Plants, Habitats and Climate Change
BIOL 4423

Instructor: Dr. Zoe Panchen
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Lecture:
M-W-F, KCIC 014, 10:30-11:20am
(in person lectures)

I'm here to help and facilitate your learning! If you have questions or concerns, please drop by my office during office hours or by making an appointment. To make an appointment please send me an email with days and times you are available and briefly what you would like to discuss. You can also email questions.
Emergency communication plans: if there is a class cancellations or classes need to move on-line, I will send an email to all students via Moodle at least 2 hours before the start of the class with a Teams link for an on-line class.

Evaluation	Percentage	Date
Weekly assignments	40%	Most classes/weeks
Adopt a plant family infographic	20% (see infographic guidelines)	Submit by 4th Oct. Present 5th, 7th, 9th Oct.
Habitat presentation	20% (see habitat guidelines)	Submit by 1st Nov. Present 2nd, 4th, 6th Nov.
Grant proposal	20% (see grant proposal guidelines)	Chalk talk: 30 Nov, 2, 4 Dec. Proposal: 18th Dec.

Part 1: Course Information

Course Description

An in-depth look at major habitats found in tropical, temperate, boreal and Arctic regions and the plants that grow there. We explore the habitat's abiotic and biotic features, and plant strategies that make them successful in these habitats. We discuss how plants can adapt to climate change and environmental change, and the impacts of change on plant communities.
Prerequisite(s): BIOL 1113/1123, and either BIOL 2033 or BIOL 2043 with minimum grades of C-, or permission from the instructor.

Course Materials & Requirements

- There is no textbook required for this course
- Access to Moodle and a computer or tablet to access online material (please let instructor know if this is an issue)
- Outdoor clothing and footwear for outdoor classes (please let instructor know if this is an issue)
- R-Studio installed and working on your computer

Course Structure

- The course will be a combination of lectures, outside-of-class preparation and reading, and in-class activities and discussions. You will often be expected to prepare for classes ahead of time.
- Some classes will be held in the Harriet Irving Botanical Gardens and KC Irving Environmental Science Centre greenhouses.

Student Learning Outcomes

1. Identify plant groups and habitats around the world
2. Describe the environmental factors of habitats that affect plant growth and reproduction
3. Explain plant adaptations that enable plants to be successful in different habitats
4. Critique literature on impacts of environmental changes on plants and plant communities
5. Apply interdisciplinary perspectives to advocate for protecting plant habitats from environmental change.

How to Meet the Learning Outcomes

1. Attend classes, take notes and ask for clarification when something is not clear
2. Do your homework – come prepared for class activities and discussions
3. Actively participate in class activities, discussions and group work
4. Complete assignments on time rather than leaving it to the last minute. If something comes up, let me know me in advance or as close to a missed deadline as possible. I am flexible, but meet me halfway!
5. Check your email and Moodle regularly. I use these to communicate with you about deadlines and updates to classes etc.

Part 2: Course Plan

The instructor reserves the right to amend the course plan with reasonable notice, and in consultation with the class. The pace of instruction, weather, guest lecture dates, and class discussion/activity pace will factor into when each lecture below occurs.

Lecture:

Wk	Date	Lecture	Unit
1	09-Sep	Introduction, plant evolution and biodiversity	Plants
	11-Sep	Plants, habitats, impact of climate change knowledge	
2	14-Sep	Plant features: environment adaptations	
	16-Sep	Plant features: H. Irving Botanical Gardens or greenhouse	
	18-Sep	Plant trait measurements: Warming experiment	
3	21-Sep	Some common families	
	23-Sep	Bombacaceae and Ginkgoaceae	
	25-Sep	Plant features: H. Irving Botanical Gardens or greenhouse	
4	28-Sep	Habitat surveys in H. Irving Botanical Gardens with Sam Jean	
	30-Sep	**National Day for Truth and Reconciliation: no class**	
	2-Oct	Winter twig ID	
5	5-Oct	Adopt a plant family: Infographics Day	

