Biology 420: Vertebrate Physiology
3 units
Point Loma Nazarene University
Fall 2016

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lecture time/location:	MWF: 8:25—9:20 a.m. Liberty Station 201
laboratory time/location:	Th, 8:00—10:00 Rohr Science 119
office hours:	MWF: 1:00—2:30 p.m.

If you have any questions about the material in this course, feel free to stop by during my office hours as listed above. Either drop by or set up an appointment. I may also be in my office at other, unscheduled, times. If my office hours don't work for your schedule, e-mail me or stop by and we can try to find a workable time to talk.

Course Description:
This course examines homeostasis and structural dynamism in different systems and in different vertebrate classes. The course specifically examines metabolism, the digestive system, the nervous system, the endocrine system, locomotion, respiration, the cardiovascular system, and the urinary system. Lecture and lab. 3 units

Prerequisites: Biology 212 and Chemistry 294:
According to the university catalog Bio 212 *Organismal Biology* and Che 294 *Organic Chemistry I* (or their equivalents) are prerequisites for Vertebrate Physiology.

Student Learning Outcomes:
1. You will define and apply the concepts of homeostasis and structural dynamism in different systems and different vertebrate classes.
2. You will understand and explain the basic physiology of the vertebrate body's systems (metabolism, digestive, nervous, endocrine, locomotor, respiratory, cardiovascular, urinary).
3. You will be able to articulate how a disruption in one body system can adversely affect the function of another body system.
4. You will be able to read, analyze and report on papers from the primary literature.
5. You will be able to carry out, analyze and write up laboratory experiments.

Required Text:
📖 Hill, Wyse & Anderson, Animal Physiology, 4th ed. (Sinauer, 2016).
📖 Journal articles for discussion; information about accessing these documents will be posted in Canvas (canvas.pointloma.edu).

Studying:
It is highly recommended that you **study at least 2-3 hours for every lecture hour**. Since Bio 420 is a three-credit course, **you should be studying 6-9 hours every single week, throughout the week**—and not just the week prior to an exam. While studying includes reading the assigned text, you should concentrate on the lecture material presented in class. Make sure that you both ***memorize*** the information and ***understand*** the material. Various study tips will be given in class throughout the semester.

Do not use any study materials from students who have previously taken this class. This includes notes, exams, presentations, essays and laboratory write-ups.

Journal Articles

As indicated on the schedule, during the semester you will be responsible for reading several assigned journal articles. Specific questions will be assigned with each article. You will be responsible for typing up and submitting the answers via Canvas (canvas.pointloma.edu) to these questions prior to the date of discussion. Credit for this assignment requires (1) typed answers submitted on time, (2) attendance on day of discussion, and (3) timely submission of written feedback.

Exams:

Exams will be administered during the laboratory times, on the dates indicated in the schedule. If an exam needs to be rescheduled due to an illness or a school-related activity, students must notify me **in advance** of the need to reschedule the exam. **The final exam cannot be rescheduled.**

Laboratory Participation:

It is **not** possible to schedule make-up labs. Come prepared for the laboratory exercise by reading the materials supplied ahead of time. Laboratory exercises will be posted to Canvas (canvas.pointloma.edu) at least two days prior to the lab. When downloading documents from Canvas it often works better to use *Chrome* rather than *Internet Explorer*. If possible, save a tree by printing these handouts as double-sided copies.

- **No food (including gum) or drinks in the laboratory.** This includes when you are in the lab for lecture exams.
- At the end of each laboratory period make sure that your table, and the equipment you've used, has been **cleaned and all materials returned to its appropriate place**. Points will be deducted for messes not cleaned up.

Laboratory assignments will be due as announced in lab.

- **You will not be allowed to hand in a laboratory write-up for a lab you did not attend**. In general, laboratory write-ups will need to be typed.
- Late lab write-ups will not receive full credit.
- Be sure that when you are asked to write up an individual laboratory report that this report reflects your own work, and not someone else's. This means that you can discuss the assignment with your classmates, but that you cannot copy their answers. Students who hand in identical assignments will not be given any credit for that particular assignment.

Grades are tentatively based on the following:

675+ expected points:

- 300 points—3 exams (100 points/exam)
- 100 points—final, cumulative exam
- 175 points—journal articles (4 articles)
  - 80 points—reading and answering questions (20 points/article)
  - 15 points—evaluating presentations
  - 80 points—group presentation
- 100 points for laboratory write-ups
- other assignments may be given in class as deemed appropriate

Your letter grade will be determined from your cumulative percent score as follows:

A:	93.0—100%	**B-**:	80.0—82.99	**D+**:	67.0—69.99
A-:	90.0—82.99	**C+**:	77.0—79.99	**D**:	63.0—66.99
B+:	87.0—89.99	**C**:	73.0—76.99	**D-**:	60.0—62.99
B:	83.0—86.99	**C-**:	70.0—72.99	**F**:	≤ 59.99

Other Academic Issues:

PLNU COPYRIGHT POLICY

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

PLNU ACADEMIC HONESTY POLICY

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See Academic Policies for definitions of kinds of academic dishonesty and for further policy information.

PLNU ACADEMIC ACCOMMODATIONS POLICY

If you have a diagnosed disability, please contact PLNU's Disability Resource Center (DRC) within the first two weeks of class to demonstrate need and to register for accommodation by phone at 619-849-2486 or by e-mail at DRC@pointloma.edu. See Disability Resource Center for additional information.

