Marine Biology
BIOL 2563

Instructor: Keegan Lutek (he/him)
Hear my name

Office: MacAskill Hall 108

Office hours: Wed 10:30-11:30 & 12:30-14:00
Thurs 12:30-13:00

E-mail: keegan.lutek@acadiau.ca

Lecture: Mon/Wed/Fri 11:30-12:20
BAC 241
In-person

ACADIA BIOLOGY

Evaluation	Percentage	Date
Lecture Quizzes	5%	Five-minute practice at the beginning of most lectures. Allotted to your average quiz mark.
Marine Photos	5%	Photo(s) and brief description(s) due by Sept. 18, Oct. 23 and Nov. 20.
Marine News & Views	10%	Three short (3-5 sentences) summaries due Sept. 28, Oct. 26, and Nov. 16.
Opinion Essay	20%	Components will be due throughout the semester. Topic selection (2%; Sept. 18), annotated bibliography (5%; Oct. 9), essay outline (3%; Nov. 6), draft essay (2%; Nov. 27), and final essay (8%; Dec. 9). The final draft will be a 5-paragraph, 600-word essay.
Exam 1	20%	Oct. 7 (Physical Properties & Processes)
Exam 2	20%	Nov. 20 (Marine Habitats, some integration with Physical Properties & Processes)
Final Exam	20%	TBA (Cumulative [integrative questions that require whole-course knowledge], but specific details emphasized from Marine Locomotion and Marine Vertebrates)

Part 1: Course Information

Course Description

An introduction to the oceans and seas of the world and the organisms that live there; the importance of these waters and animals to humans and how both are impacted by society. The diversity and ecology of phytoplankton, zooplankton, invertebrates, fish, mammals, birds, and seaweeds are explored as they relate to marine processes such as tides, currents, ecology, pollution, fisheries, and climate change. Local focus on the Bay of Fundy.

Prerequisite(s): None

Course Materials & Requirements

A textbook is not strictly required. However, reference material for this course will be helpful. Reference material will be posted and/or links created in Moodle. If you review this material, you will succeed.

Course Requirements

1. Access to Moodle. Moodle is the central portal for all course material.
2. Computer or tablet to take online quizzes and tests.
3. Attendance at all lectures.
4. Write all tests and the final exam.
5. Enthusiasm.

Course Structure

Format: Lectures presented in real time.

Slot and Room: M-W-F in-person, Slot 4: 11:30-12:20

Audio and Video Recordings

1. Students will not create audio or video recordings without written permission from the instructor.
2. Students will not take photographs of lecture slide materials.

Student Learning Outcomes

1. Understand and describe ocean formation, sea water properties, waves, currents, and tides.
2. Understand and describe ocean habitats, marine food webs, and marine ecosystems.
3. Identify and know the key characteristics of profiled organisms that inhabit oceans, seas, estuaries, and intertidal zones, the habitats in which each resides, and their life histories in a global context.
4. Relate how organisms interact with their habitat and the diversity of organisms in oceans ecosystems.
5. Understand the historical and current human actions and how they affect oceans.
6. Relate guest lecture stories and science communication to the course material

How to Meet the Learning Outcomes

1. Attend all lectures.
2. Participate.
3. Read the required readings on Moodle, and associated articles to get more background and context.
4. Study on a regular basis to excel on assignments.
5. Take good notes.

Part 2: Course Plan

The instructor reserves the right to amend the course plan with reasonable notice, and in consultation with the class.

Date	Section	Topic	Synopsis
Sept. 9		Course Introduction	Course schedule, assessments, and principles.
Sept. 11 & 14	Physical Properties & Processes	Introduction to the Marine Environment	What is "Marine Biology" and some essential technologies. Oceans, seas and trenches.
Sept. 16, 18 & 21		The Making & Characterization of Oceans	How oceans are made. The physio-chemical properties of saltwater.
Sept. 23, 25, 28 & Oct. 2		Physical Processes & Zonation	Currents and mixing. Tidal patterns. Marine zones.
Oct. 5, 7 & 9	Exam Review, Exam 1 & Essay Work Period		**Exam 1 October 7th** (Physical Properties & Processes, 20%)
October 19, 21, 23 & 26	Marine Habitats	Energy Transfer	Marine ecology and energy sources. Marine food webs; from bacteria to whales.
Oct. 28, 30, Nov. 2, 4 & 6		Coastal Habitats	Animals that form the base of coastal marine habitats. Coral reefs. Challenges of the intertidal zone.
Nov. 9, 13 & 16		Other Marine Habitats	Transitional and subtidal habitats. Deep sea ecology and biodiversity.
Nov. 18 & 20	Exam Review, Exam 2		**Exam 2 November 20th** (Marine Habitats, some integration with Physical Properties & Processes, 20%)
Nov. 23, 25 & 27	Marine Locomotion		Locomotor diversity, physics and forces.
Nov. 30, Dec. 2, 4 & 7	Marine Vertebrates		Cetaceans, fishes, & birds.
Dec. 9	Review/Spillover Day		
due Dec. 20	**Final Exam**		**Online; available for whole exam period**

Part 3: Assessment and Grading

Lecture Quizzes

Two critical components of effective studying strategies are retrieval practice and spaced practice. These lecture quizzes aim to encourage both. We will begin most lectures with short (five-minute, no more than three multiple choice/fill in the blank questions) quizzes based on material from the previous lecture. These will be on paper, designed to take half the allotted time and will not be available for make-up. This means that you need to be present in lecture to receive credit for these quizzes. I will drop your lowest three quiz marks from regular lecture periods (not including guest lectures - attendance is mandatory for guest lectures) when calculating the average, so you can miss three lectures without being penalized. Accommodation will be made for any additional absences if a reasonable explanation is provided.

Marine Photos

In case you weren't aware, Acadia University is right beside the ocean (or at least beside a bay/estuary, depending on who you ask)! My hope is that this course makes you more aware of features of the marine environment, not just in lecture, but in everyday life. The ocean is constantly changing and full of fun things! To help you in this process, you will take at least three photos that collectively illustrate five "features" of the marine environment. These features can be just about anything…perhaps other that saltwater…think about the processes, geography, terrain, environments, and living things that we discuss in lecture – what can you see along the coast? For example, where in the tidal cycle is the coastline you're at? What kind of living thing(s) do you see? Are there any geographical features characteristic of a marine coastline? This assignment can be easily accomplished in the parks and trails of Wolfville's waterfront (e.g. Dykes Trail, Kings County Rail Trail, Wolfville Waterfront Park), but you're welcome to complete it at any marine coastline you find yourself at this semester.

Marine News and Views

Marine environments play a critical role in biology, our day-to-day lives, and global society. Since this course is intended to be a broad introduction to "Marine Biology", our ability to dive deep on specific topics or processes is somewhat limited. Further, because Marine Biology is such a broad field with wide-ranging impacts, we are unlikely to explore the part(s) of Marine Biology that are of interest to you in detail. To allow you the opportunity to explore Marine-Biology-related topics that are most interesting to you and to provide practice integrating topics covered in the class, you will complete three short (3-5 sentence) descriptions of how three chosen articles (either primary scientific literature or news) integrates three topics covered in the course. The focus here is finding connections between the course topics, not just between the article and each topic individually. All topics covered in the course are fair game, though you'll (obviously) have more detail about the topics that have already been covered.

Opinion Essay

To further develop your knowledge integration skills, you will complete a summative opinion essay on a topic in Marine Biology of your choice. The writing process will be broken down into components throughout the semester, with each component being a portion of the final mark for this assignment. The aim is for you to select a topic, research said topic, form an opinion (or thesis) about that topic, and then write in support of your thesis using primary literature as evidence to guide your writing.

Exams

Exams do two things:

a) cover the basic material such as terminology of organisms/systems/zones, organism identification, concept matching, and all the 'smaller' things and

b) are designed to investigate what you have learned in a broader sense.

What are the main concepts? Are you able to apply concepts with examples? Do you understand the material, and can you integrate terminology, identification, and all the 'smaller things' in some sensible way? Can you integrate the required readings to support your answers?

1. Each exam will be delivered on paper and completed by each student, separately DURING LECTURE TIME.
2. Once the exam starts, you will have 45 minutes to complete it (no more, no less) and it MUST BE COMPLETED within the 50 min lecture slot.
3. The use of AI (artificial intelligence) of any form for a test or the final exam is forbidden. Use of AI will be considered cheating.
4. Students with accommodations will need to arrange with Accessible Learning Services a place to write an invigilated exam. The date for these exams may vary by up to two after the set test date, and times can vary starting at 8:00 AM the date of exam.

Make-up Grading

Make-up assessments for either absence, or poor performance, will not be provided as an option. If you have a valid excuse from the registrar for missing any exam, the only option is you will get to write the exam at a time no longer than one week after the exam date at an agreed upon time in a place of the instructor's choosing. In rare circumstances (e.g. prolonged medical injury) the weight from the missed item will automatically be distributed across all other items of the same category. Missed assessments without a valid excuse from the registrar will result in a mark of zero.

Part 4: Course Policies

1. Complete exams as scheduled. If you are unable to do so for a valid reason, please contact me as soon as possible (email is best) before the test date, otherwise see 'make-up grading' above.
2. Attend all classes. There is considerable material presented in class that is not provided on lecture slides or in other material.
3. Login to Moodle at least once per day to check for news, participate in discussion forums, and/or check for updated material. From time-to-time I will update course slides if errors are found, or if I find ancillary material that will help you to study.
4. Check your email at least once per day because this is the only place that we can get hold of you!
5. It is expected you will spend at least 1 hour outside of lecture time for each lecture to read associated materials, watch videos, and otherwise engage with the course material.
6. Act accordingly in class. That means no talking or disruption unless it is directly related to the course material as part of a class discussion etc…
7. Contact me when you do not know the material. It is impossible to help if you do not contact me.

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" is Nov. 27. 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. 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. The instructor's consent shall not be unreasonably withheld.

Use of artificial intelligence tools by students to assist with their learning is allowed only if: prior permission has been given by the course professor/instructor, and the student properly credits/cites how the AI technology was used in their work. AI must be used in an ethical and responsible manner as a positive learning tool. AI may not be used in ways that violate Acadia's Academic Integrity Policy. Students are reminded that plagiarism, or other forms of cheating, are both types of academic dishonesty.

Share the Air Policy

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.
https://hr.acadiau.ca/employment/university-policies.html

Part 6: Program Learning Outcomes

Foundations of knowledge	**Explanation**	**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	Lectures throughout emphasize primary literature. News & Views assignment and Opinion Essay require students to read and interpret scientific literature.	2
Historical concepts and contributions by important figures	Explain foundational concepts in biology, Two-eyed Seeing, and ethical implications of scientific discoveries	The history of marine science and technology is presented in lecture.	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	Bay of Fundy (and surrounding areas) examples used wherever possible.	2
Genetics and evolution	Understand the chemical basis of heredity, genetics and genomics; integrate concepts across disciplines to understand evolution	N/A	N/A
Human and environmental health	Understand form and function in health and disease within a One Health framework, integrating human and environmental health	Connections between marine biology and human health will be emphasized in lecture and assignments.	2
Lab and field skills	**Explanation**	**Course specific examples**	**Proficiency** 1-Introduction 2-Reinforcement 3-Proficient
Experimental design	Gain experience in applying the scientific method	N/A	

Safety	Work safely and productively in lab and field settings	N/A	
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	N/A	
Data acquisition, analysis and interpretations	Collect data, present results both qualitatively and quantitatively, and interpret outcomes in light of the literature	N/A	
Statistical analysis	Use R and or other programs to analyze biological data	N/A	
Professional skills	**Explanation**	**Course specific examples**	**Proficiency** 1-Introduction 2-Reinforcement 3-Proficient
Ethical practices	Demonstrate ethical conduct, apply principles of academic integrity, and understand the principles of EDI in science	All assessments	3
Collaboration and group work	Work effectively in groups within and across disciplines	N/A	
Critical thinking	Analyze and evaluate information to make science-based decisions	Exams and opinion essay assessments emphasize these skills	2
Computer proficiency	Use common and discipline-specific software	N/A	
Scientific communication	Communicate science effectively to both scientific and general audiences	Opinion essay will work on written skills.	2