	7-Oct	Adopt a plant family: Infographics Day	
	9-Oct	Adopt a plant family: Infographics Day	
6	12-Oct	**No class: Thanksgiving Day**	
	14-Oct	**No class: Study break**	
	16-Oct	**No class: Study break**	
7	19-Oct	Biomes and habitats	
	21-Oct	Biomes and habitats	
	23-Oct	Arctic habitats and plant adaptations	
8	26-Oct	Plant freeze tolerance mechanisms: Guest lecture by Dr. Ian Willick	Habitats
	28-Oct	Temperate North American Habitats: Bogs and Fens	
	30-Oct	Temperate North American Habitats: Swamps and Marshes	
9	2-Nov	Habitats student presentations	
	4-Nov	Habitats student presentations	
	6-Nov	Habitats student presentations	
10	09-Nov	Climate and climate change	
	11-Nov	**Remembrance Day: no class**	
	13-Nov	Climate change: plant responses and impacts	
11	16-Nov	Paper critique: Plant functional traits changes with warming	
	18-Nov	Plant trait analysis: Warming experiment	
	20-Nov	Impact of wildfires on plant communities	
12	23-Nov	Impact of climate change on salt march plants: Guest lecture by Kendra Sampson	Climate Change
	25-Nov	Impact of climate change on invasive plant species: Guest lecture by Claire Wilson, Conservation Planning Biologist, DNRR	
	27-Nov	Paper critique: Plant community change with warming	
13	30-Nov	Grant proposal paper critique chalk talk	
	2-Dec	Grant proposal paper critique chalk talk	
	4-Dec	Grant proposal paper critique chalk talk	
14	07-Dec	Plant community change analysis: Warming experiment	
	09-Dec	Advocacy to protect plant habitats from environmental change	

Part 3: Assessment and Grading

The assessment schedule and grading are listed at the beginning of the syllabus.
Weekly Assignments: For many lectures there will be a short assignment that will help reinforce the learnings from the lecture. The due date will either be at the end of the class e.g. paper hand-ins from class activities or within a week of the lecture. Due dates will be communicated in class and/or on Moodle.
Adopt a plant family infographic: Please see adopt a family infographic guidelines in Moodle.
Habitat presentation: Please see habitat presentation guidelines in Moodle.
Grant proposal: Please see grant proposal guidelines in Moodle.

Part 4: Course Policies

This is very much an interactive student-centred learning course. Thus, in-person attendance is extremely strongly encouraged! If you are unable to attend a class for a valid reason, please let me know and we can work together to find a work around. Please be respectful of everyone in our class and put effort into your participation and projects. Students may use laptops or tablets to take notes in lectures but please limit their use to classroom material only.

Students are expected to submit work that reflects their own ideas, writing ability and their interpretation of the scientific literature. All ideas and quotations borrowed from other sources must be cited. The citation style to use is the *New Phytologist* citation style or another approved citation style. Students may not use generative AI, such as Chat GPT, or paraphrasing software, such as QuillBot, to help them complete assignments. In this course, the use of generative AI or paraphrasing software, even with citation, constitutes cheating.

Part 5: University Policies

University policies are available in the Acadia University Academic Calendar or through the Registrar's website: https://registrar.acadiau.ca/welcometotheregistrarsoffice.html

Equity, Diversity and Inclusion

Acadia University is committed to becoming a culturally safe and anti-oppressive community. This can only be achieved where there are simultaneous efforts to eliminate all forms of discrimination and harassment from our campus community, including the elimination of all discrimination, harassment and violence based on one's identity, including but not limited to, gender, race, class, ethnicity, sexual orientation, disability, gender identity, gender expression, and Indigeneity. The policy against harassment and discrimination, and resources for students who believe they may have experienced, or witnessed, discrimination or harassment, are available here: https://www2.acadiau.ca/student-life/equity-judicial/equity.html

Last Drop Day

Last day to drop a course and receive a "W". Please check the Acadia University calendar dates, which are available here: https://registrar.acadiau.ca/AcademicCalendars.html

Inform Your Instructor of Accommodations

Acadia University is dedicated to improving access to campus life for all students with disabilities. While we attempt to ensure that all courses are accessible, we recognize that there are barriers that need to be addressed on an individual basis. Students who require accommodations to complete coursework or otherwise fully participate in class should contact Accessible Learning Services directly as soon as possible. https://www2.acadiau.ca/student-life/accessiblelearning.html . Acadia's Policy for Students with Disabilities can be found here: https://senate.acadiau.ca/tl_files/sites/senate/Senate%20Policies/Jan%202015%20Revised%20Policy%20Regarding%20Support%20for%20Students%20with%20Disabilities.pdf.

