

September - December 2017

Biology 3601a: Animal Physiology I

<p>Instructor: Dr Brent Sinclair Email: bsincla7@uwo.ca</p> <p>TA: Jantina Toxopeus Email: jtoxopeu@uwo.ca</p>	<p>Available: in BGS 2078 during office hours: Monday 5-6 pm Wednesday 8-9 am Friday 2-3.30 pm, or by email appointment</p>
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Class: Monday, Wednesday, Friday 10.30-11.30 am, BGS 0153

Tutorials: One of: Tues 9.30-11.30; Tues 1.30-3.30; Weds 2.30-4.30; Thurs 9.30-11.30.

Note: Tutorials will not be held every week, and some or all will take place in computer labs. Watch OWL for details.

Course summary and learning outcomes:

This course will cover a variety of topics, including allometry, ion and water balance, sensory neurophysiology, endocrinology, thermal biology and physiological responses to human environmental impacts. The goal is to understand how animals survive and thrive in a range of extraordinary terrestrial and aquatic environments.

Content will be covered through...

1. student-directed learning based on textbook chapters and online quizzes (completed outside of class)
2. lectures covering specific areas of interest for each topic (in class)
3. facilitated reading of recent articles from the primary scientific literature (in class)

...and will be complemented by tutorials which will focus on the analysis and interpretation of existing datasets, and in-class exercises that focus on integrating and applying knowledge from the lectures and readings.

Together, this approach will allow students to address integrative-applied problems, associated primarily with the lecture material, in the exams.

Learning outcomes:

By the end of this course, students will be able to...

- 1) Distinguish physiological strategies and mechanisms, and compare and contrast some of the strategies and mechanisms animals use to maintain ion and water balance, survive extreme temperatures, sense and respond to their environment, and coordinate physiological processes throughout the body.
- 2) Explain how physiological measurements can inform conclusions about the impacts of humans on animals in nature.
- 3) Analyse a basic dataset in a physiological context, and write a succinct and accurate conclusion based upon those data.
- 4) Apply basic physiological principles to critically evaluate an existing dataset.
- 5) Read a scientific paper in the general field of comparative animal physiology and critically evaluate the experimental design, methods, and data.

- 6) Design an experiment or experiments to address a physiological question that students have not previously encountered, and clearly articulate that experiment in writing.

Please note that the focus of this course is on comparative animal physiology, and we will not cover biomedical or disease-model physiology. Courses on those topics are available through the basic medical sciences.

Course requirements

Please see the Western University Academic Calendar for pre- and anti-requisites. Students are responsible for ensuring they are qualified to be enrolled in this course. You are required to attend all lectures and your assigned tutorials (there are penalties for missing the latter), and to manage your time to allow you to read textbook chapters and complete quizzes by the deadlines. You will also be expected to read the papers discussed in class *prior* to the lecture in which they are discussed. In this course, I assume that you have passed Biology 2601a with a clear understanding (and memory!) of the material therein. You may have to revisit your notes (or additional textbook chapters) to keep up with the material in this course.

Evaluation, attendance & late penalties

Item	Value	Due date
Online quizzes (4)	36% (9% each)	Four during course of term; generally due 3pm on Wednesday or Friday.
Tutorials (5)	15% (3% each)	Five during the course of the term; generally due 5pm Mondays.
In-class tests (3)	23% (5, 9, and 9%)	27 Sept, 27 Oct, 13 Nov
Final Exam	26%	Scheduled by Registrar.

To pass this course, you must get at least 50% (25.5/51) for the quizzes + tutorials, and at least 50 % (24.5/49) in the in-class tests +final exam.

Attendance of the tutorials is compulsory, and you will not receive any marks for the in-class portion of the tutorial if you miss the tutorial without appropriate documentation or prior permission. There will be a **flat late penalty of 50 % of the value of each tutorial.**

There will be no late submissions for the online quizzes. You are strongly advised to attempt the quiz well before the deadlines to guard against computer failures or unexpected mishaps.

There will be no make-ups for the tests. If you miss a test with appropriate documentation, your mark will be reweighted based on your performance on the other in-class tests.

Contacting the instructor

I encourage you to come to me with questions and/or comments, or to discuss biology in general. This can often be done immediately before or after class, but you can also post

on the discussion boards on OWL (your peers may also be able to answer your question, or learn from it), or by email. If you would like to meet in person, please come to my office hours. Although I have a reputation for being intimidating, I'm actually not, and really enjoy office-hour interactions. In the past, regular office-hour attendees have developed a strong understanding and performed very well in exams. If you would prefer a scheduled meeting, or my office hours do not fit your timetable, please email to arrange a mutually convenient time. Please bear in mind that I am also chair of the Department's graduate programme and have a busy lab with >10 active researchers, so appointments may only be available with 1-2 weeks' notice.

