Arctic Environment
BIOL 3753

Instructor: Mark Mallory (he/him)

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Office hours: T, Th 11:00-12:00
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Lecture: T & Th, BAC 241, 09:30-10:50

Evaluation	Percentage	Date
Midterm	20%	6 Feb 2025
Term paper	30%	7 March 5 pm
Final exam	30%	TBD
Quizzes and assignments	20%	Random – check email

Part 1: Course Information

Course Description

An introduction to the extreme world of Arctic terrestrial, aquatic and marine environments and biota. Topics will include the physical and ecological setting, food webs, wildlife diseases, key and iconic wildlife species and threats to their health, as well as an environmental and ecological perspective on history, peoples, and current issues. Focus on Canadian Arctic regions.

Prerequisite(s): BIOL1113/1123 with a minimum of grade C, or permission of instructor. Recommend completion of at least 1, 2nd year biology course.

Course Materials & Requirements

Required Text

- None. However, several scientific papers will be provided on ACORN that form essential reading material.
- Access to course ACORN page
- Vaughn Memorial Library's Biology LibGuide

Course Structure

Lecture material will be presented in person as <80 min lectures with supplementary material on ACORN, and as videos and narrated Powerpoint presentations.

ALL COMMUNICATIONS WILL BE VIA YOUR ACADIA EMAIL; YOU ARE EXPECTED TO MONITOR THAT DAILY FOR QUIZ ANNOUNCEMENTS

Lectures will be posted by **Tuesday & Thursday 9:30AM**

Student Learning Outcomes

- Understand basis of the Arctic physical environment on land and sea, particularly as it relates to snow and ice.
- Understand adaptations of major Arctic flora and fauna to deal with extreme cold environments. What you should take home from this are examples of how evolution has favoured certain features across

taxa in an extreme environment.

- Better understand food webs, energy flow, and ecosystem structure in a simple but harsh environment.
- Understand threats to Arctic biota, from climate change, development, and contaminants. Here you will build on information taught in earlier courses (biology, environmental science) on how changes humans make to the environment affect the wildlife and habitats there.
- Understand the history of Indigenous peoples (specifically Inuit) and western European contact in the Arctic, from early exploration to modern industrial activities, and the socio-economic implications of those relationships.

You will meet the objectives listed above through a combination of the following activities in this course:

- View lectures on a regular basis, take notes, and **ask for clarification when something is unclear by email**
- Read the provided papers, web pages and review your notes regularly.

Part 2: Course Plan

We will attempt to stay as close as possible to topics and calendar dates noted in parentheses, unless there are random occurrences beyond our control.

Date	Topic	Synopsis	Notes
Topic 1 (6 to 10 Jan)	Where is the Arctic?	Course outline, definitions, Arctic vs. Antarctic, climate, habitats	Reading assignment
Topic 2 (13-17 Jan)	Iconic Arctic wildlife 1	Arctic adaptations; marine mammals (seals, whales)	Reading assignment
Topic 3 (20 to 24 Jan)	Iconic Arctic wildlife 2	Caribou, Muskoxen, Lemmings, Arctic Fox, Snowy Owl, Ptarmigan	Reading assignment
Topic 4 (27 to 31 Jan)	Everyone's favorite (except Mark's), the polar bear); WRITING MODULE	All you wanted to know about this beast A review of good writing style / writing tutorial	Reading assignment Term paper outlined; start anytime
Topic 5 (3 - 7 Feb)	Arctic Migratory Birds (*the greatest of Arctic creatures*)	Seabirds, Waterfowl, Passerines, Bird Movements	
6 FEB	**MIDTERM EXAM (take home)**	**All lectures and readings included**	**20%; due 7 Feb 5 pm**
Topic 6 (10 - 14 Feb)	Threats from the south	Contaminants / Mallory Lab Arctic work	Reading assignment
17 – 21 Feb	***Winter study break – get those papers written!***		
Topic 7 (24 – 28 Feb)	Arctic peoples	Aboriginal Peoples of the Arctic; traditional knowledge	Reading assignment
Topic 8 (3 to 7 Mar)	Southerners in the Arctic; Essays on Socioeconomics	State of Nunavut; European exploration	**TERM PAPER DUE 7 MAR (30 %)**
Topic 10 (10 - 14 Mar)	Threats: Climate change	Climate change; Viewing assignments	Reading assignment

Topic 11 (17 – 21 Mar)	Arctic Research	Ivory gulls; Working with an Inuit community	Reading assignment
Topic 12 (24 – 28 Mar)	Arctic Environmental Research; What's in the news?	Siting Arctic field camps; a review of recent headlines in the Arctic	
Topic 13 (31 Mar - 4 Apr)	Current Development Issues in the Arctic	Mineral exploration, shipping, tourism, boundary disputes	
TBA	**Final Exam**	**Includes whole semester's work**	**30 %**

All Lecture Sets will be available on ACORN.

