# ZOO*3620 Comparative Animal Physiology II

Winter 2019
Section(s): C01

Department of Integrative Biology
Credit Weight: 0.50
Version 1.00 - December 18, 2018

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# 1 Course Details

## 1.1 Calendar Description

This course will examine the physiological processes that enable animals to live within a diverse range of environments. With a focus on respiratory, cardiovascular, osmoregulatory and digestive physiological processes, the lectures will examine the underlying molecular and cellular events that mediate physiological processes and contribute to whole animal homeostasis. An associated lab course (ZOO*3630) is available.

**Pre-Requisite(s):** ZOO*3200 or ZOO*3600
**Restriction(s):** ZOO*3210

## 1.2 Timetable

Lectures: Tuesday, Thursday – 1:00-2:20 pm – MACN 113

## 1.3 Final Exam

Exam time and location is subject to change. Please see WebAdvisor for the latest information.

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# 2 Instructional Support

## 2.1 Instructional Support Team

**Instructor:** Dr. Nicholas Bernier
**Email:** nbernier@uoguelph.ca
**Office:** SC1 3467

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# 3 Learning Resources

## 3.1 Required Resource(s)

**Animal Physiology (Textbook)**

- Animal Physiology (4th Ed) by R.W. Hill, G.A. Wyse, and M. Anderson (2016). Published by Sinauer Associates, Inc., ISBN 9781605354712
- On reserve at the library

**Courselink (Website)**

https://courselink.uoguelph.ca

This course will make use of the University of Guelph's course website on D2L (via Courselink). Consequently, you are responsible for all information posted on the Courselink page for ZOO*3620. Please check it regularly. Lecture outlines will be posted the night before a lecture. They should not be treated as a substitute for the lectures; instead, they should be used to help you prepare for lectures and should be augmented with careful lecture notes.

## 3.2 Additional Resource(s)

**Principles of Animal Physiology (Textbook)**

- Principles of Animal Physiology (3rd Ed.) by Moyes and Schulte (2016)
- On reserve at the library

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# 4 Learning Outcomes

## 4.1 Course Learning Outcomes

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

1. Contrast and compare how a variety of invertebrates and vertebrates respire, circulate body fluids and digest food
2. Synthesize information to compare the iono- and osmoregulatory strategies used by different animal species
3. Apply understanding of physiological systems to compare and contrast how endothermic and ectothermic species respond to alterations in physiological/environmental temperature and to changes in energetic demands
4. Integrate data from the primary literature to explain how recent research in comparative animal physiology has contributed to our understanding of basic science (eg. structure-function relationships, acclimation/acclimatization changes) and applied science (eg. aquaculture, global climate change).
5. Utilizing recent primary literature in comparative animal physiology, identify a gap in the

knowledge and generate hypotheses and predictions for a study.

# 5 Teaching and Learning Activities

## 5.1 Course Content

| Topic | Date | Chapter | Example questions |
|---|---|---|---|
| 1) Introduction | Jan. 8 | 1, 2, 3, 5 | |
| 2) Respiration | Jan. 10-24 | 22, 23, 24 | How is blood oxygen transport affected by moving from water to land? How do bar-headed geese migrate across the Himalayas? |
| 3) Circulation | Jan. 29 - Feb. 7 | 25, 26 | How have circulatory systems evolved in diving animals? Why have reptile hearts evolved diverse chambers and shunts? |
| 4) Metabolism and Thermoregulation | Feb. 14 - 28 | 7, 8, 9, 10 | Why can't small mammals stay active in arctic winters? How can arctic ground squirrels arouse so quickly from hibernation |
| 5) Ionic and Osmotic Regulation and Excretion | March 5-19 | 27, 28, 29, 30 | Aquatic animals may regulate or conform to the ionic and osmotic properties of their environment. How do teleost and elasmobranch fishes compare? Terrestrial animals must avoid dehydration. How do kangaroo rats survive in hot deserts without drinking water? |
| 6) Digestion | March 21 - April 2 | 6 | You are what you eat! Digestive systems have evolved to accommodate specialized diets in different animal groups. How do nectar-feeding birds balance nutrient intake and water load? How do pythons ingest and digest whole animals larger than themselves |

| | | | |
|---|---|---|---|
| 7) Integration of Physiological Systems | April 4 | | |

