GIS Applications to Environmental & Geological Sciences
DEPARTMENT OF EARTH & ENVIRONMENTAL SCIENCES
ERTH / GEOG 4520 WINTER 2025

Dalhousie University operates in the unceded territories of the Mi'kmaw, Wolastoqey, and Peskotomuhkati Peoples. These sovereign nations hold inherent rights as the original peoples of these lands, and we each carry collective obligations under the Peace and Friendship Treaties. Section 35 of the Constitution Act, 1982 recognizes and affirms Aboriginal and Treaty rights in Canada.

Dalhousie University also acknowledges the histories, legacies and contributions of African Nova Scotians, who have enriched that part of Mi'kma'ki known as Nova Scotia for over 400 years.

Teaching Team

Course Instructor	Bay Berry, MSc Bay.Berry@dal.ca	Student hours: Thursdays 1:30 to 3:30 MS-BOOKINGS: https://bit.ly/3NBYAdu
Teaching Assistant	Emma Taniguchi em969694@dal.ca	

Class Location

Lecture	Wednesday 2:35 – 3:55 Friday 2:35 – 3:55	LSC C244 or Asynchronous (Brightspace) LSC C244
Lab	Monday *or* Tuesday 8:35 – 11:25	LSC B3111

Course Description

Geographic information systems (GIS) provide a rich set of new tools to the geologist and environmental scientist, not only to solve conventional problems, but also to explore questions not readily answered by other means. This course builds on the fundamentals of GIS taught in ERTH 3500.03 to explore analytical tools that aid in decision-making processes encountered in mineral exploration, hydrogeology, site selection, environmental assessment, and global change analysis. The course concentrates on case studies and problem solving, including those requiring multi-criteria and multi-objective decision-making processes.

Course Prerequisites
GEOG 3500, ENVS 3500, ERTH 3500; ERTH 5600, or SCIE 3600; STAT 1060

Course Exclusions
Credit will only be given for one of ERTH 4520.03, ERTH5520.03, GEOG 4520.03

Learning Objectives

With successful completion of the course, students will be able to:

- recognize and describe how spatial data differs from aspatial data;
- explain why these differences create a need for new methods that explicitly consider the importance of location;
- compare and contrast different categories of spatial analysis and recognize how fundamental Geographic Information Science topics influence analytical choices;
- conduct advanced spatial analysis using GIS software; and
- compare and contrast how geographic information systems can be used to aid in advanced decision-making across several disciplines.

Student Resources

Student hours for the Course Instructor are booked through the instructor's MS-BOOKINGS site (https://bit.ly/3NBYAdu). Appointments are generally booked for 20-minute timeslots, and shorter windows are available for services such as test viewing. Meetings related to course content will be held via MS-TEAMS. Test viewings will be arranged at a location to be determined.

While it is a teaching space, the Elizabeth May Centre for Geocomputation (LSC-2012) is open to students to work outside of scheduled class time. The lab is open 7:00 am to 10:00 pm except on university holidays. The class schedule for the lab will be posted on the door to assist students with planning.

The GIS Centre (5th floor Killam Library) also supports this class by providing access to additional help during normal business hours (10 am – 4 pm). Appointments with a staff member for help on workshops or projects can be booked through their MS-BOOKINGS page (https://bit.ly/3OM7dDl). It is critical to note that the GIS Centre assists with applied parts of the course only; staff do not assist in answering theory-related questions on class deliverables.