NOTE: In consultation with the class, the instructor reserves the right to amend the above course plan with reasonable notice to you.

Part 3: Assessment and Grading

Points	**Description**
Midterm (20%)	Multiple choice/matching/short answer
Random Assignments (10%)	Very short queries on course material with 1 day deadlines; may be creative
Reading Assignments (10%)	You are assigned a scientific paper to read; within 1 week I expect you to review it and provide a 3 sentence precis of the info – emailed to me
Term paper (30%)	Details provided in course
Final Exam (30%)	Cumulative over course; discussed in class
100	**Total Points Possible**

Part 4: Course Policies

Work plan:

The course is organized into 2 general sections: before the winter study break is principally "biology", and after the break is principally "policy and socio-economics of the North" (see the work plan above). I expect students will review material consistently throughout each week. Each topic is like a module; there are themes that repeat through the course, but most lectures are independent of one another.

Missed quizzes:

Make-up tests for either absence, or poor performance, will not be provided as an option. In the event that you have a *valid* excuse for missing the midterms, the weight from the missed midterm(s) will automatically be distributed elsewhere. Missed midterms without a valid excuse from the registrar will result in a mark of zero. University policies on missing classes, etc. can be found here:

https://registrar.acadiau.ca/RecordsandOtherRequests.html

Late work:

I accept assignments up to 2 days after the due date. The student will be penalized 10% of the grade per day late up to 20% (2nd day). If an assignment is not handed in after 2 days, it will be assigned a grade of zero.

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

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

Students may not use generative AI, such as Chat GPT, or paraphrasing software, such as QuillBot, to help them complete assignments. When an assignment seems like it has been completed with the aid of one of these programs, the procedure for investigating academic integrity infractions will be followed (pages 40-41 of Acadia's Academic Calendar at https://registrar.acadiau.ca/AcademicCalendars.html).

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. If you wish to make audio, video, or photographic recordings in class, you must first obtain the consent of the instructor and of any other persons (e.g., guest speakers, other students) who may be captured in such recordings. In the case of personal use by students with disabilities, the instructor's consent shall not be unreasonably withheld.

Share the Air Policy – PDF on HR website

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 odors 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	Review scientific method and comparison to local/traditional ecological knowledge.	2
Historical concepts and contributions by important figures	Explain foundational concepts in biology, Two-eyed Seeing, and ethical implications of scientific discoveries	Review local ecological knowledge, approaches, use as companion to western scientific knowledge	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		
Genetics and evolution	Understand the chemical basis of heredity, genetics and genomics; integrate concepts across disciplines to understand evolution	Examples of adaptations of Arctic wildlife and drivers of adaptation	2
Human and environmental health	Understand form and function in health and disease within a One Health framework, integrating human and environmental health	How organisms are intimately linked to environments and human health in Arctic	2
Lab and field skills			
Experimental design	Gain experience in applying the scientific method		
Safety	Work safely and productively in lab and field settings		
Lab skills	Gain experience with basic and advanced lab techniques and understand their application in research, health science and industry		
Field skills	Gain experience in basic and advanced field skills and understand their application in ecology, conservation biology and environmental change	Review considerations for field work in Arctic; examples for research success	2
Data acquisition, analysis and interpretations	Collect data, present results both qualitatively and quantitatively, and interpret outcomes in light of the literature		
Statistical analysis	Use R and or other programs to analyze biological data		
Professional skills			
Ethical practices	Demonstrate ethical conduct, apply principles of academic integrity and understand the principles of EDI in science	Review working with Arctic communities; knowledge sharing, self-determination for research	2
Collaboration and group work	Work effectively in groups within and across disciplines		
Critical thinking	Analyze and evaluate information to make science-based decisions	Review many scientific papers for insights to introduced topics	2
Computer proficiency	Use common and discipline- specific software		
Scientific communication	Communicate science effectively to both scientific and general audiences	Critical analysis of scientific writing	2