

# Research Design and Scientific Presentations Syllabus

Department of Earth and Environmental Sciences  
ERTH 6300 Fall 2026

*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 the part of Mi'kma'ki known as Nova Scotia for over 400 years.*

## Course Instructor(s)

| Name                            | Email             | Office Hours                  |
|---------------------------------|-------------------|-------------------------------|
| Yana Fedortchouk<br>(Fall term) | yana@dal.ca       | By appointment, LSC-B<br>3050 |
| John Gosse<br>(Winter term)     | John.gosse@dal.ca | By appointment, LSC-O<br>4617 |

## Course Description

The focus is on preparing and presenting a short research (thesis) proposal, using a format based on NSERC Discovery Grant proposals. Most "in class" time is spent on research design, related topics such as critical reading and error analysis, and on student presentations of the various components of their proposals. Limited instruction in effective writing and presentation will be given in an online class, with extensive written feedback from the course instructors and classmates on oral and written assignments. Attendance at departmental seminars is compulsory.

### Course Prerequisites

This course is restricted to current graduate students in the Department of Earth and Environmental Sciences.

### Course Exclusions

n/a

## **Student Resources**

Lecture materials, handouts and announcements will be posted on the course Brightspace page. Please notify the instructors of any access issues.

## **Course Structure**

### *Course Delivery*

The classes will be delivered in hybrid format in the Fall term and in person in Winter term. Classes will be scheduled once per month from September through March. Classes will last for 3 - 4 hours, depending on the enrollment.

### *Lectures*

Tuesdays (TBA), 8:35 – 11:25, Milligan room (LSC-B 8007).

### *Laboratories*

n/a

### *Tutorials*

n/a

## **Course Materials**

There are no required texts. Essential reading material will be emailed or posted on Brightspace.

## **Learning Objectives**

- Learn the elements of effective research proposal design
- Acquire extensive practice in oral presentation
- Develop skills in effective technical writing
- Practice critical reading and peer review
- Evaluate quantitative methods and uncertainty

## Assessment

### *Assignments*

Fall term:

**Assignment 1**                      **October 20, 2026**                      **5%**

- Report on previous research project: Describe a research or technical project that you have been involved in recently (e.g., honours thesis, summer job, contract, etc).

**Assignment 2**                      **November 24, 2026**                      **6%**

- Statement of the problem and critical reading: Part 1: Provide a brief summary of your research problem and questions arising from it. Part 2: Provide critical reviews of two peer-review articles relevant to your thesis research.

**Assignment 3**                      **December 15, 2026**                      **6%**

- Methods and error analysis: Part 1: Describe one of the quantitative methods that you expect to use during your thesis research. Part 2: Evaluate sources of error and uncertainty associated with the particular method.

Winter term:

**Assignment 4**                      **January, 2027**                      **6%**

- Background section: Prepare a detailed first draft of the "Background" section of your research proposal, incorporating your statement of problem, previous work, need for further work, and scientific significance.

**Assignment 5**                      **January, 2027**                      **6%**

- Objectives and Methods: Prepare the "Objectives" and "Methods" sections of your research proposal, with a diagram showing how they are linked.

**Assignment 6**                      **February, 2027**                      **NO grade**

- Proposal 1st Draft: Prepare a first draft of your complete research proposal, incorporating sections developed in previous assignments.

**Assignment 7**                      **March, 2027**                      **6%**

- Peer Review: Provide a critical peer-review of one of your classmate's draft proposals.

**Final Proposal (Due date TBD)**                      **35%**

- Final 10-page thesis research proposal according to guidelines below

**Final Presentation**                      **April, 2027 (Date TBD)**                      **25%**

- Presentation of your research proposal during the Earth Sciences Graduate Symposium, according to the guidelines below, to be held in early April (date TBA)

#### *Other course requirements*

Attendance and participation at all classes and at least 80% of departmental seminars. Write a critique of all attended seminars in Fall term 5%

| <u>Dalhousie Grade Scale</u> |            |          |
|------------------------------|------------|----------|
| A+ (90-100)                  | B+ (77-79) | F (0-69) |
| A (85-89)                    | B (73-76)  |          |
| A- (80-84)                   | B- (70-72) |          |

### **Course Policies on Missed or Late Academic Requirements**

- Assignments 1 to 6 consist of a 5-10 page written report and/or a 5-10 minute oral presentation (to be specified with each assignment) to be delivered during class in front of the instructors and other students in the class.
- Late assignments will be penalized 20% per day, unless prior permission has been obtained from the instructors.
- Assignments resubmitted after the deadline because “I submitted the wrong file” will be penalized as late. Please ensure that the assignment you submit is the one you intend to submit.
- Missed assignments will be graded as zero unless accompanied by a Student Declaration of Absence for each of the missed assignment(s), in which case the instructors may offer make-up assignments or reweighting of grades on a case-by-case basis.
- Written assignments may be scanned using plagiarism software.
- Participation in departmental seminars (typically scheduled Thursdays at 11:30 am) is mandatory and counts for 5% of the course grade. You will also be required to write a critique of all attended seminars in the Fall portion of the course.
- The Fall portion of the course needs to be passed with a minimal mark of “B-” in order to continue in the Winter term.
- M.Sc. students seeking transfer to Ph.D. should receive no lower than “A” for the course.