Course Content

The course content will be delivered over five modules:

- Module 1: Review of Fundamentals; Descriptive statistics; Aspatial Inferential Statistics
- Module 2: Aspatial and Spatial Inferential Statistics; Local Indicators of Spatial Autocorrelation
- Module 3: Vector and Raster Surface Analysis
- Module 4: Interpolation
- Module 5: Advanced Pattern Detection

Week	Date	Theory / Applied	Assessment
1	Jan. 6 to Jan. 12	Module 1 / No Labs	-
2	Jan. 13. To Jan. 19	Module 1 / SWS-1	SWS-1*
3	Jan. 20 to Jan. 26	Module 2 / SWS-2	SWS-2*
4	Jan. 27 to Feb. 2	Module 2 / SWS-3	SWS-3*
5	Feb. 3 to Feb. 9	Test / SWS-4	Test 1, SWS-4*
6	Feb. 10 to Feb. 16	Module 3 / Working **	-
7	Feb. 17 to Feb. 23	Reading Week	-
8	Feb. 24 to Mar. 2	Module 3 / Working **	Project 1
9	Mar. 3 to Mar. 9	Module 4 / SWS-5	Test 2, SWS-5*
10	Mar. 10 to Mar. 16	Module 4 / SWS-6	SWS-6*
11	Mar. 17 to Mar. 23	Review, Test / SWS-7	SWS-7*
12	Mar. 24 to Mar. 30	Module 5 / Working **	-
13	Mar. 31 to Apr. 6	Module 5 / Working **	-
14	Apr. 7	Test Makeup / No lab	Project 2

Workshop deliverables are due +72 hours from the end of your scheduled lab section.

** Working weeks have lab instructor support for the leading 2 hours of the lab session.

Course Structure

Course Delivery

This course employs a **blended delivery model** with both in-person synchronous and asynchronous remote elements for the class. The in-person elements of the class are designed for in-person delivery with several deliverables requiring in-person attendance to complete (i.e., weekly exercises, two term tests).

Synchronous sessions will not be recorded, as the sessions are not designed as traditional lectures and most frequently engaging with organized pen and paper exercises.

Finally, this course employs the ESRI platform ArcGIS Pro^{TM}. As a U.S.-based company, ESRI observes embargoes placed on several countries by the U.S. government and does not permit exporting/use of the software in those embargoed nations for non-government users. From ESRI's Export Compliance material:

> *"In addition, ENC products are eligible for export to any nongovernment customer in all destinations except the embargoed countries: Cuba, Iran, North Korea, Syria, Russia, Belarus, and the Regions of Crimea, Donetsk People's Republic, and Luhansk People's Republic of Ukraine."*

Lectures

The scheduled **Wednesday sessions** will be designated for students to complete recorded lectures <u>except</u> for the class overview, weeks a test is to be held, and to make up for any unexpected class cancellation where the Tuesday session will then be used to reduce content progression.

The scheduled **Friday sessions** will remain in-person and involve organized class exercise, student Q & A, test delivery, and introduction of upcoming applied exercises. These sessions are scheduled in LSC Common Area 244.

Laboratories

There is one three-hour in-person lab section per week (there are two scheduled options), held in the third-floor teaching lab (LSC-3111). Students are permitted to contact the Teaching Assistant via MS-TEAMS with questions during their scheduled lab section if they are unable to attend in-person.

Course Materials

Textbooks

Required: **Spatial Statistics Illustrated**. Bennett & Vale 2023, Esri Press, ISBN 9781589485709

Recommended: **Principles of Geographical Information Systems**, 3rd ed. Burrough, McDonnell & Lloyd 2015, Oxford University Press, ISBN 9780198742845

Both books are available as physical copies on reserve through the Dalhousie Libraries.

Software

Access to ArcGIS Pro^{TM} 3.3 and GeoDa 1.20+ is required. Both pieces of software are installed on all Dalhousie campus machines (e.g. teaching labs, the Wallace McCain Learning Common, Killam Library). The ArcGIS Pro^{TM} software may also be available to you on your own computer through two alternative methods[1]:

1) **Downloading ArcGIS Pro™** through the Dalhousie Software resources to run on a Windows Operating System (https://software.library.dal.ca/). It is important to double-check the hardware requirements for the software if using this approach (https://bit.ly/3jGbk4k) as video capacity (recommended minimum is a 4 GB GPU) tends to be a common limitation. Because this class will be providing access to a named user account, the Dalhousie VPN will not be necessary if licensing of the local install is managed through the named user.
2) **Web Delivered Access** through a strong, stable broadband connection in a virtual lab environment (https://apps.vlab.dal.ca/, use: ArcGIS). This method can be used by either Windows or Mac operating systems through a downloadable client, or through a web browser.

