Comparative Animal Physiology
Course Syllabus

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Office hours: Monday, 12-1 PM; Friday, 9:00 to 9:50AM; Many others available by appointment.

Course Overview:
The nature of animal physiology and the Biology 334 course:
Animal physiology is the study of animal structure and function. Animal physiologists strive to understand how animals work at all levels, ranging from individual cells to the whole integrated organism. The scope of physiology (elucidating the function of all cells in all organs or all animals) makes achieving this understanding a challenge. Many physiologists specialize in a subdiscipline of physiology. For example, I am a neurophysiologist and my focus is on understanding nerve cells, nervous systems, and behavior. The other person teaching comparative animal physiology is Alexa Tullis, a muscle physiologist who studies muscle cells, movements, and animal energetics. There are many other subfields of physiology including cellular, environmental, digestive, respiratory, digestive, circulatory and developmental physiology. Biology 334 will introduce you to many of these subfields. You will examine various aspects of animal structure and function at the cellular, system, and whole animal levels.

Not all of what you learn in Biology 334 will occur in the traditional lecture format. The course also has a strong lab component. In the laboratories, you will use state of the art equipment to answer open questions in animal physiology. Towards the end of the semester you will have a change to design and carry out an original research project. Many students find this the most fulfilling part of the course. We will also devote a portion of class sessions to reading and discussing current primary literature in animal physiology.

Specific objectives:
• Teach principles of animal physiology;
• Promote good laboratory skills and teach common physiological methods;
• Refine scientific communication skills – particularly writing;
• Promote productive intellectual interactions.

From your perspective:
At the end of the course you should feel that you have a good understanding of how invertebrate and vertebrate animals work and how these animals’ environments affect their biology. You should also feel more comfortable reading and critically evaluating scientific papers. By the end of the course you should feel comfortable working in a physiology research lab. Finally I hope that most students will feel that their independent research project allowed them to explore an original question in animal physiology, and that through their project, they have increased their own and other students’ understandings of animal physiology.

Required Texts:
• Either A short guide to writing about biology, by Pechenik (somewhere in the 6th – 8th edition would be good), OR
Lectures: MWF 11:00 to 11:50 Thompson 171
Laboratories: Meet in Harned 235. Laboratory work is an important part of any course in animal physiology. The laboratory exercises are designed to introduce you to some important physiological techniques. You will be given an opportunity towards the end of the semester to use these techniques in an experiment of your own design. Another aspect of lab work that we want to expose you to in Comparative Animal Physiology is trouble shooting, which is one of the most important skills a scientist learns. Since this is not the aim of most college science laboratories, many of the lab exercises you have done in the past have been specifically designed to be foolproof. Because we are often working with live animals or preparations, it is virtually impossible to design foolproof animal physiology labs.

Labs are scheduled for 4 hours and will usually require the entire time period. Laboratory investigations during semester weeks 1 through 8 are structured labs. All lab exercises for this course will be available on Moodle (http://moodle.pugetsound.edu). Most of the time you will be working in groups of two, although a few labs will involve groups of four. All standard lab exercises will be preceded by a short introductory lecture and are designed to be completed in one lab period.

• Pre-labs: Pre-labs are due through Moodle by the start of your lab period, and each student must complete their own pre-lab. I’ve designed these questions to help prepare you for the experiment. Reading appropriate sections of the text will help you understand the physiological processes we are studying in each experiment.

• Post-labs: Standard labs have Post-labs associated with them. Each post-lab is slightly different and is described at the end of each lab exercise. Unless otherwise stated, these will be due by the start of your next lab period through Moodle.

• Lab notebook: Everyone must have an individual lab notebook, the type is up to you. The quality of your lab notes directly influences your ability to analyze your data and, thus, indirectly influences the quality of your post-labs and research papers.

• Lab preparation and performance: Throughout the term I will be assessing your lab preparation and performance. It is usually readily apparent if a student has not prepared adequately for lab because performance will be suboptimal.

Note: Because we use live vertebrate animals in your labs, all students in the class must complete a Medical History and Risk Assessment Questionnaire for Persons Handling or Working with Live Vertebrate Animals (whew!) form (found here: https://www.pugetsound.edu/files/resources/puget_sound_animal_handler_medical_questionnaire_j.pdf) and then turn it in to CHWS. If a student has already completed this form for another class, they don’t need to fill it out again.

Independent projects
You will have the opportunity halfway through the semester to design and execute a study that you and your research partner have designed. In designing your independent project, we encourage you to integrate and expand upon techniques you learned during the standard lab exercises, although you can also use a new technique if it is practical and informative. This is a time to further investigate physiological phenomena that peaked your interest or apply techniques that you found particularly enjoyable (more info on the "Independent Projects" handout).

