

ZOOL 4230, ANIMAL PHYSIOLOGY SPRING 2015

Instructor:	Mark A. Grobner	Office Hours:	MW 9-10, W 1-2, or by appointment
Office:	N268	Term:	Spring, 2015
Phone:	(209) 667-3268	Lecture Meeting:	TR 8:00-8:50
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Website:	http://www.csustan.edu/grobner	Class Location:	N229
Corequisite:	ZOOL 4230.002		

COURSE INFORMATION

University Course Catalog Description

A physiological approach to the evolution of vertebrate organ systems.

Course Prerequisites/Requirements

Students must have completed Biol 3310 and Chem 3010 and Chem 3012 or equivalent.

Required Texts and Materials

Animal Physiology by Christopher D. Moyes and Patricia M. Schulte, 2nd edition

BioPac Student Laboratory Guide, Biopac Systems Inc. Manual (available in lab and on Blackboard)

Student Lab Notebook, Hayden/McNeil

Physiology exercises available on Blackboard

Brief course description

This course presents vertebrate and invertebrate animals and how they function in their environments. Lecture materials emphasize the familiar subjects of physiology: digestion, respiration, circulation, excretion, and movement. These topics are arranged according to major environmental features: food and energy, water, oxygen, and temperature. This arrangement is important to understand how living organisms adjust to the adversities of their environment such as obtaining enough water to live or avoiding too much water, escaping freezing to death or dying from excessive heat, moving about to find suitable surroundings and food.

At the end of the course the students will be able to understand the relationships between anatomical structures and their functions, and how they are correlated and integrated into a smoothly functioning organism. Furthermore, they will be able to understand how living organisms adjust to the adversities of their environment, using various modifications of the anatomical and physiological specializations.

This course will also provide students with opportunities to make hypotheses, design methods to test the hypothesis, collect data, and prepare a poster in the format of the scientific method. The poster will be presented in lab to the class at the end of the semester. In addition, each student has a library research project on a specific topic of animal adaptive physiology of his/her choice. The research information collected will be presented to the class in a Power Point presentation. Research, writing and speaking skills will be utilized in this course.

Course Learning Outcomes

1. Understand the fundamental biology of animals and their environments.
2. Explain the mechanisms and origins about how animals carry out their physiological functions.
3. Understand why animals possess the mechanisms they do.
4. Examine the tissue level of organization and interpret the role of tissues in animal systems.
5. Examine the process of oxygen uptake and release of carbon dioxide in aquatic and terrestrial animals.
6. Understand the transport of gases, nutrients, a variety of metabolic products, and heat as the primary function of blood.
7. Understand the major purpose of moving solutes, including gases, in the body with emphasis on the highly developed circulatory systems of vertebrates.
8. Examine the chemical components of animal bodies and how animals are able to synthesize chemical components of their body from the food and nutrients they obtain from their environments.
9. Understand animals' need of special food according to their anatomy and environments, their processes of digestion, and specific nutritional requirements to maintain their body processes.
10. Compare temperature regulations of extreme daily life of animals in aquatic and terrestrial habitats.
11. Understand muscle physiology, how animals use muscle in locomotion, and how animals achieve the most economical use of muscle energy.
12. Understand osmoregulation-- the problems of keeping water and solute concentrations constant in animals with varying environments such as in fresh water, in salt water, and on land.
13. Understand basic principles of excretory processes to maintain proper concentrations of solute and blood volume and removal of metabolic wastes.
14. Compare and contrast the two essential integrating organ systems, nervous and endocrine, and understand how these systems work together to control and regulate all physiological activities.

COURSE ASSIGNMENTS AND GRADING

This course will consist of three exams worth 100 points and a library research project PowerPoint presentation worth 50 points. The laboratory portion of this class is worth 150 total points distributed in your lab notebooks, 50 points each, an independent research project worth 50 points, and a PI report worth 50 points total.

Academic Dishonesty and Misconduct

Exams, reports, and presentations are indicators of individual performance. Copying off another student's exam, plagiarized reports, presentations or papers constitutes cheating. There is zero tolerance for cheating. Cheating in any capacity in this class will result in penalties ranging from a minimum of a zero on the assignment or exam to a maximum of expulsion from California State University, Stanislaus as indicated by the official University Policy regarding dishonesty and misconduct.

