

**Faculty of Science Course Syllabus (Section A)**  
**Department of Biology**  
*BIOL/MARI/ENVS 3664.03*  
*Intertidal Ecology & Diversity (Distance-Learning)*  
*May 3<sup>rd</sup>-June 10<sup>th</sup>, 2022 (Summer term)*

**Instructor:** C. Isabelle Aubé (she/her); [isabelle.aube@dal.ca](mailto:isabelle.aube@dal.ca); LSC 2123; (902) 220-2340 (call/text)

**Lectures:** None (Reading-based learning)

**Laboratories:** None

**Field Trips:** Self-directed day trips from home

**Student Hours:** Online Wednesdays 12-1 pm (Halifax Time) via MS Teams, and upon request

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### **Course Description**

Hands-on distance-learning introduction to ecological research on intertidal zones. Relevant ecological concepts, sampling techniques for flora and fauna, and statistical skills are learned. Field sampling on self-directed day trips, followed by lab work at home (e.g. species identification), statistical analysis, report preparation, and video presentations. **NOTES:** Offered in summer through **SEASIDE**. In lieu of paying Auxiliary fees for this class, it will be expected for you to purchase/borrow/make some or all of the following field and lab equipment: an all-weather field book, a 30-metre field measuring tape, a waterproof field-safe thermometer, a waterproof field-safe salinity refractometer, materials to set up your experiments, and a First-Aid kit. See the **"Required Course Materials"** section of the syllabus for details. For dates, times and special registration procedures, see <https://www.dal.ca/faculty/science/biology/seaside-program.html>.

### **Course Prerequisites**

Prerequisites: Proof of valid First-Aid course certificate, BIOL 2060.03 (or BIOA 3001.03), and STAT 1060.03 (or MATH 1060.03 or SCIE 15xx), and BIOL 2003.03

Cross-listings: ENVS 3664.03, MARI 3664.03

Exclusions: BIOL 3662.03, BIOL 3663.03

## Course Objectives/Learning Outcomes

After successfully completing this course, the student will have the ability to:

- ✓ Understand ecological concepts that pertain to intertidal habitats found in Nova Scotia (rocky shores, tidal flats, salt marshes, sandy beaches & dunes, and cobble beaches)
- ✓ Use free open-source programs ImageJ, R and/or Python to analyze field data from 3 different types of intertidal experiments.
- ✓ Propose, design, setup, and collect both biological and environmental data from 3 different types of field experiments within a limited budget.
- ✓ Obtain necessary scientific permits with relevant agencies (e.g., Department of Fisheries and Oceans) to conduct small-scale experiments lasting no more than 1 week each.
- ✓ Keep a picture/video journal of all aspect of field experiments.
- ✓ Use sampling equipment and keep meticulous field notes.
- ✓ Troubleshoot all logistical aspects of field experiments, from start to finish.
- ✓ Produce a video presentation on the results of at least one field experiment.
- ✓ Write a technical report on the results on at least one field experiment, including recommendations to governmental agencies.
- ✓ Improve your scientific communication skills to the academic, governmental, and general public.

## Required Course Materials

1. No required textbook, online access codes, lab manual, clicker, or lab coat
2. A [“Rite in the Rain” all-weather field book \(\\$11\)](#).
3. An [extra long measuring tape \(30m\) \(\\$35\)](#) may be needed (depends on your chosen field projects).
4. A [waterproof field-safe thermometer \(\\$17\)](#) and a [waterproof field-safe refractometer \(\\$32\)](#) may be needed to collect environmental field data (depends on your chosen field projects). You might be able to find cheaper elsewhere or borrow from Dal’s SEASIDE equipment room, but please note that due to limited supply, we do not have one for every student in the class.
5. A budget of up to \$40 to cover the cost of materials for your chosen experiments.
6. Consider borrowing equipment from your local [tool libraries](#).
7. [Valid scientific permits](#), based on your chosen experiments, if required.
8. A well-stocked First-Aid kit (~\$30-45) stored in waterproof bag that follows the [Canadian Red Cross Guidelines](#).
9. Reliable internet to access the course website: BIOL/MARI/ENVS 3664 Intertidal Ecology and Diversity (Brightspace link at dal.ca) on a regular basis.

