-support/advising.html

General Academic Support – Advising (Truro): https://www.dal.ca/about-dal/agricultural-campus/ssc/academic-support/advising.html

Student Health & Wellness Centre: https://www.dal.ca/campus_life/health-and-wellness.html

On Track (helps you transition into university, and supports you through your first year at Dalhousie and beyond): https://www.dal.ca/campus_life/academic-support/On-track.html

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

Indigenous Connection: https://www.dal.ca/about-dal/indigenous-connection.html

Elders-in-Residence (The Elders in Residence program provides students with access to First Nations elders for guidance, counsel, and support. Visit the office in the Indigenous Student Centre or contact the program at elders@dal.ca or 902-494-6803: https://cdn.dal.ca/content/dam/dalhousie/pdf/academics/UG/indigenous-studies/Elder-Protocol-July2018.pdf

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

International Centre: https://www.dal.ca/campus_life/international-centre.html

LGBTQ2SIA+ Collaborative: https://www.dal.ca/dept/vpei/edia/education/community-specific-spaces/LGBTQ2SIA-collaborative.html

Dalhousie Libraries: http://libraries.dal.ca/

Copyright Office: https://libraries.dal.ca/services/copyright-office.html

Dalhousie Student Advocacy Services: https://www.dsu.ca/dsas?rq=student%20advocacy

Dalhousie Ombudsperson: https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html

Human Rights and Equity Services: https://www.dal.ca/dept/hres.html

Writing Centre: https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html

Study Skills/Tutoring: http://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html

Faculty of Science Advising Support: https://www.dal.ca/faculty/science/current-students/undergrad-students/degree-planning.html

Safety

Biosafety: http://www.dal.ca/dept/safety/programs-services/biosafety.html

Chemical Safety: https://www.dal.ca/dept/safety/programs-services/chemical-safety.html

Radiation Safety: http://www.dal.ca/dept/safety/programs-services/radiation-safety.html

Laser Safety: https://www.dal.ca/dept/safety/programs-services/radiation-safety/laser-safety.html