

BIOL 401

Experimental Approaches to Animal Physiology

Fall Term 2026

COURSE DESCRIPTION

Laboratory-based course emphasizing experimental approaches to understanding the principles of Animal Physiology covered in BIOL 339/3.0. CO/Pre-REQUISITE BIOL 339/3.0.

Learning Objectives

The goal of this course is to afford students hands-on experience with selective instruments and techniques used in physiological research of animal. Whether you have taken BIOL339 previously, or are taking it concurrently, the lab experience will help you to gain some appreciation of the basic design and function of physiological systems with emphasis on the collection and analysis of novel data.

Students will:

1. Gain experience using assorted tools and equipment in laboratory-based physiological studies.
2. Enhance the understanding of the function of animal physiological systems through experimental approaches and hands-on learning.
3. Develop an understanding of how experiments are designed, and the importance of controls and analyses.
4. Learn how to prepare the technical aspects of scientific reports (Materials and Methods, Results) through integration of observation, collection of novel data from labs and rudimentary data analysis.

Learning Hours

<i>Teaching method</i>		<i>Average hours per week</i>	<i>Number of weeks</i>	<i>Total hours</i>
In-class hours	Lecture			
	Seminar			
	Laboratory	3	12	36
	Tutorial	1	12	12
	Practicum			
	Group learning			10
	Individual instruction			
Other	Online activity			4
	Off-campus activity			
	Private study	4	12	48
<i>Total hours on task:</i>				110

Course Outline

The following is a brief course schedule. Circumstances may arise over the duration of the course that will result in scheduling changes. Attendance to labs (at your section) and tutorials is mandatory.

Week 1: lab organization and Course Introduction

Weeks 2-3: & Lab Skills Training

Weeks 4: No lab

Week 5: Lab 1: Respiration and Metabolic Rate I & II

Week 6,7: No lab/Tutorial (Thanksgiving Day and Fall Break)

Week 8: Nitrogen excretion I

Week 9: Nitrogen excretion II

Weeks 10, 11: Metabolites I & II

Weeks 12, 13, 14: Independent projects

Week	Starting Date	Laboratory (3 h)	Tutorial (50 min)
1	7-Sep	Lab Organization, safety and introduction	No Tutorial
2	14-Sep	Lab Basic Skills Training I	Scientific Method & Exp Approaches
3	21-Sep	Lab Basic Skills Training II	Introduction to Laboratory Techniques used in Animal Physiology
4	28-Sep	No lab	Respiration & Metabolic Rate
5	5-Oct	LAB 1a: Respiration & Metabolic Rate I	TBA
6	12-Oct	Thanksgiving and Fall Term break, No Lab	No tutorial
7	19-Oct	LAB 1b: Respiration & Metabolic Rate II	RESULTS/ISSUES from LAB 1
8	26-Oct	Lab 2a: Nitrogenous excretion and metabolism I	Comparative Nitrogenous Metabolism
9	02-Nov	LAB 2b: Nitrogenous Wastes II	RESULTS/ISSUES from LAB2
10	9-Nov	LAB 3a: Metabolites I	INTRO to Metabolites
11	16-Nov	LAB 3b: Metabolites II	RESULTS/ISSUES from LAB 3
12	23-Nov	LAB 4: Independent Project - Proposal & OPEN LAB I	Independent Project Assignment
13	30-Nov	LAB 4: Independent Project OPEN LAB II	Open Q & A (1)
14	7-Dec	LAB 4: Independent Project OPEN LAB III	Open Q & A (2)

Textbooks, Readings

There is no required textbook for this course, but students should make use of undergraduate textbooks in physiology and biochemistry to clarify the material. Lab documents will be posted on onQ. Please also see

the "Course Readings and Resources" tab on the onQ table of contents for additional lab-related materials and documents.

Grade Distribution

Lab Reports/Assignments	Weight [%]
Online Quiz	5
In-lab Skills Assessment	5
Lab Report 1 & Lab Involvement	15=15
Lab Report 2 & Lab Involvement	15=15
Lab Report 3 & Lab Involvement	15=15
Lab Report 4 Independent Group Project (Incl. Proposal, Performance and Report)	5+5+20=30
2 Peer Evaluations (individual)	5
Attendance and Class Engagement	10
Total	100

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% of the assignment grades per day.

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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/>