## Course Assessment

Component	Weight (% of final grade)	Brightspace Unit
<b>Quizzes</b>		
<i>Five Coastal Zones of Atlantic Canada Quizzes</i>	(15%)	Unit 1
<b>Assignments</b>		
<i>Experimental Design Assignment</i>	(15%)	Unit 2
<i>Three Field Experiment Proposals</i>	(9%)	Unit 3
<i>Proof of scientific permits OR correspondence</i>	(3%)	Unit 3
<i>Field Experiment 1 Results</i>	(10%)	Unit 3
<i>Field Experiment 2 Video Presentation</i>	(15%)	Unit 3
<i>Field Experiment 3 Technical Report</i>	(20%)	Unit 3
<b>Other course requirements</b>		
<i>Activity &amp; Worksheet Completion Mark</i>	(10%)	Units 1 & 2
<i>Bioblitz Photo Journal</i>	(1.5%)	Term-long
<i>Detailed Field Notes</i>	(1.5%)	Term-long

Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

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

## Course Policies

### What to Expect (and what is expected of YOU):

1. You are expected to read the course syllabus in full.
2. All important announcements will be made on the Brightspace course page (not over email). You are expected to check on these weekly.
3. There are no set deadlines for individual tasks.
4. Units are sequential, meaning that all “required” Modules from Unit 1 need to be completed before moving on to Unit 2, and all “required” Modules from Unit 2 need to be completed before moving on to Unit 3. However, Modules within each Unit can be done in any order you wish. “Other Requirements” can be worked concurrently throughout the course.
5. All “required” Modules need to be completed before the end of term (June 10, 2022, 11:59 pm).
6. On weekdays, you can expect a reply from your Instructor ([Isabelle.aube@dal.ca](mailto:Isabelle.aube@dal.ca)) and/or Teaching Assistant (TBD) within 24 hrs of emailing, posting on the course Brightspace Discussion Board, on the course MS Team chat, or posting an Instant Message. On weekends you can expect a reply within 48 hours.
7. You are expected to show proof of a valid [First-Aid course certificate](#) prior to going in the field.
8. You are expected to sign and return the course liability waiver form prior to going in the field.
9. When in the field (including entry/exit points to your field locations), you are expected to familiarize and follow all local rules, including all local health and safety regulations.
10. Out of an abundance of safety, you are expected to bring at least one other person with you (e.g., family member or friend). Whether they help you hold a measuring tape, take photos, or even simply sit and watch you work from 2 meters away is up to them!
11. Expect to get wet and muddy. Field trips to the intertidal zone means close to the ocean, which means lots of water... and because you will be doing lots of examinations in the field, this also means lots of dirt (mud, salt water, sand, grass) to sit/kneel on. Do not wear your nicest clothes!
12. **Students are required to check in with the Instructor by email ([Isabelle.aube@dal.ca](mailto:Isabelle.aube@dal.ca)) or by phone (902-220-2340) BEFORE AND AFTER every self-directed field trip with the following information:**
  - a. the specific location(s) they will be,
  - b. name(s) and cell number(s) of all people going,
  - c. and expected time of return home.
13. Students are required to obtain all [valid scientific permits](#) (or proof of correspondence if none required) prior to the set up of all field experiments from relevant agencies (e.g. Department of Fisheries and Oceans, Parks Canada, Natural Resources, etc.). Students are required to bring those permits/correspondence while conducting their experiments in the field.

14. Based on your intertidal experiments, you may be required to obtain and build your own equipment. Consider borrowing from your local [tool libraries](#), or [Buy Nothing](#) groups.
15. Keep all your receipts to show that you have maintained a \$40 budget for materials used in your experiments.
16. Be academically prepared for the field trips. The day before departure, make sure you review with the instructor by email ([Isabelle.aube@dal.ca](mailto:Isabelle.aube@dal.ca)) your plan of action, prepare all data sheets and equipment needed.
17. Bathrooms? Not all field trip locations will have them. DO NOT avoid drinking so you will not have to go pee. It is very important to stay hydrated.
18. Be respectful and mature with people you encounter on field trips. Yes, it is important to have fun, but you represent Dalhousie University in the context of your presence in the field.
19. You are expected to cleanup your field location before you leave.
20. Pay attention to the forecasted weather of the place you are going. Remember, if you are near the coast they do not lie when they say “high of 25, except 14 along the coast” during weather forecasts!
21. **Most importantly, you are never expected to do anything that you are not comfortable with, or that puts you in a dangerous situation. Above all, stay safe and use common sense!**

**What to bring in the field? Below is a checklist that may help you:**

- ☐ a well-stocked First-Aid kit in a waterproof bag that follows the [Canadian Red Cross guidelines](#)
- ☐ cell phone and backup charger
- ☐ energy-rich food, snacks, and **LOTS of water!** (you will get hungrier/thirstier than you think for day trips)
- ☐ appropriate footwear for walking and getting wet... rubber boots, water sandals, rain pants, or hip waders if you have them
- ☐ jacket, layers of clothes, in case it starts off cool and gets really warm (and vice versa!)
- ☐ HAT!... and extra pair of socks if you are wearing them
- ☐ sunscreen, bug spray, if desired
- ☐ plastic bag for garbage and wet clothes... Kleenex or baby wipes
- ☐ recommended: soapy facecloth in a Ziploc bag to wash your hands for day trips
- ☐ digital camera, a [waterproof field book](#) (pro-tip: write your instructor's cell phone number in case questions pop up), pencils (pen ink can wash off; pro-tip: tie your pencil to your field book with a long piece of string), clipboard with data sheets (or pre-set your data sheets in your field book).
- ☐ bank card AND cash for pit-stops
- ☐ an ergonomic backpack to carry your personal items in. You can drop our stuff when you work, but you may have a lot of hiking to get to where you need to go.
- ☐ a cart or bucket to carry your field equipment (pro-tip: create a separate equipment checklist so you do not leave anything behind)
- ☐ permits, or proof of correspondence that no permits are required

