

ENVS/GEOG/ERTH 2850**Foundations of Geospatial Information Science and Technology**
Faculty of Science – Department of Earth and Environmental Sciences
Fall 2026 Semester

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.

We recognize that African Nova Scotians are a distinct people whose histories, legacies, and contributions have enriched that part of Mi'kma'ki known as Nova Scotia for over 400 years.

Course Information

Course Description: Geographic Information Science (GIS) focuses on the principles of geographic data acquisition, storage, management, processing, visualization, and analysis, and covers fundamental elements of spatial modeling, cartography, geovisualization, spatial data sources and collection methods. Laboratory exercises emphasize the creation, management, and visualization of geographic data drawing from a range of disciplines.

Cross-Listing: EARTH/GEOG/ENVS 2850 and ENVA 3005

Exclusions: Students that are registered for or who have completed PLAN 2006, ENVS 2006, GEOG 2006, ENVA 4005 may not take this course.



Credit Value:
3



Learning Modality:
In-person



Format:
Lecture, Laboratory

Time: Friday 11:35 AM – 1:25 PM

Lecture Location: Goldberg Computer Science Building 127

Lab Schedule & Location:

Section B01: Tuesday 8:35 AM – 10:25 AM	Life Sciences Centre B3111
Section B02: Monday 8:35 AM – 10:25 AM	Life Sciences Centre B3111
Section B03: Tuesday 2:35 PM – 4:25 PM	Life Sciences Centre B2012



Course Learning Outcomes

Upon successful completion of this course, you will be able to:

1. Describe the evolution from spatial thinking to geographic information systems and related technologies to the need for geographic information science;
2. Recognize and describe the components (and component functions) of geographic information systems;
3. Explain and demonstrate how geographic data is generated, managed, modified, and visualized;
4. Critique the quality of data and geovisualization from a range of sources (popular media, memes, peer-reviewed manuscripts).

Instructor Information



Instructor: Dr. Brandon Heung
Email: Brandon.Heung@dal.ca
Office: Extension Engineering 222
Student Drop-in Hours: Thursday 10:35 – 11:35 or by appointment

Communications

For effective email communications, use your Dalhousie email address and include the course code in the subject line. I will answer emails and other communications in a timely manner and within their own normal work hours. You should not expect me to respond immediately to your message; a response might take 24- 48 hours. Please plan accordingly. Furthermore, faculty are not expected to check and respond to emails during evening and weekend hours.

Lab Instructor Information



Instructor: Bay Berry
Email: Bay.Berry@dal.ca
Office: TBA
Student Drop-in Hours: Tuesdays 1:00 - 2:00 or by appointment

Communications

For effective email communications, use your Dalhousie email address and include the course code in the subject line. I will typically respond within 48 hours on weekdays and respond to questions related specifically to lab assignments. If you are requesting an extension, please include the course instructor in the email.



Course Resources & Tools

To successfully complete this course, you should have access to a computer with a reliable internet connection and Microsoft Office for Windows/Mac. In addition, you will need the following resources and tools:

Resource/Tool	Required	Optional	Cost	How to Purchase/Access
ESRI ArcGIS Pro (Windows Only)	☐	✓	N/A	Link
Dalhousie VPN Client	☐	✓	N/A	Link
USB Thumb Drive (>5 GB)	✓	☐	N/A	Purchase only if needed.

Please note that you will have access to the software via the lab computers. This is only needed if you think you might want to use your own computer. You can also access ArcGIS Pro on any Dalhousie computer (e.g., Killam Library or Wallace McCain Learning Commons) for working on assignments outside of class time.

Brightspace Course Site

Students must access the Brightspace site to be successful in this class. The Brightspace site includes (1) all assigned readings and videos; (2) laboratory assignments, data, and supplementary videos; (3) and discussion boards. You can access the site by logging in using your student account at: <https://dal.ca/brightspace> (the login is also available from the Brightspace link on the Dalhousie University website at dal.ca) Students should be aware that the Instructors can see individual student's use of the course Brightspace site.

Only students registered in the course are permitted to view, download, upload, comment, or otherwise participate in the course site. You do not have permission to upload course materials to external/third-party websites.

While you may be able to access the course from your phone, a desktop computer or laptop is recommended. Brightspace functions best when using Google Chrome.

