ORGANISMAL BIOLOGY - Biology 212/212L
Point Loma Nazarene University, Spring 2019

Nehemiah 9:6 - *You alone are the LORD. You made the heavens, even the highest heavens, and all their starry host, the earth and all that is on it, the seas and all that is in them. You give life to everything, and the multitudes of heaven worship you.*

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
Principles of animal and plant structure, function, and diversity. Lecture and lab must be taken at the same time. Offered every year.

Where does this course fit in? It's one of three required courses (Bio 210, 211, and 212) that form the lower division biology sequence for the Biology, Biology-Chemistry, and Environmental Science majors, and is required for the Organismal Biology minor. It also serves as preparation for upper-division organismal biology courses such as Applied Plant Biology and Advanced Human Physiology.

Course learning outcomes:
1. Students will explain the structure and function of multicellular organisms in terms of the adaptation of common body plans to diverse environmental challenges.
2. Students will analyze the common and divergent ways that animals, plants, protists, and fungi solve the physiological problems of maintaining homeostasis, detecting/responding to stimuli, obtaining energy/ nutrients, transporting materials, removing wastes, growing/developing, and reproducing.
3. Students will relate the properties of macromolecules, and the cells containing them, to the function of tissues, organs, and organ systems.

Class meeting places and times

Lecture: MWF 12:15-1:10 PM		Latter Hall 1
Labs:	Section 1 - Mon. 2:45-5:45 PM	Sator Hall 120
	Section 2 - Tues. 8:00-11:00 AM	Sator Hall 120
	Section 3 - Tues. 1:30-4:30 PM	Sator Hall 120

Instructors and instructor availability

Dianne L. Anderson, Ph.D. (first 7.5 weeks) — Trailer #5 in the gym parking lot/Rohr #146
dianneanderson@pointloma.edu — (619) 849-2705
Office hours: Thursdays 10:00-12:00, Fridays 1:30-3:30, or by appointment

Holly McMullen, M.S. (second 7.5 weeks) — Office and Office Hours: TBA
hmcmulle@pointloma.edu

Required materials

1. **Brooker, Widmaier, Graham & Stiling. *Principles of Biology***, 2nd edition. McGraw-Hill, 2017. Using another edition Brooker text is possible – you will just need to find the appropriate sections. It is helpful to bring this textbook to lab. You may wish to consult it in lecture class, too. ISBN: 978-1259875120
2. **Dissection kit -** Available at bookstore.
3. **Chamovitz, Daniel (2013 or 2017 edition). What a plant knows: A field guide to the senses.** Scientific American: New York, New York. (Referred to as "WAPK" in the schedule) NOTE: Editions of this book were released in 2013 and 2017 – they have the SAME cover. They have almost the same content, but the chapters are just rearranged.
4. **iClicker –** Available in the bookstore if you don't already have one

How we've organized this course and how you can succeed…

Lecture class is designed to introduce you to essential concepts illustrated by specific examples, and to equip you to apply your understanding to scientific problems. The associated **reading** comes from a stated portion of a chapter or chapters of Brooker, or from other reading that may be assigned. The lab exercises are an important component of the course. It's always a good idea to bring your textbook (Brooker) to lab. Each lab will have a 5 pt. quiz at the beginning of class to assess understanding of the previous week's lab.

Help with studying, keeping up, and writing

We recognize that students come from a great variety of academic backgrounds, and that some of you may not have yet developed the appropriate study skills to do as well as you would like in college. Everyone needs help from time to time. There are many places to gain assistance or study skills - your peers, the professors, or PLNU's Tutorial Services Center. The center is located at the south end of the Bond Academic Center, next to the Office of Global Studies. A list of the Center's services can be found here:
http://www.pointloma.edu/experience/offices/student-services/tutorial-services/services

Assignments and grading

All assignments are to be submitted/turned in by the beginning of the class session when they are due—including assignments posted in Canvas. Incompletes will only be assigned in extremely unusual circumstances. Your grades for lecture and lab will be combined, and the same grade will be given to both.

Assignment/Exam	**Points possible**
Exams 3 @ 100 points each	300 points
Final exam (partly comprehensive)	100 points
10 lab quizzes @ 5 points each (if you complete all 11 labs, one is extra credit)	50 points
WAPK quizzes 3 @ 10 points each	30 points.
12 labs @ 10 points each (if you complete all 13 labs, one is extra credit)	120 points
Clicker questions or other in-class activities	Approx. 90 points
Misc. assignments	Approx. 30 points.
TOTAL	**720 points**

Grade calculation

Your letter grade will be determined from your normalized cumulative total (converted to a %) as follows:

A: 90-100% B: 80-89.9% C: 70-79.9% D: 60-69.9% F: below 59.9%

Plus and minus grades will be assigned as follows:

A: 92-100 A-: 90-91.9 B+: 88.0-89.9 B: 82.0-87.9 B-: 80.0-81.9 etc.

Exams

The course has three lecture exams as well as the final exam. Exams consist of multiple-choice, matching, and short-answer questions. The final exam will consist of 60% related to the last portion of the course, as well as 40% related to the main ideas/themes of the overall course. Please notify the appropriate instructor **in advance** of the need to reschedule an exam in case of an excused absence.

Final Exam policy: Successful completion of this class requires taking the final examination on its scheduled day (**Wednesday, May 1, 2019 from 10:30 AM – 1:00 PM**). No requests for early examinations or alternative days will be approved, except in extremely rare occasions.

Attendance

Lecture and laboratory attendance is mandatory. Poor attendance tends to correlate with low exam scores. Please communicate with us regarding any planned absences. At 5 lecture (or 2 lab) absences, we must contact the Vice-Provost for Academic Administration for possible de-enrollment. At 10 lecture (or 3 lab) absences, de-enrollment is automatic. Note these important dates:

January 18, 2019 is the last day to add BIO 212.

March 22, 2019 is the last day to drop BIO 212.

In-class expectations: Laptop computers/punctuality/courtesy

Computer activity in class must be course-related. Misuse in this regard could lead to us to ban all personal computers and phones in class. We will endeavor to start lecture and lab classes at the stated times. Please do the same! Extend the same type of courteous, considerate, and respectful behavior towards each other and towards us as we will extend to you.

Clicker registration

The iClicker remote is available to buy or rent at the bookstore or online. You need to register your clicker online by going to this web address: https://www1.iclicker.com/register-a-remote

Undergraduate 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 for definitions of kinds of academic dishonesty and for further policy information.

PLNU ACADEMIC ACCOMMODATIONS POLICY

While all students are expected to meet the minimum standards for completion of this course as established by the instructor, students with disabilities may require academic adjustments, modifications or auxiliary aids/services. At Point Loma Nazarene University (PLNU), these students are requested to register with the Disability Resource Center (DRC), located in

the Bond Academic Center. (DRC@pointloma.edu or 619-849-2486). The DRC's policies and procedures for assisting such students in the development of an appropriate academic adjustment plan (AP) allows PLNU to comply with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act. Section 504 (a) prohibits discrimination against students with special needs and guarantees all qualified students equal access to and benefits of PLNU programs and activities. After the student files the required documentation, the DRC, in conjunction with the student, will develop an AP to meet that student's specific learning needs. The DRC will thereafter email the student's AP to all faculty who teach courses in which the student is enrolled each semester. The AP must be implemented in all such courses.

If students do not wish to avail themselves of some or all of the elements of their AP in a particular course, it is the responsibility of those students to notify their professor in that course. PLNU highly recommends that DRC students speak with their professors during the first two weeks of each semester about the applicability of their AP in that particular course and/or if they do not desire to take advantage of some or all of the elements of their AP in that course.

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

BIO 212 Lecture and Lab Schedule –Spring 2019

Week of	Lecture topics ("Chapters/sections/figures" refer to the Brooker text; "Readings" refer to articles/links on Canvas)	Lab topics
Jan. 7	**Part I: Algae, Plants, and Fungi (Dr. Anderson)** 8 – Domain Eukarya: Common challenges/Common & unique solutions (Tuesday start with Monday schedule!) 9 - General Protist Information ICA - Eukaryotic phylogeny *Section 23.5* ***Syllabus verification due*** 11 - General Protist Information ICA – Algae pigments *Table 23.2*	Monday lab (on Tuesday): Lab #1a: Protist Diversity Lab #1b: Plant cells NO TUESDAY LABS
Ja. 14	14 - Intro to Plant Diversity *Figure 25.2* 16 - Intro to Plant Diversity ***Botanical sense of place response due*** 18 – Plant Diversity: Non-vascular and vascular seedless plants ICA – Arsenic and brake ferns *Section 25.1*	Monday lab: Lab #1 Quiz Lab #2: Non-vascular, seedless vascular, and non-flowering seed plants (Examine 2, & 3 wk ferns) Tuesday labs: Lab #1a: Protist Diversity Lab #1b: Plant cells
Jan. 21	**21 - No class: MLK Day** 23 – Plant Diversity: Non-flowering seed plants/Gymnosperms *Section 25.3* 25 – Plant Diversity: Flowering seed plants/Angiosperms *Section 25.4* **Quiz #1: What a Plant Knows (Prologue & Chaps. 1,2)**	NO MONDAY LAB Tuesday labs: Lab #1 Quiz Lab #2: Non-vascular, seedless vascular, and non-flowering seed plants (Examine 2, & 3 wk ferns)
Jan. 28	28 – Plant Diversity: Alternation of generations, seeds vs. spores *Figures 14.11, 28.1, 31.15* *Reading: A Passion for Order* ***(3 questions)*** 30 - **Exam #1 (does not include Lab #3)** Feb. 1 - Plant Physiology: Reproducing with flowers & fruit ICA - Flowering plant reproduction functional model *Section 31.1, 31.3 and 31.4*	Lab #2 Quiz Lab #3: Flowers/seeds/fruits
Feb. 4	4 - Plant Physiology: Growing & developing *Sections 28.1, 28.2, and 28.3,* ***Pollination research homework due*** 6 – Plant Physiology: Growing and developing Plant Physiology: Obtaining matter by roots *Section 28.4, 30.1, and 30.2*	Lab #3 Quiz Lab #4: Stems, wood & roots Harvest corn seedlings/analyze and graph data

	8 – Plant Physiology: Obtaining energy & matter by photosynthesis *Sections 7.1 and 7.2* **Quiz #2: What a Plant Knows (Chaps. 3,4)**	
Feb. 11	11 - Plant Physiology: Obtaining energy & matter by photosynthesis *Sections 7.3 and 7.4* *Reading: Nature's Green Revolution* ***(3 questions)*** *13* - Plant Physiology: Transporting materials - cells and tissues *Sections 30.3 and 30.4* 15 - Plant Physiology: Transporting materials - xylem & phloem *Section 30.5* **Quiz #3: What a Plant Knows (Chap. 5,6 & Epilogue)**	Lab #5: Field trip to Balboa Park (Plant diversity)
Feb. 18	18 – Plant Physiology: Detecting to and responding to stimuli *Figures 29.2, 29.3, 29.4, 29.7, 29.11, and 29.12, Table 29.1* ***Water potential homework due*** 20 – Plant Physiology: Removing wastes and Intro to Fungi ***Parable reflection due*** 22 - Fungi *Section 23.6*	Lab #4 Quiz Lab #6: Leaves Discuss corn data **Course evaluation (first half)**
Feb. 25	25 **- Exam #2** **Part II: Animals** 27 – Intro to Animal Diversity *Sections 26.1 and Figure 26.2* **(Prof. McMullen joins us!)** March 1 – Animal Diversity: Porifera, Cnidaria & Ctenophora *Sections 26.3, 26.4, 26.5 and 26.6*	Lab #6 Quiz Lab #7: Animal Body Plans
Mar. 4	**No Classes – SPRING BREAK March 4-8**	
Mar. 11	11 – Animal Diversity: Platyhelminthes, Nematoda, Mollusca, Annelida, Arthropoda & Echinodermata *Sections 26.7 and 26.8* 13 – Animal Diversity: Chordata *Chapter 27* 15 – Animal Physiology: Reproducing *Section 39.1, and 39.2* Reading: *Doing physiology (****3 questions)***	Lab #7 Quiz Lab #8: Invertebrate dissection
Mar. 18	18 – Animal Physiology: Reproducing *Sections 39.4 and 39.5, