

Comparative Animal Physiology

Syllabus

Department of Biology
BIOL/MARI 3370, Fall 2024

Dalhousie University acknowledges that we are in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq People and pays respect to the Indigenous knowledges held by the Mi'kmaq People, and to the wisdom of their Elders past and present. The Mi'kmaq People signed Peace and Friendship Treaties with the Crown, and section 35 of the Constitution Act, 1982 recognizes and affirms Aboriginal and Treaty rights. We are all Treaty people.

Dalhousie University also acknowledges the histories, contributions, and legacies of African Nova Scotians, who have been here for over 400 years.

Lecturer

Name	Email	Office hours
Prof. Glenn Crossin	Glenn.Crossin@dal.ca	By appointment, LSC 6060

Course Description

Lectures on the physiological mechanisms that underlie and coordinate the movement, reproduction, survival, and fitness of animals.

PREREQUISITES: BIOL 2003.03 and BIOL 2020.03 (or BIOA 2001.03)

EXCLUSIONS: BIOL 3078.03, BIOL 3079.03, MARI 3074.03, and MARI 3076.03

Course Structure

Lectures will be delivered live, in the classroom. They will not be recorded.

Dates and Location: MWF, 8:35 – 9:25am, Henry Hicks room 212.

Course Materials

Textbook: Hill, R. W., Cavanaugh, D. and M. Anderson. *Animal Physiology*. Fifth edition. 2021.

Learning Objectives

By the end of this course, students should be able to:

- Explain how physiological processes underlie life history variation in wild animals.
- Explain the roles of the environment and climate in physiological processes and animal survival.
- Explain how physiological variation at the molecular, cellular, and tissue levels influence whole-organism functioning, behaviour, and fitness.
- Define and give examples of homeostasis.
- Explain the basics of neuronal function and signal transmission.
- Describe the structures and pathways involved in sensory reception.
- Relate how nerves and muscles coordinate to allow for movement.
- Describe the structure and function of skeletal muscles.
- Explain the basics of endocrine functioning, especially its role in the control and coordination of mammalian reproduction (follicle recruitment and development, endometrial development, fertilization, lactation, etc).
- Describe physiologic reproductive strategies across species.

Assessment

Lecture Exam 1, in class	35%
Lecture Exam 2, in class	35%
Lecture Exam 3, in class	15%
<u>Mechanisms Quiz, in class</u>	<u>15%</u>
Total	100%

There are 3 exams and 1 quiz, all of which occur in class during the term. In these you will be required to respond, in expository form, to questions about physiological processes or problems extending from material discussed in lecture and in the text.

Exams are writing intensive, and so your ability to articulate ideas and use of proper grammar and syntax are paramount. Grading will reflect how convincingly you answer the questions, in writing. Each exam/quiz is 50 mins in duration.

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

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

Class Schedule (Tentative)