Please include "Bio 3601a" in the subject lines of any emails. For your own protection, **please only send emails from your uwo account** – I will delete emails about the course from non-uwo addresses, as well as emails that are impolite or written in the manner of a text message. As with all communication in the adult world, please begin your emails with a salutation ("Dear Dr. Sinclair") and end with some identifier of who you are ("Abigail P. Student"). I will not usually respond to e-mails received on weekends, holidays or outside normal working hours, but will answer them as soon as possible on the next business day.

Textbook:

This course will make extensive use of

Hill, R.W., Wyse, G.A. & Anderson, M. (2016) *Animal Physiology*. 4th Edition. Sinauer, Sunderland, MA.

Note that this is new edition of the text you used in Biology 2601, so you may already own a copy. The text is available from the bookstore in hardcover (expensive!) and in pre-punched looseleaf (cheaper). If you decide you like the text after purchasing the looseleaf version, you could probably get it bound on campus by graphic services. You may also be able to find better deals on the interwebs, or there may be an e-book available, too. There are copies on reserve at the library (listed under Biology 2601a).

You are welcome to use the 3rd edition of the text (or another animal physiology textbook), which you may already own or be able to buy second hand ... however, if you choose to do so, you are responsible for figuring out what the readings are, and also to appraise yourself of any material that differs between editions (hint: use the library desk copies for this).

OWL & email announcements:

Much material will be available on OWL. You are always welcome to contact me (preferably by email) with questions. However, *please* check OWL first to see if the answer is there! I will simply direct you to the OWL site if you ask a question (e.g. "when is the second quiz deadline?") that is available in the course outline or on the website. Grades and the like will be securely available on OWL, as will links to resources we discuss in class, and anything else that seems to belong there!

Important announcements about this class will happen on OWL – check it regularly! Some announcements, or contact with individuals will happen by email. Please make sure that you keep your @uwo.ca email account below capacity – I will not resend messages to those who cannot receive them.

Readings and online quizzes:

Animal physiology is a very broad field. At the 3000-level, you are expected to begin to develop both a breadth and depth of knowledge – much more so than can be covered in class (or studied for an exam!). For this reason, the breadth of knowledge in the topics covered in this class will come from self-directed learning (reading the textbook – and probably taking notes as well!). Your broad knowledge of this material will be assessed through online quizzes; although the material itself will not be tested directly in the exams, I will assume that it provides the appropriate background for following the lectures and reading the research articles. Thus, the material covered in the readings is implicitly required for much of the rest of the course. Doing the readings and the quizzes will help you to keep up with the lectures, and to allow you to make the most of lectures and tutorials.

Your uptake of the readings will be assessed in four online quizzes, each worth 9 % of your final grade. If you get more than 80 % in the quiz, you will receive the full 9 %. If you get less than 80 %, you will receive a proportion of the 9 % equivalent to your grade in the quiz. Each quiz will have 30-50 questions, and will be available on OWL. 120 minutes will be available for each quiz attempt, so you might like to think of it as an open-book exam. You can take the quiz up to three times, and your highest grade will be logged.

Please note that the deadline for the quiz is firm. This means that if you miss the deadline without appropriate documentation covering the week prior to the deadline, then you will not get any marks for that quiz. I therefore suggest that you leave a lot of time to attempt the quiz, and do it earlier, rather than later. Technology-failure excuses such as “my internet connection died at the last moment”, or unjustifiably last-minute excuses (“I got sick an hour before the deadline”) are not acceptable, so avoid exposing yourself to that risk.

Class:

The lectures in this course serve three purposes:

1. To provide the depth to match the breadth of material covered in the readings and quizzes
2. To introduce you to the process of carefully and critically reading and interpreting the primary literature
3. To provide a forum to practice thinking about the design and interpretation of experiments – highly relevant to your performance in both the tutorials and the exam.

The ion & water balance, sensory neurophysiology and thermal biology sections will each consist of four lectures based primarily on scientific papers (available on OWL for you to read in advance). The Human impacts section will consist entirely of case studies

based on the primary literature (and integrating concepts from the other parts of the course).