If you need assistance with Brightspace or other online learning technologies, submit an online ticket at <https://service.portal.dal.ca> or call 902-494-4357 (toll-free 1-800-869-3931).

Course Assessments

The following table outlines the assessments in this course. Refer to Brightspace for assessment expectations, requirements, and rubrics.

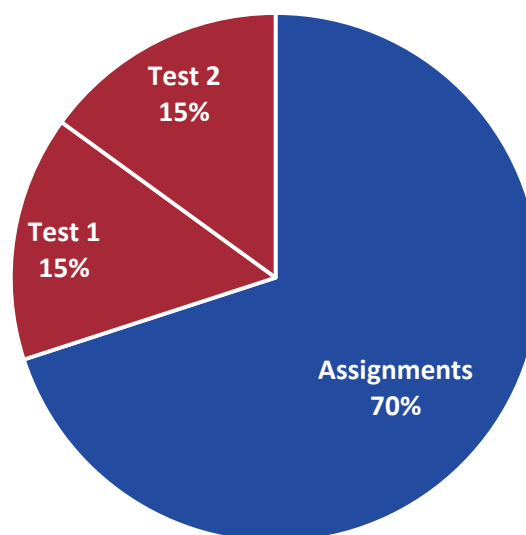
Assessment	Final Grade Weight (%)	Description	Completion/ Due Date
Laboratory 1	8.75%	Introduction to ArcGIS	September 28



Assessment	Final Grade Weight (%)	Description	Completion/ Due Date
Laboratory 2	8.75%	Digitizing in ArcGIS Pro	October 12
Midterm 1	15%	Closed-book exam, including materials from Modules 2-4, 6-7. 2-hour duration with combination of multiple choice, short answer, and long answer questions	October 16
Laboratory 3	8.75%	Projecting Geographic Data	October 19
Laboratory 4	8.75%	Digital Data and Basic Table Operations	November 2
Laboratory 5	8.75%	Table Operations in ArcMap	November 9
Laboratory 6	8.75%	Spatial Selection, Importing, Joining Tables	November 16
Laboratory 7	8.75%	Buffering and Overlay	November 23
Midterm 2	15%	Closed-book exam, including materials from Modules 8-11. 2-hour duration with combination of multiple choice, short answer, and long answer questions	December 4
Laboratory 8	8.75%	Raster Analysis	December 7

If an assessment may result in a barrier or does not align with your formal academic accommodations, reach out to me to collaboratively find a solution that meets your needs.

Course grades reflect your demonstrated achievement in meeting the course learning outcomes. Numerical grades will be converted to final letter using the following grade scale. This scale also indicates the passing course grade and GPA values that correspond with each letter grade. Refer to the [Grading Practices Policy](#) for more information.





Course Grading Scale

A final letter grade will be assigned based on the following scale:

Percentage	Grade	Definition	Notes
89.5-100	A+	Excellent	Considerable evidence of original thinking; demonstrated outstanding capacity to analyze and synthesize; outstanding grasp of subject matter; evidence of extensive knowledge base.
84.5-89.4	A		
79.5-84.4	A-		
76.5-79.4	B+	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.
72.5-76.4	B		
69.5-72.4	B-		
64.5-69.4	C+	Satisfactory	Evidence of some understanding of the subject matter; ability to develop solutions to simple problems; benefitting from his/her university experience.
59.5-64.4	C		
54.5-59.4	C-		
49.5-54.4	D	Marginal Pass	Evidence of minimally acceptable familiarity with subject matter, critical and analytical skills (except in programs where a minimum grade of "C or C+" is required).
0-49.4	F	Inadequate	Insufficient evidence of understanding of the subject matter; weakness in critical and analytical skills; limited or irrelevant use of the literature.
0.00	INC	Incomplete	
Neutral and no credit obtained	ILL	Compassionate reasons, illness	



Instructions for Submitting Assignments: All assignments will be submitted via Brightspace.

Group Work: All assignments are to be completed on an individual basis.

Use of Generative AI (e.g., Copilot Chat): The use of AI is not permitted for this course, it will be considered an academic integrity offence, and you will be subject to appropriate disciplinary and/or corrective measures.

Accessibility: Refer to the Student Accommodation Policy for information on how Dalhousie instructors and staff work collaboratively with students to create and sustain an accessible educational environment.