The Use of Animals in Teaching and Research

The use of animals in teaching and research at Acadia University is done in accordance with guidelines on the care and use of animals published by the Canadian Council on Animal Care (CCAC). For more information on the CCAC, please visit their website at http://www.ccac.ca

Commitment to Integrity

It is standard practice in Biology to check exams and assignments for cheating and plagiarism. Cheating in the class and/or lab, including plagiarism, will not be tolerated. Please read the appropriate sections of the current Acadia University Academic Calendar: https://registrar.acadiau.ca/AcademicCalendars.html

Information on copy-write and course content from Acadia University is available through the Vaughan Memorial Library: http://libguides.acadiau.ca/c.php?g=433650&p=5027078

The spoken and written course content (including the syllabus, handouts, lectures, presentations, labs, assignments, quizzes, tests, and exams) are the intellectual property of the instructor and may only be copied for personal use. Sharing these materials or uploading them where they may be accessed by others is a violation of copyright.

Students may not create audio, video, photographic or transcript recordings of classes with the exception of those students requiring an accommodation for a disability, who must speak to and obtain written permission from the instructor prior to beginning to record lectures. Students requiring an accommodation for a disability may only make audio recordings, must stop/pause the recording for any material not presented by the instructor (such as class discussion), may not post, make public, or otherwise share these recordings or portion(s) thereof and must destroy the recordings before the end of the course.

Students creating unauthorized audio, video, or photographic recording of lectures violate an instructor's intellectual property rights and the Canadian Copyright Act. Students violating this agreement will be subject to disciplinary actions.

Share the Air: Acadia is a Scent-Free Campus

In consideration of the difficulties that exposure to scented products causes individuals with sensitivities and allergies, all students, faculty, staff, employees of any companies working on university property, visitors, and guests of Acadia University, or of members of the University community are asked to refrain from wearing scented personal care products such as perfumes / aftershave, lotions, hair spray and deodorant. In addition, users of tobacco and cannabis are asked to be aware that odours associated with product use may impact individuals with sensitivities and allergies. Acadia University in consultation with its contracted cleaning staff, have agreed to use products that do not leave residual odours that may cause difficulties for individuals with sensitivities and allergies.

Part 6: Program Learning Outcomes

Foundations of knowledge	**Course specific examples**	**Proficiency** 1-Introduction 2-Reinforcement

			3-Proficient
Scientific method, inquiry and hypothesis testing	Find, understand and apply information from the literature; understand how to use the scientific method to examine problems from different perspectives	Adopt a family infographic, habitat presentations, grant proposal, critiquing literature	3
Historical concepts and contributions by important figures	Explain foundational concepts in biology, Two-eyed Seeing, and ethical implications of scientific discoveries	Tracing history of taxonomy and phylogeny of plants and climate change	2
Biodiversity and ecology	Understand the genetic, taxonomic and ecosystem levels of biodiversity; focus on SW Nova including the Acadian Forest and Bay of Fundy ecosystems	Biodiversity and ecology of plants in the context of adaptation of plants to habitats and environmental change	3
Genetics and evolution	Understand the chemical basis of heredity, genetics and genomics; integrate concepts across disciplines to understand evolution	Phylogeny of plants	2
Human and environmental health	Understand form and function in health and disease within a One Health framework, integrating human and environmental health	Impact of climate change and environmental change on plants and plant communities	3
Lab and field skills			
Experimental design	Gain experience in applying the scientific method	Warming experiments and ecological monitoring	3
Safety	Work safely and productively in lab and field settings	Activities in botanical garden and greenhouse	2
Lab skills	Gain experience with basic and advanced lab techniques and understand their application in research, health science and industry		N/A
Field skills	Gain experience in basic and advanced field skills and understand their application in ecology, conservation biology and environmental change	Plant trait measurements in warming experiment, plant identification and habitat surveys	3

Data acquisition, analysis and interpretations	Collect data, present results both qualitatively and quantitatively, and interpret outcomes in light of the literature	Analysing plant trait and species abundance data from warming experiments	3
Statistical analysis	Use R and or other programs to analyze biological data	Analysing plant trait and species abundance data from warming experiments	3
Professional skills			
Ethical practices	Demonstrate ethical conduct, apply principles of academic integrity, and understand the principles of EDI in science	Respectful participation in class activities, proper citation, professional communication through email etc.	3
Collaboration and group work	Work effectively in groups within and across disciplines	Group break outs in class, habitat presentations	3
Critical thinking	Analyze and evaluate information to make science-based decisions	Infographic, literature critique, in class activities, grant proposal	3
Computer proficiency	Use common and discipline-specific software	Use of Word, Excel, PowerPoint, R Studio	3
Scientific communication	Communicate science effectively to both scientific and general audiences	Infographic, habitat presentations	3