

**University of Guelph  
College of Biological Sciences  
Department of Integrative Biology**

**COURSE OUTLINE**

**Comparative Animal Physiology II – ZOO\*3620**

**Winter 2017**

**COURSE 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.

Prerequisite(s):       ZOO\*3600, (STAT\*2040 or STAT\*2230 is recommended)  
Restriction:           ZOO\*3210

Credit weighting: 0.5

**TEACHING TEAM**

Professor               Dr. Patricia Wright ([patwri@uoguelph.ca](mailto:patwri@uoguelph.ca))  
Teaching Assistant   Evan Pacey ([epacey@uoguelph.ca](mailto:epacey@uoguelph.ca))

**COURSE SCHEDULE**

Lectures:               Tuesday, Thursday – 1:00-2:20 pm – MCLN Rm. 102

**LEARNING OUTCOMES**

By the end of this course students should:

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.

**COURSE RESOURCES**

**Required Textbook (on reserve at the library)**

Animal Physiology (4<sup>th</sup> Ed) by R.W. Hill, G.A. Wyse, and M. Anderson (2016). Published by

Sinauer Associates, Inc.,  
ISBN 9781605354712

**Additional Textbooks (on reserve at the library)**

Eckert's Animal Physiology (5th Ed.) by Randall et al. (2002)

Principles of Animal Physiology (1st Ed.) by Moyes and Schulte (2006)

**Courselink**

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.

**COURSE CONTENT**

<b>Topic</b>	<b>Date</b>	<b>Chapter</b>	<b>Example questions</b>
1) Introduction	Jan. 10	1, 2, 3, 5	
2) Respiration	Jan. 12-26	22, 23, 24	How do amphibious fish switch between aquatic and terrestrial respiration? How is blood oxygen transport affected by moving from water to land?
3) Circulation	Jan. 31 - 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, 16, 28, March 2	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 7-23	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 28 - April 4	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 6		

**Textbook Readings from Hill et al. 2016**

## EVALUATION

Assessment				
Form of Assessment	Weight of Assessment	Due Date of Assessment	Course Content/ Activity	Learning Outcomes Addressed
Assignment 1	10%	Jan. 24 <sup>th</sup> (1:00 pm)	1-2	1,4
Midterm Exam	25%	Feb. 9 <sup>th</sup>	1-4	1-3
Assignment 2	20%	March 14 <sup>th</sup> (1:00 pm)	1-7, according to interests of the student	5
Final Cumulative Exam	45%	April 10 <sup>th</sup> 11:30 am	1-7	1-4

## IMPORTANT DATES

Jan. 24<sup>th</sup> – Assignment 1 due by 1:00 pm  
Feb. 9<sup>th</sup> – Midterm exam in class  
Feb. 20<sup>th</sup> – Winter break  
March 10<sup>th</sup> – 40<sup>th</sup> class day – last day to drop course  
March 14<sup>th</sup> – Assignment 2 due by 1:00 pm  
April 10<sup>th</sup> – final exam – 11:30 am-1:30 pm

## COURSE AND UNIVERSITY POLICIES

### Description of Assessment

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

**Assignment 1:** Students will submit ≤ 150 words on the respiratory adaptation/acclimatization response. Details will be provided. (Due at 1:00 pm)

**Assignment 2:** 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 and then determine what is the next question that should be asked. 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 1:00 pm)

### 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 before 1:00 pm on the due date. The late penalty is 25% of assignment value per day.

### 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 in writing, with your name, id#, and e-mail contact, and

be prepared to provide supporting documentation. See the undergraduate calendar for information on regulations and procedures for Academic Consideration:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

### Accessibility

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact Student Accessibility Services as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email [csd@uoguelph.ca](mailto:csd@uoguelph.ca) or see the website: <https://www.uoguelph.ca/csd/>

### Academic Misconduct

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 discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Assignment 1 and 2 are independent assignments to be written in your own words. You can discuss ideas with your classmates but do not share your work with your classmates. These are not collaborative assignments.

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.

The Academic Misconduct Policy is detailed in the Undergraduate Calendar:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

### E-mail Communication

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

### Drop Date

The last date to drop one-semester courses, without academic penalty, is the 40<sup>th</sup> class day or March 10<sup>th</sup>. For regulations and procedures for Dropping Courses, see the Undergraduate Calendar:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

### 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.

### Recording of Materials

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

### Grading

Indicate all course policies regarding in-semester tests and assignment submissions, including time and place for submission of assignments and explicit penalties for late submissions.

### **Campus Resources**

The Academic Calendar is the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs:

<http://www.uoguelph.ca/registrar/calendars/index.cfm?index>

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

- make an appointment with a program counsellor in your degree program.  
<http://www.bsc.uoguelph.ca/index.shtml> or <https://www.uoguelph.ca/uaic/programcounsellors>

If you are struggling to succeed academically:

- 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/>

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/>

If you have a documented disability or think you may have a disability:

Student Accessibility Services (SAS) can provide services and support for students with a documented learning or physical disability. They can also provide information about how to be tested for a learning disability. For more information, including how to register with the centre please see:

<https://www.uoguelph.ca/csd/>