

**University of Guelph  
College of Biological Science**

Department of Integrative Biology

**COURSE OUTLINE**

**Comparative Animal Physiology I (ZOO\*3200), (3-3) [0.50]  
Fall 2014**

**Course description**

The course will examine the underlying molecular and cellular events which mediate physiological processes and contribute to whole animal homeostasis. Particular emphasis will be placed on comparing the strategies and adaptations used by different animals and the influence of varying environmental conditions. The course discusses cellular physiology, neuromuscular physiology and endocrinology. This course involves exercises that use animals. [BIOM\\*3200](#) and [HK\\*3940](#) are available to cover similar material without labs.

**Prerequisite(s):** [BIOC\\*2580](#)

**Teaching team**

**Professor:** Dr. Todd Gillis, Office SCIE 3471, ext. 58786, [tgillis@uoguelph.ca](mailto:tgillis@uoguelph.ca)  
Office hours: by appointment

**Lab Instructor:** Peter Smith, Office SCIE 3313, ext. 53676, [pssmith@uoguelph.ca](mailto:pssmith@uoguelph.ca)

**Teaching Assistants:** TBA

**Course schedule**

LEC Tues, Thur, 01:00PM - 02:20PM, [ROZH](#), Room 101

LAB Mon, 02:30PM - 05:20PM, [SCIE](#), Room 3314

**Learning Outcomes**

By the end of this course students should have the knowledge and skills to:

1. Understand the concept of homeostasis, the basic principles of membrane transport and how muscles, nerves, endocrine and sensory systems function in a variety of invertebrates and vertebrates.
2. Describe in detail the physiological regulation of a particular system at multiple levels of organization (e.g. molecular, cellular, organ systems and whole animal).
3. Provide examples of how recent research in comparative animal physiology has contributed to our understanding of basic and applied science.
4. Describe how organisms interact with their environments and how environmental conditions modulate physiological regulatory mechanisms.
5. Understand how the scientific method is used to advance our knowledge of animal physiology.
6. Conduct laboratory experiments on living tissues using various tools and instruments.
7. Collect, analyse and interpret laboratory results. Write a coherent and concise laboratory report

## Course Resources

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

Animal Physiology (3<sup>rd</sup> Ed) by R.W. Hill, G.A. Wyse, and M. Anderson (2012). Published by Sinauer Associates, Inc., ISBN 978-0-87893-559-8

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

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

Principles of Animal Physiology (1<sup>st</sup> 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\*3200. 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.

### Undergraduate Calendar

The Undergraduate Calendar is the source of information about the University of Guelph's procedures, policies and regulations, which apply to undergraduate programs. It can be found at:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/>

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## Course Content

### LECTURES:

**TOPICS** (The questions below are examples of the topics that will be covered under each section).

#### Textbook Readings from Hill et al. (2012)

#### **Central Themes in Animal Physiology – Introduction** (Sept. 4)

*Chapter 1*

Why are most physiological systems based on negative feedback mechanisms?

#### **Membrane Transport of Ions & Water** (Sept 9, 11, 16)

*Readings from Ch. 2, 5, 6, 10, 16, 28*

Why do red blood cells burst in pure water?

How do transporters pump acid into a crocodile stomach after a big protein meal?

#### **Nerves** (Sept. 18, 23, 25, 30, Oct. 2)

*Chapters 12, 13*

Why has the squid giant axon been so useful to understand neurons?

What are the factors that affect conduction speed?

#### **Muscles** (Oct. 7, 9, 16, 21, 23)

*Readings from Ch. 8, 20, 21, 25*

How do muscle proteins slide back and forth to produce force and movement?

How can the muscles of flying insects contract 10 times faster than vertebrate muscles?

#### **Endocrinology** (Oct. 28, 30, Nov. 4, 6, 11)

*Readings from Ch. 2, 16, 17, 21*

Why are thyroid hormones important for metamorphosis?

What happens when estrogen mimics are present in the environment?

#### **Sensory Physiology** (Nov. 13, 18, 20, 25, 27)

*Chapter 14*

How do sea turtles and birds use the Earth's magnetic field to migrate?

**LABORATORY:**

Laboratories will be held in SCIE 3314 from 2:30 to 5:20. Labs are every second week. October 13<sup>th</sup> is a holiday and there are no labs Oct. 13<sup>th</sup>- 17<sup>th</sup>.

**Schedule:**

Section:	Your lab days are:
101	Sept. 8 & 22; Oct. 6 & 20; Nov. 3 (Mondays)
102	Sept. 9 & 23; Oct. 7 & 21; Nov. 4 (Tuesdays)
103	Sept. 10 & 24; Oct. 8 & 22; Nov. 5 (Wednesdays)
104	Sept. 11 & 25; Oct. 9 & 23; Nov. 6 (Thursdays)
105	More sections as needed TBA

**Attendance and participation** in the laboratories is mandatory. Each student must attend and participate in the whole lab exercise to get credit for the assignment from that lab. Students are asked not to use cameras and / or cell phones in the lab.

**EVALUATION:**

Midterm Exam	October 16 <sup>th</sup> ; 13:00-14:20 in class	20%
Final Cumulative Exam	To be scheduled, location TBA	40%
Lab Assignment 1		2%
Lab Assignment 2		8%
Lab Assignment 3		15%
Lab Assignment 4		15%
<b>Total</b>		<b>100%</b>

Grades will be assigned according to the standards outlined in the U of G Undergraduate Calendar (p40-41).

**Description of Assessment**

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.

Lab exercises feature utilization of equipment and techniques for quantification of physiological phenomena. Lab assignments focus on data analysis, figure preparation, and writing skills.

**Late Policy**

No extension on lab reports. Any assignment received after 2:30 pm on the due date is late. Late assignments will receive a penalty of 25% of the assignment value per day, including the date due, to a maximum of 2 days.

## **Absence and Illness**

If you are absent from classes during the semester, you will be expected to make up missed lecture material on your own.

When an assignment is missed, you must notify the instructor in writing, with your name, id#, and e-mail contact as soon as possible. If requesting academic consideration on medical or compassionate grounds, be prepared to provide supporting documentation. Dates of incapacitation stated on the note must, of course, cover the date of the missed midterm or lab. The original paper copy of the note must be delivered to the course instructor (for missed midterm) or lab instructor (missed lab) within 5 days of the missed assignment (weekends included), or a mark of 0% will be assigned. Notes will not be returned. Please read "LAB RULES" section of your Lab Manual for further details and 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>

## **Course and University Policies**

### 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, 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 the Centre for Students with Disabilities as soon as possible.

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

<http://www.csd.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.

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 <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. To confirm the actual date please see the schedule of dates in the Undergraduate Calendar. 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.

### **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:

- The Centre for Students with Disabilities (CSD) 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/>