

# Comparative Animal Physiology Syllabus

## Department of Biology

BIOL/MARI 3370 Fall 2023

*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.*

### Course Instructor(s)

Name	Email	Office Hours
Dr. Margaret Cooper	mhcooper@dal.ca	By Appointment; LSC 4130

### Course Description

Lecture course examining principles of animal physiology, with emphasis on the coordination of metabolism, neural and sensory function, muscular function, stress, and reproduction, all within the context of ecology and evolution.

**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

#### *Course Delivery*

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

#### *Lectures*

MWF 11:35-12:25, LSC P5260

## Course Materials

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

Hard copies and e-textbook access can be purchased from the Dal Bookstore. You will also be able to purchase the e-textbook inside of Brightspace. You will be able to access the e-textbook for free any time before the add-drop deadline. If you have any questions, please feel free to reach out to [support@willolabs.com](mailto:support@willolabs.com).

It is not necessary that you purchase the most recent edition. The 4<sup>th</sup> edition of *Animal Physiology* (Hill et al. 2018) contains all the information you will need, however, page references provided will be for the 5<sup>th</sup> edition.

I will use the course Brightspace site as my means of communication with the class. It will be important for you to keep up with the course announcements and I will post pdf files of the lecture slides prior to each lecture. The discussion board will be a place for you to ask questions and answer those of other students. Assignments will be submitted via the Brightspace site as well.

## Assessment

### ***Assignments***

Article Analysis Presentation = **20%**

One of:

Physiology and Climate Change - October 6<sup>th</sup>

Sensory Systems - November 3<sup>rd</sup>

Stress and Parental Care - November 24<sup>th</sup>

Reproduction - December 1st

There will be four presentation days throughout the term. On those days, the class will be divided into three separate rooms. Presentations in each room will be evaluated by the course instructor or one of two TAs.

Working in teams of 2, students will select from a list of articles from the peer-reviewed scientific literature and present a 10-minute PowerPoint presentation that summarizes and analyses the research. The PowerPoint presentation and supporting notes must be submitted 72-hours before the presentation. This component, along with the presentation will be worth 15%.

There will also be a peer-review component to this assignment worth 5%. Students will be assigned to two other groups whose presentations they will peer review. Students will receive a grade for how well they engage with assessing their fellow students' presentations.

### ***Tests/quizzes***

There are 2 tests scheduled during the term. They will be 50 minutes long and take place during lecture time. These exams will be a mixture of multiple choice and written answer questions.

Exam 1 - Animals & Environments through Endothermy (**20%**): *September 29th*

Exam 2 - Physiology and Climate Change through Sensory Systems (**25%**): *October 27th*

### ***Final exam***

Final Exam - Muscle Physiology to End; Includes Presentation Content (**35%**): *TBA*

- The final exam will be 2 hours long and will occur during the scheduled exam period.

Conversion of numerical grades to final letter grades follows the

#### [Dalhousie Grade Scale](#)

A+ (90-100)	B+ (77-79)	C+ (65-69)	D (50-54)
A (85-89)	B (73-76)	C (60-64)	F (0-49)
A- (80-84)	B- (70-72)	C- (55-59)	

### **Course Policies on Missed or Late Academic Requirements**

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 speak with me if you have problems with any of these regulations at any time during the term.

#### **Missing an Exam or Assignment**

**Please inform me in advance** if you are unable to attend an exam or give a presentation. These will only be rescheduled for legitimate illness, and will require a Self Declaration of Absence (SDA) form. Make-up exams will be given **within one week** of the scheduled exam date, at a mutually convenient time if possible. **PLEASE NOTE:** 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. ***Students are permitted only one SDA form during the term.***

## Course Policies related to Academic Integrity

### 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, but all submitted assessments must be only the work of the individual(s) named on the submission. This means that the use of generative AI or large language models (e.g. ChatGPT) for the Article Analysis Presentation will not be appropriate.

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.

## Learning Outcomes

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

- Understand how physiological processes underlie life history variation in wild animals.
- Understand the role that environment and climate play in physiological processes.
- Explain how physiological variation at the molecular and tissue levels influence whole organism functioning and behaviour.
- 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.