Class attendance is highly recommended

Missing classes may result in poor performance in the course. You are responsible for any information or assignments you missed in your absence. I highly recommend reading the assigned chapters before coming to class. It is required that you remain in the laboratory until the entire exercise/experiment is completed and your lab areas are cleaned. Individuals leaving their lab partners to collect data, or leaving their workspaces unclean will have 10 points deducted per infraction. Due to the complexity of the experiments, no make-up labs are available. Twenty points per lab will be deducted from your grade for each lab missed beyond one unexcused absence.

Exams (300 pts)

There will be three exams during the term worth 100 pts. each. Exams may consist of any of the following: multiple choice, definitions, fill in the blank, matching, and short answer essay questions. Both lecture materials and information assigned from the textbook will be included in the exams along with material from laboratory exercises.

You will need Scantron form # 882-E for the exams. Note that:

1. Only answers on the scantron will be graded, so transfer answers carefully
2. Take care to erase well those answers you do not want marked
3. Illegible answers in the written portion will not be graded.

There will be no make-up exams

Failure to appear at exam time without 24 hours prior notice to the instructor with an appropriate excuse, or an appropriately documented emergency, will result in zero points for that exam.

Library Research (PowerPoint, 50 pts)

Each student will prepare a paper and PowerPoint presentation on a topic of animal adaptive physiology of his/her choice. The presentations will be given during the laboratory period towards the end of the term; a signup sheet for times will be made available in the lab.

Choose a specific animal and its physiological specialization or adaptation to its environment (anything related to animal physiology.) If you are unsure of a topic, please come to my office and I will help you choose a topic. Using the library search engines, select at least three articles to use in preparing your presentation. Be sure the articles come from a peer reviewed source. You should choose articles that are timely (last 5 years), but classic papers may be included. You should include a copy (or a link to the article) of each paper you used when you submit your PowerPoint prior to your classroom presentation. PowerPoints and articles must be emailed to me 24 hours before your assigned date to present. You will sign up for a date to present in lab.

Laboratory Work

In lab, students work in groups of three, but you will be required to keep your own laboratory notebook. Each lab is three hours in length. You are expected to stay the entire length of the lab and not leave until all materials are put away and your area cleaned. This semester's lab sessions will start with an introduction to the scientific method, writing and reviewing skills. The subsequent labs will consist of investigative experiments utilizing various techniques such as glucose determination, urinalysis, and collecting physiological data such as ECG, EMG, and pulmonary functions, using BioPac (a software program). Each student in a group is responsible for carrying out all and understanding the assigned experiments. Of the investigative experiments, each student will chose one exercise for full-length lab

report using the scientific method as described elsewhere. The full-length lab report will utilize the *principal investigator system* described on the course Blackboard site.

Laboratory Notebooks (50 pts)

For each laboratory exercises you will need to make entries into your laboratory notebook. Example of data sheets and questions that should be addressed in your notebook will be found on the Blackboard site for the course. I will collect the carbon copy sheets from your notebook four times during the term for grading. The content of the laboratory notebook will be explained during the first laboratory period.

Independent Research Project (poster, 50 pts)

Students will design their own laboratory research using what we have available in the laboratory. The purpose of these independent research projects is two-fold. First, we want to give you an opportunity to experience the complete research process as experienced by many professional scientists. This process includes several steps: thinking of a research question, developing a hypothesis to test, designing a study to address that question, conducting the experiments, presenting the results of the study to the scientific community, and writing up the work for publication in a journal. The second purpose is to allow you to branch out and study some aspect of physiology that you find particularly interesting. This is an opportunity for you to be as creative and inquisitive as you like.

