



ENVS-ERTH-BIOL-SCIE-GEOG 4850 | Winter 2020

## GIS Research Project

**Instructor:** Dr. Amy Mui ([amy.mui@dal.ca](mailto:amy.mui@dal.ca))  
**Office Hours:** Open door policy or email for appointment  
**Office Location:** Life Sciences Centre, LSC813

	DAY	TIME	LOCATION
<b>Lectures:</b>	Friday	8:35-11:25am	LSC-BIOL&EARTH B2012

### Course Description

Students learn how to design, manage and complete a research project in Geographic Information Science (GIS). Projects must include a substantive analytical component where GIS is central to methods employed. Evaluation includes a written report, oral presentation and digital data. Required for completion of the Certificate in GIS.

**Course Prerequisites:** ENVS/ERTH/GEOG 3500

**Co-Requisite:** ERTH/GEOG 4250

**Exclusions:** Restricted to 3rd and 4th year students.

### Course Objectives/Learning Outcomes

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

- Conduct an independent GIS-focussed research project from experimental design and data collection to analysis and interpretation of results
- To apply critical thinking skills to environmental problems in the spatial domain
- Develop skills in disseminating research through web-based GIS platforms

### Course Materials

**Readings |** There is no required textbook for this course. Reading materials will be provided in class in digital form on the course Brightspace site or from the reserve desk at the Killam Library. The course syllabus, updates, announcements, assignments, and other relevant information will be posted to the course Brightspace page.

**Web-based Student Response Systems (SRS's) |** We will be using a combination of web-based student response systems (e.g., Socrative, Poll Everywhere) which can be accessed online through lab computers or through your mobile devices. SRS's will be used to review past material, and to poll the class on various topics of interest.

## Course Assessment

Component	Weight	Date
<b>Project</b>		
Data Search	5%	Thurs Jan 30
Workflow	8%	Wed Feb 12
Assignment 3	10%	Thurs Feb 27
<b>Research Project</b>		
Proposal	10%	Thurs Feb 20
Proposal Discussion	7%	Fri Feb 28 (In-class)
ESRI Story Map	15%	Fri Apr 3
Final Research Presentation	15%	Mon Apr 6 (In-class)
Final Research Report	25%	Wed Apr 16
<b>Other</b>		
Participation	5%	(ongoing)

**Assignments:** There are *three assignments* which address different components of a research project and provide the opportunity to practice and obtain feedback on essential skills. An ESRI Story Map will be introduced as a method of web-based dissemination of spatial information. Assignments are completed individually and will often need to be completed outside of class time depending on how quickly you work. Submission is electronically through the Brightspace course website on the due date by the end of the day (11:59pm). See 'Important Notes' section for policy on late assignments.

*Assignment 1* – Project Proposal Brainstorming – Develop three tangible ideas for your research project and search for available data for each. Describe the problem, identify your data needs, and outline the solution using the template discussed in class.

*Assignment 2* – Project Flowchart – Select one of your project ideas and create a flowchart following the guidelines provided in class. Provide a detailed breakdown of the proposed analytical tool along with examples of its use in other geospatial problem-solving contexts.

*Assignment 3* – ESRI Story Map Georesume – Create a visual and geospatial resume to present to potential employers and showcase your web app, GIS, and design skills. At the end of your class, you will add the results of your project to this shareable Story Map platform.

**Research Project:** The research project is the focus of this course. Individuals will choose a topic of interest, collect/acquire the necessary spatial data, and apply analytical methods within a GIS framework. The proposal will include a summary of the proposed research including methods and a literature review. A short and very informal proposal discussion with the class will help to foster communication and the exchange of ideas among peers. Final presentations will be given in class (15-20 minutes each) and research reports submitted by the end of term before the exam period. Each student will create an ESRI story map (adding to Assignment 3) to highlight their research. The Story Map may be used in the final presentation, but additional slides are also required. Details to be discussed in class.

**Participation:** Assessment is through participation in class activities such as discussions, SRS polls, whiteboard work, peer review and skill development exercises. Applied skills in GIS and spatial analysis will be advanced through sharing and collaborative learning. Assessment is through participation in asking, sharing, and responding to questions posed.