## Course Content

Date	Lecture
Sept	6 COURSE INTRODUCTION
	8 Animals and Environments
	11 Animals and Environments cont.
	13 Evolutionary Physiology
	15 Enzymes - instruments of change
	18 Animal Energetics and Metabolic Rate
	20 Dealing with Temperature - Ectothermy & Homeothermy
	22 Dealing with Temperature - Endothermy
	25 Physiology and Climate Change
	27 Exam Review
	<b>29 Exam 1 - Animals &amp; Environments through Endothermy (25%)</b>
Oct	2 <i>Truth &amp; Reconciliation day - University closed</i>
	4 Nervous System and Neurons
	<b>6 Article Presentations 1 - Physiology and Climate Change</b>
	9 <i>Thanksgiving Holiday – University closed</i>
	11 Membrane Potentials & Action Potentials
	13 Membrane Potentials & Action Potentials cont.
	16 Sensory systems - Vision part 1
	18 Sensory systems - Vision part 2
	20 Sensory systems - Hearing
	23 Muscle Anatomy and Physiology
	25 Exam Review
	<b>27 EXAM 2 - Physiology and Climate Change through Sensory Systems (25%)</b>
	30 Muscle Anatomy and Physiology cont.
Nov	1 Muscle Energetics
	<b>3 Article Presentations 2 - Sensory Systems</b>
	6 Endocrine Physiology
	8 Endocrine Physiology cont.
	10 Sexual Reproduction - Mating systems
	13 <b>READING WEEK - No classes</b>
	15 <b>READING WEEK - No classes</b>
	17 <b>READING WEEK - No classes</b>
	20 Reproduction in Placental Mammals
	22 Reproduction in Non-placental Animals
	<b>24 Article Presentations 3 - Stress and Parental Care</b>
	27 Nutrition, Feeding, and Digestion
	29 Nutrition, Feeding, and Digestion cont.
Dec	<b>1 Article Presentations 4 - Reproduction</b>
	4 TBA
	5 Exam Review
	6 Exam Review
<b>TBA</b>	<b>Final Exam - Muscle Physiology to End; Includes Presentation Content (35%)</b>

## University Policies and Statements

### 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 at 1321 Edward St or [elders@dal.ca](mailto:elders@dal.ca). Additional information regarding the Indigenous Student Centre can be found at: [https://www.dal.ca/campus\\_life/communities/indigenous.html](https://www.dal.ca/campus_life/communities/indigenous.html)

### Internationalization

At Dalhousie, 'thinking and acting globally' enhances the quality and impact of education, supporting learning that is "interdisciplinary, cross-cultural, global in reach, and orientated toward solving problems that extend across national borders." Additional internationalization information can be found at: <https://www.dal.ca/about-dal/internationalization.html>

### Academic Integrity

At Dalhousie University, we are guided in all our work by the values of academic integrity: honesty, trust, fairness, responsibility, and respect. As a student, you are required to demonstrate these values in all 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. Additional academic integrity information can be found at: [https://www.dal.ca/dept/university\\_secretariat/academic-integrity.html](https://www.dal.ca/dept/university_secretariat/academic-integrity.html)

### Accessibility

The Student Accessibility Centre is Dalhousie's centre of expertise for matters related to student accessibility and accommodation. If there are aspects of the design, instruction, and/or experiences within this course (online or in-person) that result in barriers to your inclusion, please contact the Student Accessibility Centre ([https://www.dal.ca/campus\\_life/academic-support/accessibility.html](https://www.dal.ca/campus_life/academic-support/accessibility.html)) for all courses offered by Dalhousie with the exception of Truro. For courses offered by the Faculty of Agriculture, please contact the Student Success Centre in Truro (<https://www.dal.ca/about-dal/agricultural-campus/student-success-centre.html>)

## **Conduct in the Classroom – Culture of Respect**

Substantial and constructive dialogue on challenging issues is an important part of academic inquiry and exchange. It requires willingness to listen and tolerance of opposing points of view. Consideration of individual differences and alternative viewpoints is required of all class members, towards each other, towards instructors, and towards guest speakers. While expressions of differing perspectives are welcome and encouraged, the words and language used should remain within acceptable bounds of civility and respect.

## **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 (Strategic Priority 5.2). Additional diversity and inclusion information can be found at: <http://www.dal.ca/cultureofrespect.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. The full Code of Student Conduct can be found at:

[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)

## **Fair Dealing Policy**

The Dalhousie University Fair Dealing Policy provides guidance for the limited use of copyright protected material without the risk of infringement and without having to seek the permission of copyright owners. It is intended to provide a balance between the rights of creators and the rights of users at Dalhousie. Additional information regarding the Fair Dealing Policy can be found at: [https://www.dal.ca/dept/university\\_secretariat/policies/academic/fair-dealing-policy-.html](https://www.dal.ca/dept/university_secretariat/policies/academic/fair-dealing-policy-.html)