PI laboratory report (50 pts)

A principal investigator (PI) is the lead person in a research group that is responsible for initiating the project, overseeing the experiment, writing the paper and incorporating reviewer's comments into the final draft of the paper. For each investigative lab there will be one PI and two reviewers. In this semester every student will be a PI once and reviewer twice. The table below outlines the PI system. Each paper is worth 30 points to the PI and 10 points for each reviewer. The reviewer's points are awarded based the PI reviewer grading rubric. The PI would lose points if the reviewer does not do a good job; reviewers therefore contribute to the total number of points for the paper. The comments and editing from each reviewer should be made available to the instructor via Google Docs. Instructions on using Google Docs for peer reviewing your lab write-up can be found on the Blackboard site. Lab reports are due 2 weeks from the date of completion of the exercise. Late papers will be penalized 5 points per day. All reports need to be submitted electronically in Blackboard using the Turnitin.com link. The peer review will be done using Google docs and made available to the instructor.

Principal Investigator (PI) System

	PI Lab 1	PI Lab 2	PI Lab 3
Student A	PI	Reviewer	Reviewer
Student B	Reviewer	PI	Reviewer
Student C	Reviewer	Reviewer	PI

The PI Laboratory Grading sheet

Introduction	5 points
Results	6 points
Discussion	10 points
Conclusion	3 points
Clarity, general grammar and mechanics	3 points
References	3 points
Report Total	30 points
Peer reviewer (2 @ 10 points each)	20 points
TOTAL	50 points

Course Grading

Your grades will be assigned as follows:

Assessment	Total Points
Exams	300
Powerpoint research	50
Lab Notebooks	50
PI Lab report	50
Independent research poster	50
Total	500

I will use plus/minus grading.

Grading Scale (%)	
94-100	A
90-93	A-
87-89	B+
84-86	B
80-83	B-
77-79	C+
74-76	C
70-73	C-
67-69	D+
64-66	D
60-63	D-
0 - 59	F

Grades of "Incomplete"

From The University Catalog –

An Incomplete signifies (1) that a portion of required coursework has not been completed and evaluated in the prescribed time period due to unforeseen but fully justified reasons beyond the student's control, and (2) that there is still a possibility of earning credit. It is the responsibility of the student to bring pertinent information to the attention of the instructor and to determine from the instructor the remaining course requirements which must be satisfied to remove the Incomplete. The conditions for removal of the Incomplete shall be put in writing by the instructor and given to the student, with a copy

placed on file with the department chair. A final grade will be assigned when the work agreed upon has been completed and evaluated.

Any Incomplete must be made up within the time limit set by the instructor; in any case, no more than one calendar year following the end of the term in which the Incomplete was assigned. An Incomplete should never be used to (1) give a failing student an opportunity to redo unsatisfactory work or complete additional work; or (2) give a student more time to complete his/her work when the reasons for the delay have been within his/her control. This limitation prevails whether or not the student maintains continuous enrollment. Failure to complete the assigned work will result in an incomplete reverting to a grade of NC for grading options 1 and 2, and to a grade of IC for grading option 3. (See the Academic Standards section of this catalog and the Schedule of Classes Informational Guide for grading options.)

In cases of prolonged illness or any emergency which necessitates an extension of time to complete the course, the student may petition through the academic department where the course was offered. Students may not be permitted to graduate until all Incompletes are removed or evaluated as "IC" grades. Students are not to reregister in courses in which they have an Incomplete.

http://catalog.csustan.edu/content.php?catoid=12&navoid=541&returnto=search#indi_stud_cour

COURSE POLICIES: TECHNOLOGY AND MEDIA

Email

Questions regarding course materials should be directed to me at mgrobner@csustan.edu. Please be sure to put **ZOOL 4230** in the subject line as I get a lot of emails everyday and I want to be sure to respond to yours quickly. For issues with BlackBoard, please contact the helpdesk, linked from the BlackBoard login page.

Cell Phones

Cell phones should not be out or used during class. Any cell phones out during lecture or laboratory will be confiscated and returned at the end of the period. If your cell phone is out during an exam, this will result in an automatic F for the exam.