Textbook readings from Hill et al. 2016

### 5.2 Important Dates

- Feb. 12th – Midterm exam in class
- Feb. 18th – Winter break week
- Feb. 28th – Assignment due by 11:59 pm via Courselink Dropbox

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# 6 Assessments

## 6.1 Marking Schemes & Distributions

| Name | Scheme A (%) |
|---|---|
| Midterm Exam | 25 |
| Assignment | 25 |
| Final Cumulative Exam | 50 |
| Total | 100 |

## 6.2 Assessment Details

**Midterm Exam (25%)**
**Date:** Tue, Feb 12, 1:00 PM, MACN 113
**Learning Outcome(s):** 1,2,3

- Course content: 1-3
- Your understanding of the physiological mechanisms introduced in class and through assigned textbook readings will be assessed through an in-class midterm
- Cheat sheet (1 page 8½ x 11”) allowed.

**Assignment (25%)**
**Due:** Thu, Feb 28, 11:59 PM
**Learning Outcome(s):** 5

- Course content: 1-7, according to interests of the student
- The purpose of the assignment is to get you to critically evaluate the primary literature. In this project students will be asked to pick a paper published in the last two years from a specific list of papers available on Courselink. After careful reading and analysis, you will then determine what is the next question that should be asked based on the results of the paper. Specific assignment instructions will be available on Courselink.
- It is expected that the students will summarize the area of interest and then write hypothesis and predictions that will answer the outstanding question.
- This project builds upon the skills developed in the written assignment of ZOO*3600. (Due at 11:59 pm via Courselink Dropbox)

**Final Cumulative Exam (50%)**
**Date:** TBA, TBA
**Learning Outcome(s):** 1,2,3,4

- Course content: 1-7
- Your understanding of the physiological mechanisms introduced in class and through assigned textbook readings will be assessed through a cumulative final exam held during the final exam period.
- Cheat sheet (1 page 8½ x 11") allowed.

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# 7 Course Statements

## 7.1 Grading

- Written assignment: Grades will be assigned according to the standards outlined in the U of G Undergraduate Calendar (p. 40 -41).
- Late Policy: The written assignments are due on February 28$^{th}$ before 11:59 pm on the due date via Courselink Dropbox. The late penalty is 10% of assignment value per day, i.e. assigments submitted on March 1st will receive a 10% late penalty, those on March 2nd will receive a 20% late penalty, etc...

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# 8 Department of Integrative Biology Statements

## 8.1 Academic Advisors

If you are concerned about any aspect of your academic program:

- Make an appointment with a program counsellor in your degree program. B.Sc. Academic Advising or Program Counsellors

### 8.2 Academic Support

If you are struggling to succeed academically:

- Learning Commons: There are numerous academic resources offered by the Learning Commons including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist. http://www.learningcommons.uoguelph.ca/
- Science Commons: Located in the library, the Science Commons provides support for physics, mathematic/statistics, and chemistry. Details on their hours of operations can be found at: http://www.lib.uoguelph.ca/get-assistance/studying/chemistry-physics-help and http://www.lib.uoguelph.ca/get-assistance/studying/math-stats-help

### 8.3 Wellness

If you are struggling with personal or health issues:

- Counselling services offers individualized appointments to help students work through personal struggles that may be impacting their academic performance. https://www.uoguelph.ca/counselling/
- Student Health Services is located on campus and is available to provide medical attention. https://www.uoguelph.ca/studenthealthservices/clinic
- For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions related to stress management and high performance situations. http://www.uoguelph.ca/~ksomers/

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## 9 University Statements

### 9.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

### 9.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml

Graduate Calendar - Grounds for Academic Consideration
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml

## 9.3 Drop Date

Courses that are one semester long must be dropped by the end of the fortieth class day; two-semester courses must be dropped by the last day of the add period in the second semester. The regulations and procedures for course registration are available in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Dropping Courses
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml

Graduate Calendar - Registration Changes
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml

## 9.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

## 9.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day.

More information can be found on the SAS website
https://www.uoguelph.ca/sas

## 9.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community-faculty, staff, and students-to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct
https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml

Graduate Calendar - Academic Misconduct
https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml

## 9.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

## 9.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars
https://www.uoguelph.ca/academics/calendars