Digital Storage

There are several times during the course where digital files are used across several weeks and deliverables. Because campus terminals are "frozen", students will need to save their work to an external location like their Dalhousie OneDrive or to an external USB drive (best practice is to save duplicates in separate locations). I recommend bringing a 64 GB Minimum USB drive (USB-3 recommended) to use exclusively for this course to save weekly applied work in addition to saving to OneDrive.

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[1] If using either of these options, students are responsible for ensuring they have either an appropriate Windows capable machine at home and/or a stable broadband connection (ethernet strongly recommended) to use VMWare or Remote Desktop.

Assessment

Category	Component	Weight	Date
Applied	Workshops	100	Weekly*
	Lab Project 1	175	February 28th (noon)
	Lab Project 2	175	April 7th (noon)
Theoretical	In Class Exercises	100	Weekly
	Test 1	150	February 5th (in person)
	Test 2	150	March 21st (in person)
	Test 3 (Final exam)	150	Scheduled by registrar
Total		1000	

Structured Workshop deliverables are due +72 hours after the end of your scheduled lab section.

Assignments

Applied – Small Value Lab Deliverables (100 pts.): Standalone, structured exercises completed in a single lab session with a deliverable such as a single map or worksheet to be evaluated. These exercises introduce and develop fundamental GIS techniques and data management practices in preparation for the Independent Lab Project. **Workshop deliverables are due +72 hours from the end of the student's scheduled lab section.**

Applied – Two Independent Lab Projects (350 pts.): Two multiple lab session projects, each worth 200 pts., requiring students to select and apply techniques learned in the previous standalone, structured exercises for an assigned area and topic. These projects are intended to develop the ability to integrate and contextualize analytical outputs in a professional product (e.g., PowerPoint Presentation, Technical Report, Story Map).

> Project 1 (175 pts.) – Due February 28th, 2024 at 12:00 pm (noon)
> Project 2 (175 pts.) – Due April 7th, 2025 at 12:00 pm (noon)

Synchronous Session – In Class Exercises (100 pts.): Weekly pen & paper exercises completed and discussed in the lecture section of the class. These exercises are pass / fail and intended to reinforce specific lecture topics or to demonstrate how the software executes an operation on one or more inputs.

Knowledge Tests

Students will complete three written tests for a total of 450 pts. Each test is valued at 150 pts towards the final grade and largely structured as short/long answer format. Tests 1 and 2 are held during the scheduled in person sessions and have a 90-minute time limit. Test 3 will be scheduled during the final exam period and have a 90-minute time limit.

> Test 1 (150 pts) – Wednesday, February 5th, 2025; Content = Modules 1 & 2
> Test 2 (150 pts.) – Friday, March 21st, 2025; Content = Modules 3 & 4
> Test 3 (150 pts.) – Scheduled during exam period; Content = Modules 1 - 5

Content on Tests 2 and 3 are not fully "cumulative" but may rely on several scaffolded topics from previous tests that carry through the entire term and underpin later concepts covered in the course.

Other Course Requirements

Students must earn 275 total points in the theory portion of the class and earn 225 total points in the applied portion of the class to complete the course. Students that do not achieve this threshold in both the theory and applied portions of the course will be assigned an F regardless of the total number of points earned.

Dalhousie Grade Scale

Grade	Range	Definition and Expectations
A+ A A-	90-100 85-89 80-84	**Excellent:** Considerable evidence of original thinking; demonstrated outstanding capacity to analyze and synthesize; outstanding grasp of subject matter; evidence of extensive knowledge base.
B+ B B-	77-79 73-76 70-72	**Good:** 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.
C+ C C-	65-69 60-64 55-59	**Satisfactory:** Evidence of some understanding of the subject matter; ability to develop solutions to simple problems; benefitting from his/her university experience.
D	50-54	**Marginal Pass:** Evidence of minimally acceptable familiarity with subject matter, critical and analytical skills (except in programs where a minimum grade of 'C' is required).
F	< 50	**Inadequate:** Insufficient evidence of understanding of the subject matter; weakness in critical and analytical skills; limited or irrelevant use of the literature.