**Course Content (Schedule)**

Date	Class Activity	Due Dates
Jan	Course Intro, Icebreakers, Skills Assessment, Class Polling, Sample GIS Exercise <i>EXERCISE: Measuring Habitat Fragmentation</i>	
	Steps in GIS Problem Solving <i>Brainstorming Research Ideas</i>	
	<i>WORKSHOP: Multi-Criteria Analysis</i>	
	Acquiring & Preprocessing Data <i>WORKSHOP: Estimating Sea Level Rise</i>	<b>Assignment 1 DUE:</b> Thurs Jan 30 @11:59pm
	Guest Lecture; Jen Strang, GIS Analyst, GIS Centre (Killam Library) <i>WORKSHOP: Using Model Builder to Improve Workflows</i>	
Feb	7 <i>MUNRO day – no class</i>	<b>Assignment 2 DUE:</b> Wed Feb 12 @11:59pm
	Written Proposal Overview	
	14 Storytelling using Spatial Data <i>WORKSHOP: ESRI Story Maps</i>	
	21 Winter Study Break	<b>Written Proposals DUE:</b> Thurs Feb 20 @11:59pm
	28 Proposal Discussions (IN-CLASS) Remote Sensing overview, Spectral Indices, Image Classification	<b>Assignment 3 DUE:</b> Thurs Feb 27th @ 11:59pm <b>Proposal Discussion</b>
Mar	6 Research project work time*	
	13 Research project work time*	
	20 Research project work time*	
	27 Research project work time*	
Apr	3 Research project work time*	<b>ESRI Story Map DUE:</b> Fri Apr 3 @11:59pm
	6 Final Presentations (NOTE: This is a Monday)	<b>Final Presentations</b> <b>IN-CLASS</b>
	No Final Exam	<b>FINAL RESEARCH</b> <b>REPORT DUE:</b> Wed Apr 16 @ 11:59pm

\*Scheduling details to be discussed prior to the reading break. Project and technical supervision and guidance provided by myself and Jen Strang from the GIS Centre.

**IMPORTANT NOTES:**

- **If you are going to miss an assessment deadline due to an absence of no more than THREE days, you must email me PRIOR to the deadline to request accommodation.** Details can be found here: [https://www.dal.ca/campus\\_life/safety-respect/student-rights-and-responsibilities/academic-policies/student-absence.html](https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/academic-policies/student-absence.html)
- Attendance is a requirement and expectation of this course. Chronic absences will result in a poor participation mark and overall lower quality of work. Use the time in class to receive support for your research project.

- 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.
- In order to receive timely notifications, **sign-up to receive immediate text or email notifications from Brightspace** 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”.
- The last day to drop courses in the Winter 2018 session without a ‘W’ appearing on your transcript is February 5, 2018. View this and other important dates here: [https://www.dal.ca/academics/important\\_dates.html](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 Policies

**Class culture:** We aim to cultivate a culture of mutual respect, inclusiveness, and collective curiosity. Students should arrive to class on time and not engage with materials that are outside of the course. Be courteous of your neighbours and use class time to focus on course materials to ensure your success.

**Missed classes:** All of the information related to the logistical and administrative components of this course will be communicated in the lectures. If you miss any part of a lecture, it is your responsibility to make contact with a fellow student and catch up on what you missed, regardless of whether the absence was justified or not.

**Late penalties:** Assignments handed in on the due date will be evaluated at 100% of their potential score. Late assignments will be subject to a late penalty of 20% per day (including weekends). Assignments submitted five calendar days past the due date will be assigned a zero. Assignments handed in AFTER the work has been returned to the class cannot be marked for credit.

**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 accessed through Brightspace. **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.**

**Plagiarism:** Plagiarism and cheating is a serious academic offense and includes the submission or presentation of the work of another as if it were one's own. Failure to acknowledge someone else's words, phrases, ideas, recording, images, code, results, lecture content, term paper, or assignment responses may result in a failing grade or, if very serious, suspension or expulsion from the university. Please visit [https://www.dal.ca/dept/university\\_secretariat/academic-integrity/plagiarism-cheating.html](https://www.dal.ca/dept/university_secretariat/academic-integrity/plagiarism-cheating.html) for more information.

