

Environmental Informatics

*Dalhousie University is in Mi'kma'ki, the ancestral and
unceded territory of the Mi'kmaq. We are all Treaty people.*

Instructor:	Dr. Amy Mui (amy.mui@dal.ca)
Teaching Support:	Emma Daigle (edaigle@dal.ca)
Course Delivery:	In-Person

	DAY	TIME	LOCATION
LEC	MON	10:05-11:25	MCCAIN2019
LAB:	MON	12:35-2:25	LSC B3111
		2:35-4:25	LSC B3111

Course Description

Environmental Informatics is the knowledge, skills and tools which enable information to be collected, managed and disseminated to support research in environmental science. Students develop analytical skills using a variety of software including an introduction to spatial querying in GIS. Identification of fallacies in the media and principles of effective science communication are introduced and applied to current environmental issues and challenges.

Course Prerequisites: ENVS 1100.03 or ENVS 1200.03 and STAT 1060.03

Learning Objectives / Outcomes

After successfully completing this course, students will be able to;

- Understand sources of information required for addressing environmental challenges
- Identify a suite of contemporary tools and techniques in environmental informatics
- Apply literacy, numeracy, and critical thinking skills to environmental problem-solving
- Utilize geographic information systems (GIS) at an introductory level
- Apply basic R coding language to view, query, and visualize environmental data

Course Materials

Textbook. There is no textbook for this course. Reading materials will be posted on Brightspace.

Student Response Systems. Throughout the term we may use a series of online student response systems for polling the class. Examples include Socrative (www.socrative.com), Poll Everywhere (www.pollev.com) and functions built into BrightSpace and/or MS Teams. All platforms are free and no additional fees are required.

Course Assessment

Component	Weight	NOTES
Assignments (48%)		
1. LAB 1: Big Data Analysis through the Lens of Generative AI	12%	Submitted online via Brightspace
2. LAB 2: Mapping Census Patterns with ArcGIS Pro	12%	Submitted online via Brightspace
3. LAB 3: Intro to Coding Env Data in R	12%	Submitted online via Brightspace
4. LAB 4: Environmental Communication	12%	Submitted online via Brightspace
5. BONUS Remote Sensing Lab	(2%)	Optional submission
Mid-term Quiz	17%	Covers all topics prior to the fall break
Participation	10%	Ongoing
FINAL EXAM	25%	Cumulative. Held during exam period. 3h.

Accommodations: If you have an approved accommodation, you must email me prior to the start of class to confirm your needs. Accommodations are not automatically applied. E.g., if you have a need for extended time for quizzes/tests, you must approach me before the test and confirm you will be using this accommodation. In most cases, extended time and low-disturbance writing environments can only be accommodated by the Student Accessibility Centre. To book with them, you will need to complete the online form no later than 9 days from the date of your quiz/test/exam.

Assignments: Assignments build on class topics and are begin in the computer lab but are often completed outside of class time. Any campus computer will have the programs used in this course. Assignments are submitted electronically through the Brightspace on the due date. Reach out if you need additional assistance beyond what is provided in class. [See note on late assignments below.](#)

Participation: This is determined through your engagement in class and posted activities. Often instructions are provided during lectures, for which attendance is required. Missed participation items cannot be made up.

Tests: There will be one mid-term quiz and one final exam. The final exam is computer-based and covers course material from the entire term

MISSED OR LATE ACADEMIC REQUIREMENTS DUE TO STUDENT ABSENCE

Late penalties: Late assignments will be subject to a late penalty of 10% per day (including weekends). Assignments submitted 7 calendar days past the due date will be assigned a zero. If you require an accommodation, please speak with an instructor in advance of the due date. I will grant one free late admission per student provided the assignment is submitted before the grades and feedback are returned to the rest of the class (typically one week after the original due date but confirm with Amy). If you intend to use the free pass you must email Amy and confirm your new due date. Free passes are not automatically applied and will not be applied after a late submission.

Missed Midterm or Final Exam: Students must email an instructor at least 48 hours prior to the quiz or exam day if they are not able to write the assessment. Cases will be reviewed individually to determine if a missed assessment will be replaced by (a) a make-up quiz offered on another date, (b) an alternate assignment in lieu of the exam or (c) a re-weighting of already assessed components.

Student Declaration of Absence: The Student Declaration of Absence (SDA) Form will be used in this course and will replace sick notes for absences of three days or fewer that result in missed or late academic requirements. The form can be submitted to me via email. Submission does not provide automatic exemption from any academic requirements that were missed or late during an absence. Any alternate coursework arrangements for missed or late academic requirements are at the discretion of the course instructor. Students must also email the instructor prior to the due date if a deadline is going to be missed.

Course Policies related to Academic Integrity & Artificial Intelligence. At Dalhousie University, we are guided 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. https://www.dal.ca/dept/university_secretariat/academic-integrity.html
Students are allowed to work together on assignments and are encouraged to do so, but the collaborative effort must be fair, balanced, and devoid of copying from peers.

