



Faculty of Science Course Syllabus | Department of Earth and Environmental Sciences

ENVS 3100 Environmental Analytics Winter Term 2026

Instructor: Dr. Amy Mui (amy.mui@dal.ca)
Office Hours: Click [HERE](#) to make a virtual booking with me
Course TA: Kate Sparling (kate.sparling@dal.ca)

	DAY	TIME	LOCATION
Lectures:	Tues	1:05-2:35pm AST	MCCAIN 2019
Labs	Wed	10:05-1:35am AST	MCCAIN 2019

Course Description:

This course provides students with the opportunity to apply foundational knowledge of statistics and data analysis to support environmental decision-making and communication of results. Lab sessions provide hands-on experience with spatial pattern determination, spatial interpolation, raster analysis, and the use of ecological modelling algorithms. Emphasis is placed on learning skills directly applicable to conducting environmental research in a variety of settings. Analysis and interpretation of data is conducted across multiple software environments and packages (e.g., R, ArcGIS, Linkage Mapper) and includes advanced methods of visualizing spatial, multi-dimensional (2D/3D), and non-static information.

Prerequisites: ENVS2100, STAT2080

Objectives / Learning Outcomes:

Students will;

- Strengthen their understanding of the conceptual foundations of environmental statistics and the major issues and pitfalls associated with study design and the use of computer models.
- Learn to recognize and apply appropriate analytical techniques to different types of environmental data
- Interpret results of analytical methods and apply science-based conclusions
- Gain experiencing utilizing a variety of visualization methods for depicting complex environmental data

Course Format & Materials

BRIGHTSPACE: All assignment instructions, grades, and primary announcements will be posted here. Ensure your settings send you an email when announcements are made. This will be my primary method of communication.

I am open to suggestions along the way. If you have any ideas to make this term better for everyone, please do not hesitate to reach out to me

Course Materials & Computer Access:

There is no textbook for this course. Reading materials will be provided through Brightspace or links in the course slides. We will be using R (RStudio), Excel, and a GIS (Arc +/- Google Earth) in class. A windows computer is highly recommended for ArcGIS Pro though remote and virtual platforms are available or Mac users.

Course Assessment

Component	Weight	Date
Group exercises	40%	Ongoing (during lab time)
Concept Checks x 3 (5% each)	15%	(in-class)
Mythbusters	15%	(in-class)
Participation-Engagement	5%	Throughout term
Final Exam	25%	(during final exam period)

- 1. In-class Group Exercises.** Students complete small tasks related to weekly topics in pairs or small groups to build proficiency in applied skills (e.g., data analysis and data visualization). The purpose is to repeat tasks until they become familiar. The exercises are discussed as a group, but submitted individually by the due date.
- 2. Concept Checks.** Short questions based on broader concepts will assess your understanding of the class topics. Concept checks are written online via Brightspace and spread out throughout the term. They are written during class time and should take approx. 10-15min to complete.
- 3. Mythbusters:** This popular module combines science communication with dispelling a common myth and as much added flair as you want! Students will work in pairs to develop a short presentation with choice of multiple formats. Details to be discussed in class.
- 4. Participation-Engagement:** Assessed through your contribution to class prompts, teamwork and peer support, TWO peer support polls will be given out during the term worth 1% each. This is to recognize students who take initiative to start discussions, provide support, and lead or moderate peers during breakout groups and contributes to development of important soft skills.
- 5. Exam.** A final applied exam will be written during the exam period. The test is cumulative and involves applied skills. If you completed all the in-class exercises, the final exam should hold no surprises.

MISSED CLASS. If you miss a class you are responsible for catching up on missed materials. Aside from reviewing slides and lab instructions, you should also contact a classmate to make sure you are aware of all the information that was missed. Extra incentive to make a buddy!

MISSED WORK. Students must submit an email to me **prior to** missing a deadline and I will respond with next steps.

Course Schedule

WEEK	TOPIC	CLASS	LAB	Assessment
1	WELCOME to 3100!	Poll, Icebreaker, short activity	Excel Refresher	
2	Data Skills: Summarising & Finding Trends	UN SDG Exercise	Data Extraction in Excel	
3	Data Skills: Building Spreadsheet Proficiency	Useful tools and formulas	Data Manipulation in Excel	
4	Data Mining: Correlation	Case Study: Plight of the Pika	Correlation Analysis in Excel and R	
5	Data Mining: Regression	Case Study: Plight of the Pika (cont'd)	Regression Analysis in Excel and R	
6	DataViz: Graph Interpretation	Graphing Literacy & ggplot Intro	Practice graph interpretation exercises	Concept Check 1
7	Winter Study Break (no meetups, no class)			
8	Data Viz: Building Better Graphs	Creating animated graphs	Create ggplots from sample data	
9	GeoSpatial Problem Solving	Demonstrate coding script for gganimate (animated graphs)	GIS-based practice exercises	Concept Check 2
10	GeoSpatial Problem Solving	Case Study: Parks & PA Planning	GIS-based practice exercises	
11	Science Communication & Dissemination	Effective Argument	Overflow: Time to work on presentations	Concept Check 3
12	Presentations WEEK	Student Presentations	Student Presentations	
13	Course Review	Concept Review	Applied review	
14	Last Class Tues Apr 7: Open Drop-in Session (optional)			

EXAM PERIOD: April 11-27, Final Exam will be computer-based and written in MCCAIN2019

**In-Class exercises are discussed as a group but submitted individually and graded. If you miss a class, you may still complete the exercise on your own, but attendance is required for the peer review (2%).*

IMPORTANT NOTES:

- Attendance is a requirement and expectation for success in this course.
- 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.

- Important dates such as the last day to drop courses can be viewed here:
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):

https://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>