Important Dates

Last day to change / add courses	January 20, 2025
Last day to drop without 'W'	February 3, 2025
Last day to drop with 'W'	March 5, 2025
Munro Day, university closed	February 7, 2025
Nova Scotia Heritage Day, university closed	February 17, 2025
Winter study break	February 17-21, 2025
Last day of classes – Friday schedule	April 7, 2025
Break before exams	April 8, 2025
Exam period	April 8-26, 2025

General Course Management Policies

Audits

As per section 10 of the Undergraduate calendar, audits of this course are only permitted if permission to audit the course is given by the course instructor and a plan of what constitutes the planned audit is agreed upon by the instructor and student.

Synchronous Sessions

There are no direct grade penalties for not attending the scheduled synchronous session (i.e., attendance). There are, however, assessments such as in-class exercises and term tests delivered and submitted during the synchronous sessions over the semester. Moreover, these sessions are also intended to provide a forum to ask clarification questions about lecture content, lab projects, and upcoming tests or exams. Material covered in the synchronous session may not be replicated in other media (i.e., the sessions are not recorded). Students are responsible for any information missed in the synchronous sessions.

Learning Management System (LMS)

Important information is posted to the LMS several times a week. It is the responsibility of each student to check the LMS and their Dalhousie email on a regular basis to ensure they are not missing any important materials, updates, announcements, etc.

Materials posted to the Learning Management System are for personal use only and are not to be shared (see Copyright Disclaimer in the LMS Course Shell). Sharing class materials with other students (registered in the class, not in the class, or outside the institution) is not permitted. Posting class materials to course sharing sites is also not permitted and could be considered both a copyright issue as well as a breach of academic integrity.

Social Media

It can be disheartening to see your instructor posting material to social media that negatively discusses their students, even when those posts do not identify individuals. As students in this class, you have my promise that I will not publicly post anything negative about participants in this class.
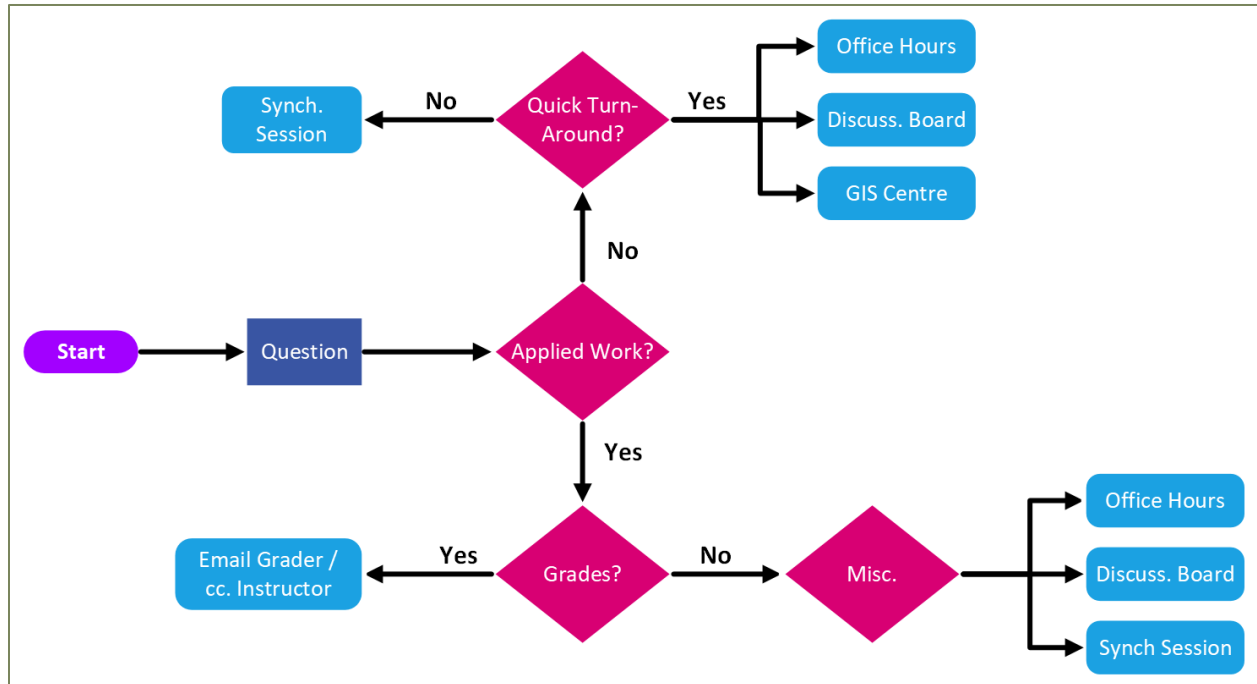
Course Variations

