Last updated: 12/19/2023

BIOL 322
Experimental Approaches to Animal Physiology Winter Term 2024

Course Description

A comparative examination of the interaction between animals and their environment, including: physiological adaptations to extreme environments (e.g., arctic, desert, FW/SW); responses to acute and chronic environmental stress (e.g., hypoxia, temperature); environmental regulation of normal physiological processes; uses of comparative models in other fields. This course is more than just an extension of the prerequisite course BIOL 339. Although the content should be familiar, this course assumes a working knowledge of *Comparative Animal Physiology* and its application toward the understanding the environmental adaptations of animals. The aim of the assignments is to use the environment to examine the mechanisms of adaptations in animals, real or otherwise.

Course Instructors	
Teaching Assistant	
Office Hours	*Please schedule by email*

Learning Objectives

- Identify the central environmental challenges to an animal in particular geographical location.
- Understand and describe the impact of the environment on basic physiological mechanisms in animals.
- Identify why and how animals adapt to their environment; on a spatial and temporal (immediate, evolutionary) scale.
- Describe and rationalize physiological adaptations based on novel environmental conditions.

Learning Hours

Teaching method		*Average hours per week*	*Number of weeks*	*Total hours*
In-class hours	Lecture	3	12	36
	Seminar			
	Laboratory			
	Tutorial			
	Practicum			
	Group learning	3	6	18
	Individual instruction			
Other	Online activity	1	12	12
	Off-campus activity			
	Private study	4	12	48
			Total hours on task:	**114**

Course Outline

Topics covered in this course:

- Introduction to *Environmental Physiology*
- Water and Life
- Homeostasis
- Osmotic / Ionic balance
- Respiration
- Thermal strategies
- Locomotion
- Metabolism
- Scaling and size

Lecture schedules will be published through course OnQ. Lecture slides will be released prior to each lecture.

Textbooks, Readings

There are two textbooks that are associated with this course. The primary text will provide the main content for the course, in complement to a variety of figures taken from the primary literature (additional info will be provided).

PRIMARY TEXTBOOK:

Willmer, Stone & Johnston. 2005. Environmental Physiology of Animals (2nd ed.) Blackwell Science. ISBN 1-4051-0724-3

(pdf available online)

SUPPORTING TEXTBOOK:

Moyes, CD and Schulte PM. 2016. Principles of Animal Physiology. Third edition. Pearson. San Francisco. pp. 750.ISBN 13: 978-0-321-83817-9

*The supporting textbook may be helpful in reviewing some of the mechanisms associated with the course; this textbook is associated with the course prerequisite BIOL*339 Animal Physiology.*

Required readings

- See specific references to class course text figures and tables within the course notes.

Journals of Interests:

- Presented in course notes.

Grade Distribution

20% Midterm
40% Final Exam
40% Term Essay

Grading Method

In this course, some components will be graded using numerical percentage marks. Other components will receive letter grades, which for purposes of calculating your course average will be translated into numerical equivalents using the Faculty of Arts and Science Letter Grade Input Scheme.

When letter grades are employed, the following scale will be employed for purposes of calculating your course average:

Arts & Science Letter Grade Input Scheme

Assignment mark	**Numerical value for calculation of final mark**
A+	93
A	87
A-	82
B+	78
B	75
B-	72
C+	68
C	65
C-	62
D+	58
D	55
D-	52
F48 (F+)	48
F24 (F)	24
F0 (0)	0

Your course average will then be converted to a final letter grade according to Queen's Official Grade Conversion Scale:

Queen's Official Grade Conversion Scale

Grade	Numerical Course Average (Range)
A+	90-100
A	85-89
A-	80-84
B+	77-79
B	73-76
B-	70-72
C+	67-69
C	63-66
C-	60-62
D+	57-59
D	53-56
D-	50-52
F	49 and below

Academic Integrity and Queen's Code of Conduct

Students are responsible for familiarizing themselves with the regulations concerning academic integrity and for ensuring that their assignments and conduct conform to the principles of academic integrity. Information is available from the instructor of this course and on the Biology Department's website: (http://biology.queensu.ca/academics/undergraduate/prepare-yourself/). Departures from academic integrity include plagiarism, use of unauthorized materials, facilitation, forgery and falsification, and are antithetical to the development of an academic community at Queen's. Given the seriousness of these matters, actions which contravene the regulations on academic integrity carry sanctions that can range from a warning or the loss of grades on an assignment to the failure of a course to a requirement to withdraw from the university.

Accommodation Policy, Exam Conflicts, and Other Conflicts

Students who feel they need accommodations for disabilities or extenuating circumstances, or have a conflict between exams or other commitments should consult the Biology Department's website for details about how to proceed (http://biology.queensu.ca/academics/undergraduate/prepare-yourself/). In general, the earlier your instructor is apprised of an extenuating circumstance, the more likely an accommodation can be made. Students are encouraged to be proactive in anticipating difficulties, when it is possible to do so.

Late Policy

Late assignments will be penalized at 5% per day.

Copyright

Course material for Biol 322 is copyrighted and is for the sole use of students registered in Bio 322.

The material used in this course arises from two main sources, the course instructor and the registered students in the course. This material is thus designed for use as part of Biol 322 at Queen's University and is the property of the instructor and students unless otherwise stated. Third party copyrighted materials (such as book chapters and articles) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law.

Copying this material for distribution (e.g. uploading material to a commercial third-party website) can lead to a violation of Copyright law. Find out more about copyright here: http://library.queensu.ca/copyright

Disability Accommodations Statement

Queen's University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a disability and think you may need accommodations, you are strongly encouraged to contact Student Wellness Services (SWS) and register as early as possible. For more information, including important deadlines, please visit the SWS website at: http://www.queensu.ca/studentwellness/