

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: | To be announced |
| Course Delivery: | Lectures synchronous via MS Teams Labs are in-person |

| | DAY | TIME | LOCATION |
|------------------|------|----------------|------------------|
| Lectures: | MON | 2:35pm-3:55pm | Online via Teams |
| Labs: | TUES | 9:35am-11:25am | LSC B3111 |
| | TUES | 11:35am-1:25pm | 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 (55%) | | |
| 1. LAB: Data Management in Excel | 12.5% | Submitted online via Brightspace |
| 2. LAB: Mapping Census Data with ArcGIS Pro | 12.5% | Submitted online via Brightspace |
| 3. <u>BONUS</u> Remote Sensing Activity | (2%) | Submitted online via Brightspace over Fall Break |
| 4. LAB: Intro to Coding in R | 15% | Submitted online via Brightspace |
| 5. LAB: Environmental Communication | 15% | Submitted online via Brightspace |
| Mid-term Quiz | 15% | During class time. Covers first half of term. |
| Participation | 10% | Ongoing |
| FINAL EXAM | 20% | Cumulative. Held during exam period. 3h. |

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

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.

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.

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 or at most, two days after the due date has passed. For this Fall 2025 term I will grant one free late admission provided the assignment is submitted before the grades and feedback are returned to the rest of the class. This is typically one week after the due date. If you intend to use this free pass, send Amy an email.

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 new 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. 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. Generative AI and large language models such as ChatGPT are not permitted for use in assignments.

Information: 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.

Course Schedule

| Week | Date | | Class Activity | Quizzes & Due Dates |
|------|------|--------|---|--|
| 1 | Sep | 23 LAB | FIRST CLASS! Intro + Course Overview + Env Data LAB 1 (part 1) Demo | |
| | | 29 LEC | Data Visualization + Lab 1 (part 2) Demo | |
| 2 | | 30 LAB | **Truth & Reconciliation** NO CLASS | LAB 1 DUE: Mon Oct 6 @ noon |
| | Oct | 6 LEC | Introduction to GIS & Mapping | |
| 3 | | 7 LAB | LAB 2 Part 1, Mapping Census Variables | |
| | | 13 LEC | **Thanksgiving** NO CLASS | |
| 4 | | 14 LAB | LAB 2 Part 2, Guest Support Jennifer Strang, GIS Centre | LAB 2 DUE: Mon Oct 20 th @ noon |
| | | 20 LEC | Introduction to Coding in R | |
| 5 | | 21 LAB | LAB 3, Intro Coding Part 1 Demo | |
| | | 27 LEC | Introduction to Remote Sensing (Bonus Activity Introduced) | |
| 6 | | 28 LAB | LAB 3, Intro Coding Part 2 Demo | LAB 3 DUE: Mon Nov 3 @ noon |
| | Nov | 3 LEC | Mid-term Review | |
| 7 | | 4 LAB | MIDTERM (during lab time) | |
| | Nov | 10 LEC | Fall Study Break, NO CLASS | |
| 8 | | 11 LAB | Fall Study Break....Remember to study! | BONUS: Due Wed Nov 12 @ 11:59pm |
| | | 17 LEC | Logical Fallacies in the Media | |
| 9 | | 18 LAB | LAB 4 Overview | |
| | | 24 LEC | Cognitive Biases | |
| 10 | | 25 LAB | LAB 4 optional attendance (Check-in) | |
| | Dec | 1 LEC | Science Advocacy | LAB 4 DUE: Mon Dec 1 @ noon |
| 11 | | 2 LAB | Course Review – computer-based | |
| | | 8 LEC | Course Review – game-style | |
| 12 | | 9 LAB | Open Study Lab (optional) | |
| | Dec | 11-21 | Exam Period (formerly Dec 5-16) | |

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) | |

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 Mi'kmaq and Indigenous Relations (including the Elders in Residence program, Land Acknowledgements, Understanding Our Roots, and much more) can be found at: <https://www.dal.ca/about/mission-vision-values/mikmaq-indigenous-relations.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/mission-vision-values/global-relations.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/campus_life/ssc.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: <https://www.dal.ca/about/mission-vision-values/equity-diversity-inclusion-and-accessibility/about-office-equity-inclusion.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/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>

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.

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>

Dalhousie Grading Practices Policies: <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/content/dam/www/about/leadership-and-governance/university-policies/sexualized-violence-policy.pdf>

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/campus_life/ssc.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://www.dal.ca/about/mission-vision-values/mikmaq-indigenous-relations/elders-in-residence-and-traditional-knowledge-keepers.html>

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/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/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>