The course will be taught as close to the listed schedule as possible; however, some deviation from this schedule may be required as the term progresses.

Communications

Students are required to use discussion boards in the Learning Management System for many communication types, especially if related to course management and assessments that have applicability to the entire class cohort. If the Instructor, Lab Instructor, or Teaching Assistants receive an email and feel the question should go to the discussion boards, they will ask the student to replicate their question there for a full response or to ask the question in the next scheduled synchronous session.

Discussion boards will be set up to allow anonymous posting to increase the comfort level of students posting publicly. Please note that even with anonymous posting the moderator (i.e., the teaching staff) will know the identity of the user posting. Please endeavor to be courteous in all communications, including discussion boards.

Due to the volume of emails received during the semester, I am unable to guarantee immediate responses to email enquiries. Typically, students should expect an average of one business day for turnaround of responses to emailed questions. A rough decision tree to assist students in what communications tools to employ has been provided below.

Enquiries containing sensitive information or where privacy should be maintained should always be handled through office hours or email communications, never discussion boards.

Course Policies Related to Late or Missed Academic Requirements

Student Absence Declaration

This course has opted into the student declaration of absence in lieu of sick notes. Please refer to https://bit.ly/2NJS8jw for specific details about the use of the Student Declaration of Absence. This mechanism is meant to substitute for sick notes from a doctor related to short absences (less than three days) and does not provide an automatic exemption from any missed assessments. Accommodating the absence whether by exemption, extra time, makeup assessment, other is at the discretion of the course instructor. The SDA process can only be used twice in the course.

To streamline the process, when submitting an SDA you are required to submit the formal Dalhousie PDF (https://bit.ly/3NLYro9) through the completion of a Microsoft form (https://forms.office.com/r/4RXzmrLrhW) that will automatically send an email to the instructor when the form is submitted, thus satisfying the "inform instructor" portion of the policy. A link to this form is also provided in the LMS to the right of the Course Announcements.

Discretionary Extensions ("the Saving Throw")

In addition to accommodations provided by the SDA policy and long-term absence policy, each student begins the semester with <u>five</u> discretionary extensions they may use on any applied assessment (workshop or lab project). These extensions differ from accommodations like SDAs in that Students may choose to a discretionary extension to apply a +24-hour extension on that assessment for any reason not covered by standard accommodation policies, for any reason at all and with no questions asked. A maximum of <u>two</u> of these discretionary extensions or "Saving Throws" can be applied to the same assessment for a maximum of a +48-hour extension on the assessment.