## University Policies and Statements

### **This course is governed by the academic rules and regulations set forth in the University Calendar and by Senate**

#### **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 (The Center for Academic Integrity, Duke University, 1999). 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.

**Information:** [https://www.dal.ca/dept/university\\_secretariat/academic-integrity.html](https://www.dal.ca/dept/university_secretariat/academic-integrity.html)

#### **Accessibility**

The Advising and Access Services Centre is Dalhousie's centre of expertise for student accessibility and accommodation. The advising team works with students who request accommodation as a result of a disability, religious obligation, or any barrier related to any other characteristic protected under Human Rights legislation (Canada and Nova Scotia).

**Information:** [https://www.dal.ca/campus\\_life/academic-support/accessibility.html](https://www.dal.ca/campus_life/academic-support/accessibility.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.

**Code:** [https://www.dal.ca/dept/university\\_secretariat/policies/student-life/code-of-student-conduct.html](https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html)

#### **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 .

**Statement:** <http://www.dal.ca/cultureofrespect.html>

#### **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 (1321 Edward St) ([elders@dal.ca](mailto:elders@dal.ca)).

**Information:** [https://www.dal.ca/campus\\_life/communities/indigenous.html](https://www.dal.ca/campus_life/communities/indigenous.html)

**Important Dates** in the Academic Year (including add/drop dates)

[https://www.dal.ca/academics/important\\_dates.html](https://www.dal.ca/academics/important_dates.html)

**University Grading Practices**

[https://www.dal.ca/dept/university\\_secretariat/policies/academic/grading-practices-policy.html](https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html)

**Missed or Late Academic Requirements due to Student Absence (policy)**

[https://www.dal.ca/dept/university\\_secretariat/policies/academic/missed-or-late-academic-requirements-due-to-student-absence.html](https://www.dal.ca/dept/university_secretariat/policies/academic/missed-or-late-academic-requirements-due-to-student-absence.html)

## Student Resources and Support

### Advising

General Advising [https://www.dal.ca/campus\\_life/academic-support/advising.html](https://www.dal.ca/campus_life/academic-support/advising.html)

Science Program Advisors:

<https://www.dal.ca/faculty/science/current-students/academic-advising.html>

Indigenous Student Centre: [https://www.dal.ca/campus\\_life/communities/indigenous.html](https://www.dal.ca/campus_life/communities/indigenous.html)

Black Advising Centre: [https://www.dal.ca/campus\\_life/communities/black-student-advising.html](https://www.dal.ca/campus_life/communities/black-student-advising.html)

International Centre: [https://www.dal.ca/campus\\_life/international-centre/current-students.html](https://www.dal.ca/campus_life/international-centre/current-students.html)

### Academic supports

Library: <https://libraries.dal.ca/>

Writing Centre:

[https://www.dal.ca/campus\\_life/academic-support/writing-and-study-skills.html](https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html)

Studying for Success:

[https://www.dal.ca/campus\\_life/academic-support/study-skills-and-tutoring.html](https://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html)

Copyright Office: <https://libraries.dal.ca/services/copyright-office.html>

Fair Dealing Guidelines <https://libraries.dal.ca/services/copyright-office/fair-dealing.html>

### Other supports and services

Student Health & Wellness Centre: [https://www.dal.ca/campus\\_life/health-and-wellness/services-support/student-health-and-wellness.html](https://www.dal.ca/campus_life/health-and-wellness/services-support/student-health-and-wellness.html)

Student Advocacy: <https://dsu.ca/dsas>

Ombudsperson: [https://www.dal.ca/campus\\_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html](https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html)

### Safety

Biosafety: <https://www.dal.ca/dept/safety/programs-services/biosafety.html>

Chemical Safety: <https://www.dal.ca/dept/safety/programs-services/chemical-safety.html>

Radiation Safety: <https://www.dal.ca/dept/safety/programs-services/radiation-safety.html>

### Scent-Free Program:

<https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html>