- **If there are aspects of this course, including but not limited to its design, teaching approaches, learning activities, and assessments, that result in barriers to your learning or do not align with your formal academic accommodations, reach out to me to collaboratively find a solution that meets your needs.**
- You are eligible for accommodations based on protected characteristics such as religion. If you have religious, cultural, or community-significant observances that conflict with course requirements, reach out to me to collaboratively find alternatives for completing the course requirements.
- To begin the process of requesting a formal academic accommodation, contact the Student Accessibility Centre (or the Student Success Centre for Faculty of Agriculture courses).
- Your classroom may contain accessible furniture and equipment. It is important that these items remain in the classroom, undisturbed and unused, so that classmates who require their use will be able to fully participate in the course.

Academic Integrity: Dalhousie expects all students to be responsible learners, demonstrating the values of intellectual honesty, trust, fairness, and respect in your work. Key aspects of academic integrity include, but are not limited to: avoiding plagiarism, not engaging in cheating, submitting original work, and acknowledging sources of information and ideas when they are not your own. Refer to the Statement on Intellectual Honesty for definitions of various academic offences. Failure to meet Dalhousie's academic integrity standards will result in appropriate disciplinary and/or corrective measures.

Missed and Late Assessments: Unless permitted otherwise, late assignments will receive a 10% deduction per day. A 48-hour extension will be provided once for any reason. If additional extensions are required, please submit a Student Declaration of Absence (SDA) Form via email or email me directly.

Assignment Regrades: All requests for regrades should be directed to the course instructors.



Tentative Course Schedule

Refer to [Dalhousie's Important Dates](#) for holidays and academic dates such as course add, drop, and withdrawal dates. The course schedule may be revised/amended due to unusual circumstances (e.g., instructor illness, Public Health/university requirements, campus closure due to inclement weather). This may include providing lecture or lab material online rather than in person. Any such change, including changes in assignment dates, will be communicated to students by e-mail and/or Brightspace notices.

Week #	Class Date	Topics	Optional Readings	Activities & Assessments
1	Sep 11	Module 1: Course Introduction & Overview Module 2: Thinking Geographically	Course Outline	
2	Sep 18	Module 3: Introduction to GIS Module 4: GIS Software	GIS Fundamentals (Bolstad), "Chapter 1 – An Introduction to GIS"	Assignment 1: Introduction and Map Creation
3	Sep 25	Module 5: Introduction to Spatial Data Models Module 6: Maps & Mapping Concepts	GIS Fundamentals (Bolstad), "Chapter 2 – Data Models"	Assignment 1: Introduction and Map Creation (continued)
4	Oct 2	Module 7: Projections & Coordinate Systems	GIS Fundamentals (Bolstad), "Chapter 3 – Geodesy, Datums, Map Projections, and Coordinate Systems"	Assignment 2: Digitizing in ArcGIS Pro
5	Oct 9	Module 8: Acquisition of Spatial Data Midterm 1 Review		Assignment 3: Projecting Geographic Data
6	Oct 16	Midterm 1	Modules 2-4; 6-7	No Lab



Week #	Class Date	Topics	Optional Readings	Activities & Assessments
7	Oct 23	Module 9: Spatial Data Management, Storage, and Quality I	GIS Fundamentals (Bolstad), "Chapter 7 – Digital Data"	Assignment 4: Digital Data & Basic Table Operations
8	Oct 30	Module 9: Spatial Data Management, Storage, and Quality II		Assignment 5: Table Operations
9	Nov 6	Module 10: More on Spatial Data Models		Assignment 6: Spatial Selection, Importing, and Joining Tables
10	Nov 13	READING WEEK (NO CLASS)		
11	Nov 20	Module 11: Basics of Spatial Analysis (Raster & Vector Data)		Assignment 7: Raster Analyses
12	Nov 27	Midterm 2 Review		Assignment 8: Buffering and Overlay in ArcGIS Pro
13	Dec 4	Midterm 2	Modules 9-11	

*Current as of August 5, 2026.

Syllabus Appendix: Student Supports & University Statements, Policies, and Guidelines

Select the link above for student supports available to all Dalhousie students, and University-wide statements, policies, and guidelines applicable to your academic studies.