ENVS2100 Policy on Generative AI

GenAI cannot do the learning for you. Real learning that lasts and builds your skills requires effort and challenge. LLMs like CoPilot, ChatGPT, Claude, can be useful tools if used to support learning but not replace learning. You must also develop your own moral stance on whether it is environmentally ethical to use genAI as a citizen of Earth. This course will help you decide where you stand. REMIND YOURSELF: an LLM is not a person. It's a machine trained to recognize patterns and reflect those patterns back at us. It can hallucinate and send back wrong answers with high confidence. It cannot think for itself. And it cannot think for you. With this in mind, you must adhere to the following guidelines in this class:

-  You cannot use LLMs to answer lab questions. This is an academic integrity offence and will not prepare you for the exams.
-  Due to privacy and confidentiality issues, you cannot paste any course material into a GenAI tool – unless you have been instructed to do so for an assessment. This includes – but is not limited to – quiz questions, learning objectives, bonus case-studies, course material (e.g, slides, text), etc.
-  You are free to use genAI to give you feedback on notes you have created yourself, suggest a study schedule ahead of an exam, explain a general concept, or provide practice exam questions. Always ask for responses that are evidence-based, and check the sources.
-  Fact-check all AI outputs. Assume it is wrong unless you cross-check the claims with reliable sources. GenAI models will confidently reassert factual errors. You are responsible for any errors or omissions. Often if you question the AI or ask it to fact-check itself, holes will appear.

IMPORTANT: Generative AI (GenAI) currently poses considerable privacy risks. To mitigate these risks, use the Dalhousie-licensed version of Copilot and avoid inputting personal information.

Course Schedule

Week	Date		Class Activity		Due Date
1	Sep	14	LEC	Class INTRO & Overview	
			LAB	Excel Hacks: Shortcuts and Pro Tips	
2		21	LEC	Understanding AI	
			LAB	LAB 1 – Env Impacts of AI (Excel)	
3		28	LEC	Understanding AI	
			LAB	LAB 1 – Env Impacts of AI (Excel)	LAB 1 DUE: Mon Oct 5 @ 9am
4	Oct	5	LEC	Introduction to Spatial Data	
			LAB	LAB 2 – Mapping Census Patterns (ArcGIS)	
5		12	LEC	**THANKSGIVING Mon Oct 12**	
			LAB	NO CLASS/LAB this week	
6		19	LEC	Intro to Spatial Data & Mapping	
			LAB	LAB 2 – Mapping Census Patterns (ArcGIS)	LAB 2 DUE: Mon Oct 26 @ 9am
7		26	LEC	Introduction to Coding in R	
			LAB	LAB 3 – Env Data Visualization in R	
8	Nov	2	LEC	Introduction to Remote Sensing	
			LAB	LAB 3 – Env Data Visualization in R	LAB 3 DUE: Mon Nov 9 @ noon
9		9	FALL BREAK – NO CLASS/LAB		
			Review materials will be posted over the break		
					BONUS LAB: due date TBD
10		16	LEC	Virtual Q&A session prior to midterm	
			LAB	MIDTERM (during lab time)	
11		23	LEC	Logical Fallacies	
			LAB	LAB 4 – Communicating Science to Change Minds	LAB 4 DUE: Tues Dec 8 @ 12:59pm
12		30	LEC	Cognitive Biases	
			LAB	LAB 4 – Communicating Science to Change Minds	
13	Dec	7	LEC	Course Review: Saving the World, One Dataset at a Time	
			LAB	OPEN LAB (Optional Attendance)	
14		8	LEC	Course Review: Still Saving the World, With More Datasets	
			LAB	NO LAB	

Exam Period (formerly Dec 11-20)

IMPORTANT NOTES:

- This schedule is tentative and may change slightly depending on class interests and time available. The syllabus will be updated accordingly and posted on Brightspace.
- All course materials will be posted on Brightspace - please login to the site regularly. In order to receive timely notifications, please **sign-up to receive immediate text or email notifications** when new course announcements appear. You can do so by clicking on your

name in the top right corner of Brightspace > select *Notifications* > under *Instant Notifications* check “Announcements – new announcement available”.

- Check this website for the last day to drop fall session courses without a ‘W’ (for withdrawn): https://www.dal.ca/academics/important_dates.html
- Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale:

A+ (90-100)	B+ (77-79)	C+ (65-69)	D (50-54)
A (85-89)	B (73-76)	C (60-64)	F (<50)
A- (80-84)	B- (70-72)	C- (55-59)	

Course 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.

- 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](#). 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)

Syllabus Appendix

Click on the link to access student supports, university policies, and guidelines:

[Syllabus Appendix: Student Supports & University Statements, Policies, and Guidelines](#)