BIO 665: Physiology of Plants and Animals
Point Loma Nazarene University, Summer 2016

PLNU Mission: To Teach ~ To Shape ~ To Send

Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service becomes an expression of faith. Being of Wesleyan heritage, we aspire to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

Course description:
The course focuses on concepts related to the physiological mechanisms that contribute to homeostasis in both plants and animals as addressed from the perspective of teaching for conceptual understanding. Lecture and lab. 3 units

Course learning outcomes:
1. Students will discuss major concepts and theories relevant in the study of physiology including the concept of homeostasis and the relationship between structure and function.
2. Students will be able to articulate the persistent challenges faced by physiologists.
3. Students will demonstrate both an ability to perform, and an understanding of, experimental methods and data analysis used in the study of physiology.
4. Students will analyze representative research papers in physiology.
5. Students will explain the structure and function of multicellular organisms in terms of the adaptation of common body plans to diverse environmental challenges.
6. Students will analyze the common and divergent ways that animals and plants solve the physiological problems of responding to stimuli, obtaining energy and nutrients, circulating/transporting materials, and reproducing.
7. Students will relate the properties of macromolecules and the cells containing them to the function of tissues, organs and organ systems.

Instructors and contact information:
Your instructors are ready and willing to help when needed, and will generally be available each morning. Appointments are suggested.

Byron Noordewier ByronNoordewier@pointloma.edu
Rohr Science 101, (712) 541-1344
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Rohr Science 113, (619) 849-2705

Class sessions and attendance:
Class will meet on Mondays, Tuesdays, Wednesdays, and Thursdays from 1:00 PM – 5:30 PM, in either Sator Hall 117 (for lab activities) or Latter Hall 2 (for lecture/discussion). Class attendance will be kept and the school's policy will be enforced as outlined in the university catalog. Since the class only meets 12 times, missing more than one class period will impact the final grade, and may result in the student being dropped. Students missing 2.5 sessions will be dropped.

Recommended Text:
One of the following:

Campbell, N. & Reece, J. *Biology,* San Francisco: Pearson Benjamin Cummings
Brooker, R., Widmaier, E., Graham, L., & Stiling, P. *Biology,* San Francisco: McGraw-Hill Higher Education

Other biology majors-level textbook

All required readings will be posted on Canvas or will be available through the PLNU library databases.

Refund schedule:

100% refund if dropped after 1-2 sessions
75% refund if dropped after 3-4 sessions
50% refund if dropped after 5 sessions
25% refund if dropped after 6-7 sessions
0% refund if dropped after 8-12 sessions

Assessment:

Research paper analyses (6 @ 20 points each)		120 points
Lab reports (3 @ 50 points each (individuals)		150 points
Exams: 3 @ 150 points each (individuals)		450 points
Presentation (pairs)		100 points
Smaller assignments	approx.	80 points
		900 points

Grading scale

A 90% B 80% C 70% D 60% F 50%

Final course grades will be recorded with – added to the lowest 2% and + added to the highest 2% within each range. For example, 91% = A- and 88% = B+

Research paper analysis and lab reports

Summaries of research papers focusing on the claims and evidence in each paper will be required throughout the course. These analyses serve as practice for students completing the non-thesis option in the program as article analysis is a major focus of the comprehensive exam at completion of the program.

Since the condensed nature of this course does not allow for time to complete lengthy lab reports, reports will focus on a presentation of the results (including appropriate graphs and tables), an analysis of the data, and a clear conclusion/claim with clear justification of how the data presented supports the claim. No late assignments will be accepted.

Exams

Take-home exams will be posted on Canvas each Friday by noon, and will be due (via e-mail to both professors) by midnight on Saturday. Exams are open book/open internet and will require integration of course content to demonstrate understanding. While working and studying in groups is encouraged during the week, each take-home exam must represent each person's own work. All concerns or requests for clarity regarding the test questions themselves MUST be directed to the instructors, not to other students. Late exams will be penalized 20% for being up to 24 hours late. No exams will be accepted after that time unless arrangements have been made prior to the exam date.

Presentations

Pairs of students will choose an appropriate topic for a 10-minute presentation on the last day of the class. Following the presentation, the presenters will field questions from other class members and/or professors for approximately 5 minutes. Topics must be cleared by professors.
Options for the presentations:

1. Prepare a presentation on the comparison between the physiological mechanisms used by two types of plants, two types of animals, or plants and animals in response to a particular challenge.
2. Prepare a presentation on the molecular basis of a physiologic response to a specific hormone in plants or animals.
3. Propose a physiology-related presentation not on this list.

Spiritual Care

PLNU strives to be a place where you grow as whole persons. To this end, we provide resources for our graduate students to encounter God and to grow in their Christian faith. Please check out the PLNU's web site link for more information about your site chaplain and other spiritual resources: http://www.pointloma.edu/experience/faith/graduate-student-spiritual-life

Graduate and Professional Studies Syllabus Notification Page

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 in the Graduate and Professional Studies Catalog for definitions of kinds of academic dishonesty and for further policy information.

PLNU ACADEMIC ACCOMMODATIONS POLICY

If you have a diagnosed disability, please contact Jean Moncada in the Center for Student Success (CSS) within the first two weeks of class to demonstrate need and to register for accommodation by phone at (619) 563-2849 or by e-mail at jmoncada@pointloma.edu. Ask your academic advisor or program director for any additional accommodation 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 Graduate and Professional Studies Catalog for additional detail.

Course schedule: See Canvas for more details

Week #1	**Topic**
Mon., 6/20	Intro to class Responding to Stimuli (plant receptors, hormones and electrical impulses) Movement in plants lab
Tues., 6/21	Responding to Stimuli (animal nervous and endocrine systems) Reproducing (hormonal control of animal reproduction) 10 year celebration dinner (6:00-7:30)
Wed., 6/22	Discuss research paper #1: "Microsensory hairs in bumblebees…" (2016) Reproducing (plant diversity in reproduction) Plant reproduction lab
Thurs., 6/23	Discuss research article #2: "Nectar Production & Floral Visitors" (2015) Moving materials through the organism (animal circulation) **CIRCULATION LAB**
Week #2	
Mon., 6/27	**CIRCULATION LAB DUE** Review of exam Moving materials through the organism (plant xylem and phloem) **TRANSPIRATION LAB**
Tues., 6/28	Discuss research article #3: "Testing the Munch hypothesis…" (2016) Record transpiration lab data Moving materials through the organism (animal respiration & acid/base homeostasis)
Wed., 6/29	**TRANSPIRATION LAB DUE** ZOO DAY from 11:00-5:00 (Meet at front gates at 11:00, zoo is open until 8:00) Moving materials (plants), obtaining nutrients/energy (animals & plants), responding to stimuli (plants and animals), reproduction (plants and animals)
Thurs., 6/30	**Zoo lab response due** Discuss research article #4: "Law of urination" (2014) Moving materials through the organism (animal renal system and osmolar/volume homeostasis) **URINE LAB**
Week #3	
Mon., 7/4	**NO CLASS THIS DAY**
Tues., 7/5	Review of exam **URINE LAB DUE** Metabolism and temperature homeostasis **GLUCOSE LAB**
Wed., 7/6	**GLUCOSE LAB DUE** Discuss research article #5: "Effect of 7 days of exercise training…" (2009) Obtaining energy and nutrients (photosynthesis and root uptake – including hydroponics) Root and leaf growth lab
Thurs., 7/7	Discuss research article #6: "The Effects of Drought and Shade…" (2015) Concluding summary of course **PRESENTATIONS**