Research Papers
Each student must submit 2 written research papers, one on a standard lab and one on your independent project. Each paper includes some kind of revision. The specifics for these papers
vary and are outlined in the "Writing Assignments" handout. Completion of both papers is required for a passing grade in this class.

To save paper and for a faster turnaround time, you will be turning in most assignments through Moodle. **IMPORTANT: Unless otherwise stated, I will only accept Microsoft Word files or Excel files.** If I cannot open your file or if there is something wrong with it such that I cannot read it after I open it then I may consider the assignment not turned in.

All labs are required. If you need to make up a lab due to a medical or family emergency it is your responsibility to make the necessary accommodations (this usually involved talking to Alexa or Sue). Due to the time involved in setting up each lab, you will only be able to make up labs during the week that a particular lab is scheduled.

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<thead>
<tr>
<th>Instructor</th>
<th>Day</th>
<th>Time</th>
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<tbody>
<tr>
<td>Tullis</td>
<td>Monday</td>
<td>12 - 4 PM</td>
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<tr>
<td>Tullis</td>
<td>Tuesday</td>
<td>1 - 5 PM</td>
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<tr>
<td>Hannaford</td>
<td>Wednesday</td>
<td>1:30 – 5:30PM</td>
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<tr>
<td>Hannaford</td>
<td>Thursday</td>
<td>1 - 5 PM</td>
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**Exams:** There will be two mid-term exams on a final exam. Exams will cover primarily lecture material but may also contain questions relating to the laboratory and discussion readings. Please note – I have scheduled the midterm exams for 6 to 8 PM. Please make arrangements now to reserve those times. The final exam will be given Wednesday, December 12, from noon until 2 pm. No make up exams will be given.

**Late policy:** Turning in an assignment late will reduce the maximum credit available by 5% up to a total of 50%. To be fair to all students, please note that this late penalty will be strictly enforced. I will waive the penalty only if there is a medical or family emergency. Proof of the nature of the emergency may be required.

**In-class discussions:**
Throughout the term we will devote some lecture periods to discussion of a published paper or a series of papers related to a specific physiological topic. These are referred to as Case Studies on the lecture schedule. It is important that you prepare for these discussions by thoroughly reading the assigned paper in advance and by bringing your questions and ideas about the readings to the class.

**Absences related to medical/graduate school interviews or to sports/music ensembles:** I understand that students are at times obligated to travel and, as such, may miss a class. I will try to make accommodations so that you can participate in such events. However, I can only do so if you give me fair warning. If you are going to miss an exam or a laboratory due to such travel, you must inform me at least one week prior to the date. If you need to make up a laboratory in another section it is your responsibility to make the arrangements.

**University Student Bereavement Policy:**
Upon approval from the Dean of Students’ Office, students who experience a death in the family, including parent, grandparent, sibling, or persons living in the same household, are allowed three consecutive weekdays of excused absences, as negotiated with the Dean of Students’. For more information, please see the Academic Handbook, [http://www.pugetsound.edu/student-life/personal-safety/student-handbook/academic-handbook/bereavement-policy/](http://www.pugetsound.edu/student-life/personal-safety/student-handbook/academic-handbook/bereavement-policy/)
**Official Classroom Emergency Response Guidance**

Please review university emergency preparedness, response procedures and a training video posted at www.pugetsound.edu/emergency/. There is a link on the university home page. Familiarize yourself with hall exit doors and the designated gathering area for your class and laboratory buildings.

If building evacuation becomes necessary (e.g. earthquake), meet your instructor at the designated gathering area so she/he can account for your presence. Then wait for further instructions. Do not return to the building or classroom until advised by a university emergency response representative.

If confronted by an act of violence, be prepared to make quick decisions to protect your safety. Flee the area by running away from the source of danger if you can safely do so. If this is not possible, shelter in place by securing classroom or lab doors and windows, closing blinds, and turning off room lights. Lie on the floor out of sight and away from windows and doors. Place cell phones or pagers on vibrate so that you can receive messages quietly. Wait for further instructions.

**University Policy on Academic Accommodations**

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Peggy Perno, Director of the Office of Accessibility and Accommodation, 105 Howarth, 253-879-3395. She will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

**APPROPRIATE BEHAVIOR**

Students are expected to behave in an appropriate manner while attending this class.