Basically, the lectures will serve as a series of case studies, and the coverage in the lectures is intended to allow you to understand these case studies. Hopefully, through this mechanism, you will also get a feeling for how one examines science critically, as well as how the information covered in the course is generated, and used to solve new scientific problems. This will help you to solve the scientific problems posed in the exam (well – the questions will be based on things we've already discussed anyway!). In addition, the skill of reading and interpreting scientific literature will be helpful in other courses, in life as a researcher/physician/astronaut/lawyer/[insert career goal here] and as an informed citizen participating in society.

Attendance at the lectures is not compulsory. However, it is **highly recommended**, since the exams will reflect the emphasis of the lectures (not always apparent from the posted powerpoints), and the material in the lectures is not necessarily covered in the textbook. Also, although you are welcome to read the assigned papers and figure them out for yourself, you could just as easily read the paper, and come to class to let me explain it for you!

Tutorials:

There are five scheduled tutorial sessions for this course. In each of them, you will work your way through a dataset, practicing analysing and interpreting data, and using your knowledge from lectures and readings to draw biological conclusions. This will achieve two goals:

1. You will gain experience working with a variety of different datasets in a way that integrates your knowledge from other parts of the course.
2. You will get practice describing biological conclusions in a clear, concise manner.

In preparation for the tutorials, please bring a hard copy of the tutorial worksheet that you can fill out and hand in at the end of the tutorial. You may find it helpful to bring your class notes and textbook.

Each tutorial is worth 3 % in total. 1 % of your mark will come from filling out the worksheet in class (effectively this is an attendance mark – you can't get it if you just complete the tutorial at home). The other 2 % will come from a short (paragraph) answer you will submit via OWL – you can complete this in class, or by on the scheduled day of the deadline. Note that this deadline is closer if you have a tutorial later in the week, but that this should not matter, because you should be able to complete and submit your answer during your tutorial session.

The tutorials are part of a research project:

One of our goals in this class is to give you the opportunity to develop your skills in integrating concepts. To this end, we have structured the tutorials with slightly different kinds of exercises to see how we can best facilitate this outcome. In the second lecture, you will be invited to consent to be part of this study. This consent simply allows us to

use your (anonymized) data for analysis, and to share our findings through conference presentations or peer-reviewed papers (so other teachers can learn from our experience). You will receive exactly the same tutorial and lecture experience whether or not you participate in the study, and the study is designed so there are no ‘control’ or ‘placebo’ groups – we’re doing our best to teach you, and are simply gauging the effectiveness of that teaching as we go. If you do consent to participate, you will be asked to fill out a short (~15 min) online survey after the course is completed. If you have questions about this research project, or reservations about participating, feel free to discuss it with Dr. Sinclair.

In-class tests:

There will be three tests in this course, which will occur during class time, in the room assigned for the course. The tests will be 40 minutes in length. The first of these tests is worth 5% of your final mark, the following two are worth 9%. The tests will consist of short answer questions, and some integrative questions (more of the latter later in the course). There will be some choice in which questions to answer, and each will examine only a portion of the course (usually the preceding 5-8 lectures; this will be clearly indicated). Expect these tests to be considerably more challenging than the online quizzes.

If you require accommodation for these tests, please arrange that through SSD.

The marks for the tests will be posted on OWL. The tests themselves will be available for pick-up during Dr. Sinclair’s office hours.

Exams:

The cumulative final exam is worth 26 % of the course. The exam will be based on the emphasis of material covered in the lectures (including the scientific papers), and will require you to integrate information and skills from all aspects of the course (however, you should concentrate your focus on the lecture material when studying). The exam will consist of short and paragraph answer questions, and will include quite a lot of choice, so don’t be too overwhelmed by the breadth of material in the course. However, the final will be are difficult, because it will emphasise ‘application’ type questions. You should be well-prepared for this by the in-class tests. Note that the nature of the exam (and test) questions will differ considerably from the content-focused nature of the online quizzes, so do not assume that because you aced the quizzes with ease that you will find the exam and tests similarly straightforward.

Turnitin.com Note that in this course I will require you to submit your tutorial answers to turnitin.com, as well as in hard copy. In the unlikely event that you haven’t come across it yet, turnitin.com is an anti-plagiarism tool that checks the text of your submission against the work of your classmates (which shouldn’t be a problem, since you all have different topics), the turnitin.com database (previous assignments submitted to turnitin.com) and **the entire internet**. This means that if you copy things from the internet (or from other students), you will be caught. Please be aware that turnitin.com is

clever enough to detect plagiarism where a few words are changed in an attempt to make the passage ‘different’.