PLNU ATTENDANCE AND PARTICIPATION POLICY

Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation. See Academic Policies in the Undergraduate Academic Catalog.

LAPTOP COMPUTERS:

I recognize that portable computers may be the preferred method for students to take notes in this class and I support those students who choose this method. Computers, however, can become a distraction as they also can enable activities other than note-taking. These activities are not only a distraction to you, but they are also a distraction to the students around you. Thus I am placing a ban on all computer activities that are not directly related to this class during the course of the lecture and lab periods. Failure to comply with this restriction will result in the loss of your privilege to use computer during class and may result in the loss of this privilege by all of the students in this class.

Tentative Lecture & Lab Schedule

Aug 30 (Tu)	Animals and Environments	chp. 1
Aug 31(W)	Molecules and Cells in Animal Physiology	chp. 2
Sept 1 (Th)	*Lab: Get Acquainted Meetings*	
Sept 2 (F)	Animal Research	article
Sept 5 (M)	**Labor Day**	
Sept 7 (W)	Transport of Solutes and Water	chp. 5
Sept 8 (Th)	*Lab: Weight of the Nation*	
Sept 9 (F)	Nutrition, Feeding, and Digestion	chp. 6
Sept 12 (M)	Nutrition, Feeding, and Digestion	chp. 6
Sept 14 (W)	Energy Metabolism	chp. 7
Sept 15 (Th)	*Lab: Journal Article #1*	
Sept 16 (F)	Aerobic and Anaerobic Forms of Metabolism	chp. 8
Sept 19 (M)	The Energetics of Aerobic Activity	chp. 9
Sept 21 (W)	**FREE DAY**	
Sept 22(Th)	***Lab: Exam 1***	
Sept 23 (F)	Thermal Relations	chp. 10
Sept 26 (M)	Neurons	chp. 12
Sept 28 (W)	Neurons	chp. 12
Sept 29 (Th)	*Lab: Metabolism and Temperature in Rats*	
Sept 30 (F)	Synapses	chp. 13
Oct 3 (M)	Sensory Processes: Background [touch, chemical senses]	chp. 14, pp. 369-376, 383-391
Oct 5 (W)	Sensory Processes [inner ear: balance and hearing]	chp. 14, pp. 376-382
Oct 6(Th)	*Lab: Effects of Castration on Juvenile Male Rats—1*	
Oct 7 (F)	Sensory Processes [vision]	chp. 14, pp. 391-404
Oct 10 (M)	Nervous System Organization	chp. 15, pp. 407-417
Oct 12 (W)	Autonomic Nervous System	chp. 14, pp. 417-420
Oct 13 (Th)	*Lab: Journal Article #2*	
Oct 14 (F)	Biological Clocks	chp. 15, pp. 420-427
Oct 17(M)	Endocrine and Neuroendocrine Physiology [overview]	chp. 16
Oct 19 (W)	**FREE DAY**	
Oct 20 (Th)	***Lab: Exam 2***	
Oct 21 (F)	**HOLIDAY: FALL BREAK**	
Oct 24(M)	Endocrine and Neuroendocrine Physiology [hypothalamus and pituitary]	chp. 16
Oct 26 (W)	Endocrine and Neuroendocrine Physiology [other endocrine glands]	chp. 16
Oct 27(Th)	*Lab: Effects of Testosterone on Juvenile Male Rats—2*	
Oct 28 (F)	Reproduction [Sexual differentiation]	chp. 17
Oct 31 (M)	Reproduction [Male physiology]	chp. 17
Nov 2 (W)	Reproduction [Female physiology]	chp. 17
Nov 3 (Th)	*Lab: Journal Article #3*	
Nov 4 (F)	Reproduction [Pregnancy and Lactation]	chp. 17

Nov 7 (M)	Control of Movement: The Motor Bases of Animal Behavior	chp. 19
Nov 9 (W)	Muscle	chp. 20
Nov 10 (Th)	*Lab: No Lab*	
Nov 11 (F)	Muscle	chp. 20

Nov 14 (M)	Introduction to O_2 and CO_2 Physiology	chp. 22
Nov 16(W)	**FREE DAY**	
Nov 17 (Th)	***Lab: Exam 3***	
Nov 18 (F)	External Respiration: The Physiology of Breathing	chp. 23

Nov 21 (M)	Transport of O_2 and CO_2 in Body Fluids	chp. 24
Nov 23-25	**HOLIDAY: THANKSGIVING BREAK**	

Nov 28 (M)	Circulation: Heart	chp. 25
Nov 30 (W)	Circulation: Blood Vessels and Cardiac Output	chp. 25
Dec 1 (Th)	*Lab: Journal Article #4*	
Dec 2 (F)	Water and Salt Physiology: Introduction and Mechanisms	chp. 27

Dec 5 (M)	Water & Salt Physiology of Animals in Their Environments	chp. 28
Dec 7 (W)	Kidneys and Excretion	chp. 29
Dec 8 (Th)	*Lab: Diabetes Mellitus*	*chp. 14, pp. 407-409; handout*
Dec 10 (F)	Kidneys and Excretion	chp. 29

Dec 12 (M)	**FINAL EXAM, 7:30—10:00 a.m.**