### Course Schedule and Content Checklist

- \*All items are asynchronous except the optional synchronous Orientation Meeting
- \*Units must be worked consecutively, but Modules within each Unit can be done in any order
- \*Must obtain 100% on the Orientation Quiz (unlimited attempts)
- \*Activities & Worksheets are graded for completion & feedback only.

Unit Topic	Modules & Tasks
<input type="checkbox"/> Orientation <i>(Recommended Time Frame: 1-2 days)</i>	<input type="checkbox"/> Orientation Meeting: <b>Wed May 4th, 12-1 pm</b> (Halifax Time) via MS Teams (synchronous, optional, recorded) <input type="checkbox"/> Orientation Quiz (required to access other quizzes and assignment dropboxes) <input type="checkbox"/> Discussion Board Activity (required to access other quizzes and assignment dropboxes)
1. <input type="checkbox"/> Coastal Zones of Atlantic Canada <i>(Recommended Time Frame: 1-1.5 wks)</i>	<input type="checkbox"/> 1: Coastal Zones of Atlantic Canada Introduction (optional) <input type="checkbox"/> 2: Nearshore (optional) <input type="checkbox"/> 3: Estuaries (optional) <input type="checkbox"/> 4: Salt Marshes (required) <input type="checkbox"/> Study Worksheet (1%) <input type="checkbox"/> Quiz (3%) <input type="checkbox"/> 5: Tidal Mudflats (required) <input type="checkbox"/> Study Worksheet (1%) <input type="checkbox"/> Quiz (3%) <input type="checkbox"/> 6: Sandy Beaches & Dunes (required) <input type="checkbox"/> Study Worksheet (1%) <input type="checkbox"/> Quiz (3%) <input type="checkbox"/> 7: Rocky Shores (required) <input type="checkbox"/> Study Worksheet (1%) <input type="checkbox"/> Quiz (3%) <input type="checkbox"/> 8: Islands & Cliffs (optional) <input type="checkbox"/> 9: Cobble Beaches (required) <input type="checkbox"/> Study Worksheet (1%) <input type="checkbox"/> Quiz (3%) <input type="checkbox"/> 10: Bogs (optional) <input type="checkbox"/> 11: Freshwater Barrier Ponds (optional) <input type="checkbox"/> 12: Fjords (optional) <input type="checkbox"/> 13: Coastal Zones of Atlantic Canada Activities (optional)

Unit Topic (cont.)	Modules & Tasks (cont.)
2. <input type="checkbox"/> Experimental Design (Recommended Time Frame: 1-1.5 wks)	<input type="checkbox"/> 14: Open-Source Apps & Tools Activities (required) (3%) <input type="checkbox"/> 15: Rocky Intertidal Diversity Activity (required) (1%) <input type="checkbox"/> 16: Minimum Sample Size of Barnacles Activity (required) (1%) <input type="checkbox"/> 17: <i>Ascophyllum</i> Experimental Design Assignment (required) (15%)
3. <input type="checkbox"/> Intertidal Field Experiments (Recommended Time Frame: 2 wks + 0.5 buffer wk)	<input type="checkbox"/> 18: Field experiment 1 (required) <input type="checkbox"/> Proposal 1 (3%) <input type="checkbox"/> Scientific Permits and Correspondence 1 (1%) <input type="checkbox"/> Results Assignment (10%) <input type="checkbox"/> 19: Field experiment 2 (required) <input type="checkbox"/> Proposal 2 (3%) <input type="checkbox"/> Scientific Permits and Correspondence 2 (1%) <input type="checkbox"/> Video Presentation (15%) <input type="checkbox"/> 20: Field experiment 3 (required) <input type="checkbox"/> Proposal 3 (3%) <input type="checkbox"/> Scientific Permits and Correspondence 3 (1%) <input type="checkbox"/> Technical Report (20%)
<input type="checkbox"/> Other Requirements (Concurrent throughout course)	<input type="checkbox"/> Valid First-Aid Certificate and signed liability waivers (required BEFORE going in the field) <input type="checkbox"/> Bioblitz Photo Journal (required) (1.5%) <input type="checkbox"/> Detailed Field Notes (required) (1.5%)



## **Faculty of Science Course Syllabus (Section B)**

### **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)

## **Faculty of Science Course Syllabus (Section C)**

### **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 Students 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>

**Dalhousie COVID-19 information and updates:** <https://www.dal.ca/covid-19-information-and-updates.html>