And for the legalese:

Tutorial assignments will be subject to submission to turnitin.com for textual similarity review by the commercial plagiarism software under license to the University. All documents submitted to the turnitin.com system will be included as source documents in the reference database for the purpose of detecting plagiarism in documents subsequently submitted to the system. Use of this service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

Submitting Tutorials:

- Submitting your tutorial text will automatically upload it to turnitin.com.
- Note that by submitting the assignment, you are agreeing to the terms and conditions of turnitin.com (as negotiated by Western University), and also confirming that this copy is identical to that uploaded to turnitin.com.

Missing a class, deadline, test, exam, or assignment because of illness or other circumstances:

If you are going to miss a tutorial, please let Dr. Sinclair and your TA know in advance (we will let you miss one tutorial without penalty – but you will have to catch up on the material and provide your completed in-class assignment to the TA for marking). Please be prepared to gather the required documentation in case I ask you to provide evidence to the Dean’s office (this will happen if you make a habit of missing tutorials...).

If you have a valid reason to miss a quiz deadline, please take appropriate documentation to your Dean’s office. The counselor will contact me directly. Note that because you should be attempting the quiz well in advance, your medical or other note will have to cover at least the 24 h immediately prior to the deadline (i.e.: if you break your arm 2 h before the deadline but were ‘too busy’ prior to that, your excuse will not be deemed valid – you should have guarded against last minute mishaps). Once you have taken your documentation to the Dean’s office, please also inform me (by email is fine), and we can talk about how to accommodate your absence. Note that you are not required to provide any details of the reason for your absences to me (this is assessed confidentially in the Dean’s office), but that the agreed-upon accommodation will not be valid if I do not hear from the Dean’s counselor, and that in some cases, giving me some clues about when you will again be fully functional will help me to provide reasonable accommodation.

Being ‘very busy’ is not a valid excuse. We are all busy, and if you want a busy competition, I guarantee that I will win! The deadlines in this course are set well in advance. It is up to you to manage your time in a way that allows you to meet them.

Mental Health

Students who are in emotional/mental distress should refer to the Mental Health@Western website <http://www.uwo.ca/uwocom/mentalhealth/> for a complete list of options about how to obtain help.

Academic Integrity:

As you know, we take academic integrity seriously at Western. Plagiarism in paper summaries or cheating in exams will be viewed as academic offenses and dealt with as such. Penalties range from severe mark penalties to failure of the course or expulsion from the University. More information on plagiarism is available from the following website, or from the academic calendar.

<http://www.usc.uwo.ca/education/scholastic.htm>

Common sources of plagiarism include making use of a previous year's summary and deliberately or inadvertently copying it and wholesale copying of material from the internet or a published article.

Timetable overview

Week of	In class	Other deadlines
4 September	Friday: Welcome to the course!	
11 September	M: Body size W,F: Water and ion balance <i>Tutorial 1</i>	
18 September	M,W: Ion & Water Balance F: Neuro 1 (end of material for Test 1)	Tutorial 1 short answers due 5pm Monday 18 September Quiz 1 due 3pm, Friday 22 September
25 September	M: Pre-test discussion/practice questions F: Neuro 2	Wednesday 27 September: Test 1 (in class)
2 October	M,W: Neurophysiology F: Endocrinology 1 <i>Tutorial 2</i>	Quiz 2 due 3pm, Friday 6 October
9 October	Reading Week (no classes)	
16 October	Endocrinology F: Last material for Test 2 <i>Tutorial 3</i>	Tutorial 2 short answers due 5pm Monday 3 October
23 October	M: Guest lecture: Anhydrobiosis W: Guest panel- life as a grad student	Tutorial 3 short answers due 5pm Monday 23 October Friday 27 Oct: Test 2 (in class)
30 October	Temperature <i>Tutorial 4</i>	
6 November	M: Temperature W: Integration 1 (end of material for Test 3) F: pre-test discussion/practice questions	Tutorial 4 short answers due 5pm Monday 6 November Quiz 3 due 3pm, Wednesday 8 November
13 November	W,F: Human impacts	Monday November 13: Test 3 (in class)
20 November	Human impacts <i>Tutorial 5</i>	
27 November	Integration	Tutorial 5 short answers due 5pm Monday 27 November Quiz 4 due 3pm, Friday 1 December
5 December	Monday: Pre-exam discussion Wednesday: last day of classes; office hours during class time I will provide abundant office hours appropriate to the timing of the final exam (scheduled by the registrar).	

The papers we will cover in class, and which constitute additional reading will be available on OWL.