## Originality Checking Software

The course instructor may use Dalhousie's approved originality checking software and Google to check the originality of any work submitted for credit, in accordance with the Student Submission of Assignments and Use of Originality Checking Software Policy. Students are free, without penalty of grade, to choose an alternative method of attesting to the authenticity of their work and must inform the instructor no later than the last day to add/drop classes of their intent to choose an alternate method. Additional information regarding Originality Checking Software can be found at:

[https://www.dal.ca/dept/university\\_secretariat/policies/academic/student-submission-of-assignments-and-use-of-originality-checking-software-policy-.html](https://www.dal.ca/dept/university_secretariat/policies/academic/student-submission-of-assignments-and-use-of-originality-checking-software-policy-.html)

## Student Use of Course Materials

Course materials are designed for use as part of this course at Dalhousie University and are the property of the instructor unless otherwise stated. Third party copyrighted materials (such as books, journal articles, music, videos, etc.) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law. Copying this course material for distribution (e.g. uploading to a commercial third-party website) may lead to a violation of Copyright law.



Faculty of Science

# Student Resources and Support

## University Policies and Programs

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

[http://www.dal.ca/academics/important\\_dates.html](http://www.dal.ca/academics/important_dates.html)

Classroom Recording Protocol:

[https://www.dal.ca/dept/university\\_secretariat/policies/academic/classroom-recording-protocol.html](https://www.dal.ca/dept/university_secretariat/policies/academic/classroom-recording-protocol.html)

Dalhousie Grading Practices Policies:

[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)

Grade Appeal Process: [https://www.dal.ca/campus\\_life/academic-support/grades-and-student-records/appealing-a-grade.html](https://www.dal.ca/campus_life/academic-support/grades-and-student-records/appealing-a-grade.html)

Sexualized Violence Policy: [https://www.dal.ca/dept/university\\_secretariat/policies/health-and-safety/sexualized-violence-policy.html](https://www.dal.ca/dept/university_secretariat/policies/health-and-safety/sexualized-violence-policy.html)

Scent-Free Program: <https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html>

## Learning and Support Resources

General Academic Support – Advising (Halifax): [https://www.dal.ca/campus\\_life/academic-support/advising.html](https://www.dal.ca/campus_life/academic-support/advising.html)

General Academic Support – Advising (Truro): <https://www.dal.ca/about-dal/agricultural-campus/ssc/academic-support/advising.html>

Student Health & Wellness Centre: [https://www.dal.ca/campus\\_life/health-and-wellness.html](https://www.dal.ca/campus_life/health-and-wellness.html)

On Track (helps you transition into university, and supports you through your first year at Dalhousie and beyond): [https://www.dal.ca/campus\\_life/academic-support/On-track.html](https://www.dal.ca/campus_life/academic-support/On-track.html)

Indigenous Student Centre: [https://www.dal.ca/campus\\_life/communities/indigenous.html](https://www.dal.ca/campus_life/communities/indigenous.html)

Indigenous Connection: <https://www.dal.ca/about-dal/indigenous-connection.html>

Elders-in-Residence (The Elders in Residence program provides students with access to First Nations elders for guidance, counsel, and support. Visit the office in the Indigenous Student Centre or contact the program at [elders@dal.ca](mailto:elders@dal.ca) or 902-494-6803:

<https://cdn.dal.ca/content/dam/dalhousie/pdf/academics/UG/indigenous-studies/Elder-Protocol-July2018.pdf>

Black Student 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.html](https://www.dal.ca/campus_life/international-centre.html)

South House Sexual and Gender Resource Centre: <https://southhousehalifax.ca/about/>

LGBTQ2SIA+ Collaborative: <https://www.dal.ca/dept/vpei/edia/education/community-specific-spaces/LGBTQ2SIA-collaborative.html>

Dalhousie Libraries: <http://libraries.dal.ca/>

Copyright Office: <https://libraries.dal.ca/services/copyright-office.html>

Dalhousie Student Advocacy Services: <https://www.dsu.ca/dsas?rq=student%20advocacy>

Dalhousie 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)

Human Rights and Equity Services: <https://www.dal.ca/dept/hres.html>

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)

Study Skills/Tutoring: [http://www.dal.ca/campus\\_life/academic-support/study-skills-and-tutoring.html](http://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html)

Faculty of Science Advising Support: <https://www.dal.ca/faculty/science/current-students/undergrad-students/degree-planning.html>

## **Safety**

Biosafety: <http://www.dal.ca/dept/safety/programs-services/biosafety.html>

Chemical Safety: <https://www.dal.ca/dept/safety/programs-services/chemical-safety.html>

Radiation Safety: <http://www.dal.ca/dept/safety/programs-services/radiation-safety.html>

Laser Safety: <https://www.dal.ca/dept/safety/programs-services/radiation-safety/laser-safety.html>