Please note, <u>the teaching staff must be informed prior to the deadline</u> (see Communications Decision Tree) for the assessment passing to use these extensions for the extension to apply. Again, a Microsoft Form (https://forms.office.com/r/6JxJAanCz9) has been created for students to submit these requests. Like the SDA submission, this link is also provided in the LMS to the right of Course Announcements

You can use a discretionary extension / saving throw after the deadline, however half the late penalty will be applied for that saving throw. Additional saving throws for the same assessment requested prior to the deadline are treated independently.

These discretionary extensions are meant to supplement applicable policies such as the SDA (i.e., they are in addition to existing policies), and not meant to act as a replacement for these existing policies. If you are sick, have accommodations that include extensions, are in bereavement, then the policies that normally govern those conditions should be used (SDA, Accessibility, etc.).

Missed Small Deliverables (Module-Related Exercises and Structured Workshops)

For both the module related exercises and the structured workshops, the lowest individual item for each will be dropped from the total score. If a student does not submit an item, that item is assigned a 0 and will count as the lowest score item.

Missed Tests

If a student misses a test for valid reasons, they can write a make-up test during the scheduled class time on April 7th (Friday schedule). Students that miss more than one term test must consult with the instructor for options on a case-by-case basis.

Submission of Work and Late Penalties

To reduce the carbon footprint related to class delivery, most work will be submitted and graded electronically in the Brightspace LMS to reduce paper use.

Late penalties for written work without accommodation from the instructor are -20% per calendar day. Late penalties begin to accrue after the assigned submission time has been reached. For example, if an assignment is due on February 4th at 12:00 pm, submissions past that time (plus a brief "grace period") are subject to the first application of a -20% late penalty.

Course Policies Related to Academic Integrity

All written work may be subject to evaluation using a plagiarism detection service. All students are responsible for ensuring the product they submit to the LMS is the one they intended to submit. "I submitted the wrong draft" is not an acceptable justification for high similarity in originality detection, or as an effort to buy time to avoid late penalties from submitting after the scheduled due date. If a resubmission is permitted, that submission will be subject to a grade penalty unless there is timely notification from the student to the instructor that the wrong draft was submitted.

Unless otherwise noted by the instructor, independent work is required for each student. General discussion and peer tutoring are acceptable and encouraged; however, assessments with highly similar structure and flow of ideas are not acceptable and could be submitted to the faculty academic integrity officer for review. Similarly, if not indicated in individual assessment instructions, then the products of Large Language Models / Generative AI (e.g., text generated by ChatGPT, Conch AI, Mobile ChatBot extensions, browser extensions) will not be considered as independent student work and is explicitly not permitted for use in assessment submissions.

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 of 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 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. 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/ssc.html).

Conduct in the Classroom

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

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: https://www.dal.ca/cultureofrespect.html

Code of Student 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 student code of conduct can be found at: https://www.dal.ca/content/dam/www/about/leadership-and-governance/governing-bodies/code-student-conduct.pdf

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/content/dam/www/about/leadership-and-governance/university-policies/fair-dealing-policy.pdf

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/content/dam/www/about/leadership-and-governance/university-policies/originality-software-policy.pdf

Student Use of Course Materials

Course materials are designed for use as part of the Course Code 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.

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/content/dam/www/about/leadership-and-governance/university-policies/class-recording-protocol.pdf

Grading Practices Policy: https://www.dal.ca/content/dam/www/about/leadership-and-governance/university-policies/grading-practices-policy.pdf

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/about/mission-vision-values/equity-diversity-inclusion-and-accessibility/about-office-equity-inclusion/human-rights-and-equity-services/sexualized-violence/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

Mi'kmaq and Indigenous Relations: https://www.dal.ca/about/mission-vision-values/mikmaq-indigenous-relations.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

South House Sexual and Gender Resource Centre: https://southhousehalifax.ca/

LGBTQ2SIA+ Collaborative: https://www.dal.ca/about/mission-vision-values/equity-diversity-inclusion-and-accessibility/about-office-equity-inclusion/community-specific-groups/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/about/mission-vision-values/equity-diversity-inclusion-and-accessibility/about-office-equity-inclusion/human-rights-and-equity-services.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