University Academic Conduct Policy

There will be zero-tolerance for plagiarism/cheating. Plagiarism and/or cheating will result in a 0.0 for the class. For further information, please see the CSU Stanislaus catalog for Student Code of Conduct http://catalog.csustan.edu/content.php?catoid=3&navoid=115#stud_cond

RESOURCES

University Library

For help with researching materials for your service learning project, please go to the following for tutorials on the various resources the library has to offer:

<http://library.csustan.edu:8080/researchassistance.html>

Disability Resource Services

CSU Stanislaus respects all forms of diversity. By university commitment and by law, students with disabilities are entitled to participate in academic activities and to be tested in a manner that accurately

assesses their knowledge and skills. They also may qualify for reasonable accommodations that ensure equal access to lectures, labs, films, and other class-related activities. Please see the instructor if you need accommodations for a registered disability. Students can contact the Disability Resource Services office for additional information. The Disability Resource Services website can be accessed at

<http://www.csustan.edu/DRS/>

Phone: (209) 667-3159

Recording Policy:

Audio or video recording of classes (tape and digital format) or use of cameras/phones to photograph or record lectures is not permitted. An exception is made for students registered with Disability Resource Services, who are approved for this accommodation. In such exceptions, DRS students will be asked to sign a "Recording Agreement" which disallows them from sharing recordings with other individuals unless approved by the DRS program.

COURSE SCHEDULE

Tentative Lecture Schedule

Materials will be active online with due dates, please check Blackboard and Mastering Anatomy and Physiology periodically to make sure you don't miss any assignments.

DATE	TOPIC	CHAPTER
Jan 27	Introduction: The Meaning of Physiology	1
Jan 29 & Feb 3	Chemistry, Biochemistry and Cell Physiology	2
Feb 5 & 10	Circulatory Systems	8
Feb 12 & 17	Respiratory Systems	9
Feb 18 & 24	Ion and Water Balance	10
Feb 26	EXAM 1	
Mar 3 & 4	Digestion	11
Mar 10 & 12	Neuron Structure and Function	4
Mar 17 & 19	Functional Organization of the Nervous System	7
Mar 24 & 26	Sensory Systems	6
Apr 2	Exam 2	
Apr 14 & 16	Thermal Physiology	13
Apr 21 & 22	Cellular Movement and Muscles	5
May 5 & 7	Locomotion	12
May 12 & 13	Reproduction	14
May 19	Final Exam (8:30-10:30)	

Tentative Lab Schedule

Date	Topic	Handout
Jan 27	Getting Started Introduction and Lab notebooks	Introduction
Jan 29	Homeostasis, General Models and Allometry	General models & Allometry
Feb 3	Organs and organ systems	Organ System
Feb 5	Osmosis, diffusion and tonicity	Transport
Feb 10	Circulatory System	BioPac 5 & 7
Feb 12	Ethanol, caffeine and nicotine effects on heart rate	Daphnia heart rate
Feb 17	The Respiratory System	BioPac 12 & 13
Feb 19	Diving Reflex	Diving
Feb 24	Respiration Effects on Acid Base Balance	Acid-Base
Feb 26	Renal Regulation of Fluid and Electrolyte Balance, Urinalysis	Renal
Mar 3	Osmo-regulation in Mosquitos	Mosquitos
Mar 5	Digestive System	Digestion
Mar 10	Distribution of Digestive Enzymes in the Cockroach & Mouse	Cockroach & Mouse
Mar 12	Glucose regulation– Research proposals due	Glucose
Mar 19	Hyperglycemia in crustaceans	Crayfish
Mar 24	Taste Receptors in Flies	Fly receptor
Mar 26	Mammalian Eye, Hearing and Equilibrium	Vision & Ear
Apr 2	No Lab – 4-Week research plan due	
Apr 6-10	Spring Break	
Apr 14	Effect of Temperature on Acclimated Goldfish	Goldfish
Apr 16	Effects of Insulation and Antifreeze on Thermoregulation Introduction and Materials and Methods due	Thermoregulation
Apr 21	The muscular system	BioPac 1 & 2
Apr 23	Reaction Time Student Research & PowerPoint Presentations	BioPac 11
Apr 28	The Polygraph Student Research & PowerPoint Presentations	BioPac 9
Apr 30	Student Research & PowerPoint Presentations	
May 5	Student Research & PowerPoint Presentations	
May 7	Student Research & PowerPoint Presentations	
May 13	Student Posters	
May 15	Student Posters	

We will also be observing the effects of thyroxine on tadpole morphogenesis. This lab will be set up when tadpoles are available.

Please note; this schedule is tentative and may change depending on the availability of materials.