- Absolutely no food or drink in the laboratory. Drinks can be kept outside the lab door.
- You may not make audio recordings of my lectures without my express written permission.
- If you leave the room during a test or quiz, your paper will be collected and you will not be permitted to complete the test/quiz.
- Plan to use the restroom prior to lecture; doors to the classroom are kept locked and getting up during lecture is disruptive to your peers.
- During class time I expect you to be working on materials for this course only.
- Personal technology: Please be respectful of others in class:
  - Switch your phones to vibrate or no-ring before coming to class
  - Online activity is to be limited to class activities only
  - You may not touch or use any electronic devices in any way during an exam
  - You may not have ear buds in at anytime while in class
- Lack of respect for diversity will not be tolerated in the class. Diversity encompasses age, life experiences, profession, race, religion, gender, gender identity, nation, lifestyle, social class, learning style, philosophy of life, sexual orientation, personality, mental and physical challenges, customs, values, among others.
- Telephones located in classrooms and labs are for staff use and medical/safety emergencies only (no personal calls).
Grading (subject to slight changes):

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<tr>
<th>Points</th>
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<tbody>
<tr>
<td>Midterms (2 x 100 pts)</td>
<td>200</td>
</tr>
<tr>
<td>Final</td>
<td>200</td>
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<tr>
<td>Graded homework assignments (approx.)</td>
<td>25</td>
</tr>
<tr>
<td>Lab research paper: first submission</td>
<td>25</td>
</tr>
<tr>
<td>Lab research paper: final submission</td>
<td>50</td>
</tr>
<tr>
<td>Summary of primary references #1</td>
<td>10</td>
</tr>
<tr>
<td>Summary of primary references #2</td>
<td>10</td>
</tr>
<tr>
<td>Introduction &amp; Methods Draft for Independent Project Paper (completeness)</td>
<td>5</td>
</tr>
<tr>
<td>Peer reviews of Intro. &amp; Methods</td>
<td>10</td>
</tr>
<tr>
<td>Final Independent Project (Paper &amp; Poster)</td>
<td>105</td>
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<tr>
<td>Pre-labs (5 @ 3 pts each)</td>
<td>15</td>
</tr>
<tr>
<td>Post-labs (5 @ 10 pts each)</td>
<td>50</td>
</tr>
<tr>
<td>Lecture preparation and participation*</td>
<td>15</td>
</tr>
<tr>
<td>Lab preparation and performance**</td>
<td>15</td>
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<tr>
<td>TOTAL</td>
<td>735pts</td>
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* This category refers to your apparent preparation and participation in lecture. I will assess your performance in this area by taking into consideration your attendance, the extent to which you do the assigned readings and assignments (even those that are not graded), and how readily you participate during lecture.

** I will assess your lab preparation and performance during every lab session by observing your level of preparation and how directed and independently you work during lab. I will also be observing how thoughtfully you treat the lab animals and how clean you leave the lab space.

Policy on academic dishonesty:

All work that you turn in this class (exams and papers) must represent your own thinking and be in your own words. Regretfully, in almost every year that I have taught at Puget Sound I have encountered at least one case of plagiarism (and certainly more cases of inadvertent plagiarism). Please review the University’s policy on plagiarism. Most everyone knows that directly lifting words from an original source without indicating that they are not yours (by placing them in quotation marks) is plagiarism. Remember that this rule holds whether the original source is a published paper, the internet, or a lab handout. Note, also that there is a second form of plagiarism in which the original is paraphrased but not cited. Always back up your sources, never “borrow” more than three words in a row from a source, and be careful to avoid the more subtle, paraphrasing, form of plagiarism.

All students as part of their obligation to University of Puget Sound assume the responsibility to exhibit in their academic performance the qualities of honesty and integrity. All forms of student dishonesty, which may include but not be limited to: cheating, fabrication, facilitating academic dishonesty, and plagiarism are subject to disciplinary action. Examples of academic misconduct may include:

- Representation of the work of others as one’s own
- Use of unauthorized assistance in any academic work
- Failure to cite sources used
- Obtaining and/or using tests unless distributed and/or approved by the instructor
- Copying the work of another student on any form of test
- Knowingly help someone else cheat
- Modification, without the instructor's approval, of any form of test, computer program, paper, record, report, assignment, or project for the purpose of obtaining additional credit or an improved grade
- Failure to meet other conditions of academic integrity as identified by the
instructor in the course syllabus

Depending upon the severity of the incident, an instructor may, after discussion with the student, impose a penalty or penalties such as:

- Issue a warning.
- Reduce the grade of the assignment, examination, or project assignment, any form of test, or project.
- Give zero credit for the assignment, any form of test, or project.
- Dismiss the student from the course, and issue a withdrawal or failure for a grade.

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