### **Course Policies related to Academic Integrity & Artificial Intelligence**

During the course we will have a discussion on applications of **generative AI and large language models (e.g., Copilot, Claude, ChatGPT, etc.)** in written and oral presentations and research design. As you are being assessed on your ability to communicate scientific ideas with technical

English, it is important that we evaluate your work and not someone or something else's. However, there is utility in responsibly employing AI to improve your science communication.

For **written components of assignments**:

(i) the original words of their written works must be theirs's, i.e. no GPT can be used in their complete draft. If they choose not to use AI in any way, then they are done, and can submit the draft as the final version.

However, if they choose to modify their work with an AI-GPT:

(ii) they must submit the original complete draft, labeled clearly as so, in MS Word, and then a final version that has short statement below their name on the title page, that AI has been used to improve the draft (no details regarding how).

(iii) a complete but not detailed list of how the AI was used to modify the writing at the end of the document, including figure captions, references etc.

(iv) a statement that they (a) ensured that all changes were considered recommendations before they were accepted, (b) that any references cited were read and verified by the student. Incorrect or false references are not acceptable.

Likewise, for **modifications of a student's slideshow or submitted written work involving a figure, table, chart, calculation** (e.g. curve fitting), or **creation or modification of a software code/script**, the student must divulge those changes by providing a separate slide or page at the end of the slideshow or written assignment that has a bullet list of the AI usage (not detailed, just general, but for each slide, software, figure, equation, etc).

Failure to disclose the details of the employment of AI/GPT in your submitted work, or failure to verify the changes that you accepted from the AI/GPT will, at a minimum, result in a lower score for the assessment, and may result in dismissal from the course if the instructor believes they have grounds to allege falsification or plagiarism (e.g. claiming the work was yours when it was modified by AI).

### **Course Accessibility**

- 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

## Course Content

### ***Detailed Requirements for Research Proposal and Defense***

Thesis proposal (written): Ten page (single spaced, including tables, figures and references) proposal of your thesis research, written in a style much like the format your supervisor uses when they submit proposals to NSERC. The general format consists of:

- Identification form (p. 1);
- Summary of proposal and timeline (p. 2);
- Budget (p. 3);
- Actual proposal (p. 4-10), consisting of:
  - Statement of Problem
  - Background
  - Objectives
  - Approach and Methods
  - Anticipated Results and Significance
  - References

The length and format of written proposals is the same for MSc and PhD students, the only difference being that the PhD-level proposals for should have **only limited input from the supervisor** (limited editing, but suggestions for content are encouraged and the timeline and depth of the project should be consistent with the length of the degree program: 2 years for MSc; 4 years for PhD). Grading: Written proposals will be graded by a four-person Examination Committee consisting of: one of the EARTH 6300 Instructors, the student's Supervisor, and two Readers. Readers will generally be drawn from the student's thesis committee, and must be members of the Dalhousie Faculty of Graduate Studies. The final grade will be calculated as the average of all grades from the Examination Committee.

Proposal presentation (oral): Thesis proposals will be presented at a EARTH 6300 Graduate Symposium to be held in April, 2027. Presentations will be 20 minutes in length followed by questions from the examining committee and audience. There will be one round of questions from each member of the examination committee, 20 minutes total. An additional 10 minutes will be allotted to questions from the wider audience. The date, schedule, advertisement, membership of the examining committees, organization before and during the symposium, and assignment of a grade for the oral grade, will be the responsibility of the instructors of EARTH6300. The questions will evaluate the student's knowledge of, preparation for, and ability to communicate the following: (i) objectives, hypotheses, and important research questions, why they are important, and how they impact current fundamental or applied research at regional or global scales; (ii) a firm understanding at the post-graduate level of background information including: earth system setting, the published literature up to the month of presentation, and methodological approaches including relevant methods that are not being attempted; (iii) innovations and original components of the expected results; (iv) application of

proposed methods, justifying the choice, defending the feasibility including knowledge that assumptions and uncertainties are appropriate to achieve the objectives; (v) a time-table to accomplish the research. Grading: Presentation grades will be calculated as the average of scores on thesis proposal oral defence forms submitted by faculty members (including adjuncts and examining committee members) present.

## Syllabus Appendix

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