Date	Lec #	Topic
4-Sep W	-	COURSE INTRODUCTION
6-Sep F	1	Physiological Diversity, Mechanisms & Origins
9-Sep M	2	Internal Constancy vs. Conformity, and Homeostasis
11-Sep W	3	The Physical and Chemical Environment
13-Sep F	4	Evolutionary processes and physiology
16-Sep M	5	Dealing with Temperature - Ecothermy & Homeothermy
18-Sep W	6	Dealing with Temperature - Endothermy
20-Sep F	7	Physiology and Climate Change
23-Sep M	-	RECITATION
25-Sep W	-	EXAM 1 – Lecture 1-7
27-Sep F	8	Enzymes - instruments of change
30-Sep M	-	NO CLASSES – Truth & Reconciliation
2-Oct W	9	Nervous System & Neurons
4-Oct F	10	Membrane Potentials & Action Potentials
7-Oct M	11	Sensory systems – Vision
9-Oct W	12	Sensory systems – Mechanoreception & Touch
11-Oct F	13	Sensory systems – Lateral Lines in Fishes
14-Oct M	-	NO CLASSES – Thanksgiving
16-Oct W	14	Sensory systems – Hearing
18-Oct F	15	Muscle Anatomy
21-Oct M	16	Muscle - Contractile Physiology & Energetics
23-Oct W	-	RECITATION
25-Oct F	-	EXAM 2 – Lecture 9-16
28-Oct M	17	Endocrine Physiology
30-Oct W	18	Sexual Reproduction - Mating systems
1-Nov F	19	Reproduction in Placental Mammals
4-Nov M	20	Reproduction in Egg-laying Vertebrates
6-Nov W	21	Stress & Parental Care
8-Nov F	22	Menopause
11-Nov M	-	READING WEEK
13-Nov W	-	
15-Nov F	-	
18-Nov M	-	RECITATION
20-Nov W	-	EXAM 3 – Lectures 15-22
22-Nov F	23	Foraging & Trophic Polymorphisms
25-Nov M	24	Evolutionary Physiology - The Penguins
27-Nov W	25	Evolutionary Physiology - The Curious Case of Egg Size Dimorphism
29-Nov F	26	Conservation Physiology
2-Dec M	-	Mechanisms Quiz – Cumulative
3-Dec T	-	Guest Lecture - TBA
4-Dec W	-	TBA - END OF TERM

Course Policies

To avoid any misunderstanding or confusion during the term, please note the following policies. These regulations have been put in place to try to ensure fair and equal treatment for all. Extenuating circumstances can arise, however, so please feel free to talk to us if you have problems with any of these regulations at any time during the term.

Missing an Exam or Assignment

You MUST Inform me in advance if you are unable to attend an exam or give a presentation. This will require a Self Declaration of Absence (SDA) form. **ONLY one SDA is permitted during the term.** Make-up exams must be written within 4 academic days of the originally scheduled exam (e.g. if the exam was on a Monday you must rewrite it by Friday; if the exam was on a Friday you must rewrite by Thursday). Makeup exams will not be offered after this time period. I am **NOT** obligated to provide you with a makeup exam, so excuses other than illness or extreme circumstance are unlikely to be considered. The weight of missed exams will not be redistributed across other exams.

Plagiarism and Academic Integrity

You are expected to abide by Dalhousie University's policies on academic integrity.

We encourage you to work with classmates to help each other learn the content of the class. The Discussion boards will be particularly important for asking questions and receiving help.

However, essay assignments must be independently written and entirely in your own wording. You can work together to understand content, but assignments must be your own work. This class subscribes to a Brightspace Learning web-based service that checks for originality in submitted work. This service will be used for all assignments and any online exams submitted.

Copyright Notice

The assessments of your work (exams, presentations, essays) are the property of the course and are kept confidential. **You may not share the contents** of these assessments on 'homework sharing' websites like Chegg, Course Hero, Studocu, etc. This includes all images, videos, documents, assignments and exams. It is an academic offence to share these materials outside of this course space in such a way that others might gain an unfair advantage, and students who do so may be subject to University discipline. Copying this material for distribution may also lead to a violation of Copyright law.

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

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

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

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).

Information: https://www.dal.ca/campus_life/communities/indigenous.html

Important Dates in the Academic Year (including add/drop dates)

<https://academiccalendar.dal.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=117&chapterid=-1&topicgroupid=31821&loadusercredits=False>

University Grading Practices

https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html

Student Resources and Support

Advising

General Advising https://www.dal.ca/campus_life/academic-support/advising.html

Science Program Advisors: <https://www.dal.ca/faculty/science/current-students/undergrad-students/degree-planning.html>

Indigenous Student Centre: https://www.dal.ca/campus_life/communities/indigenous.html

Black Students Advising Centre: https://www.dal.ca/campus_life/communities/black-student-advising.html

International Centre: 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

Studying for Success: 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.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

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>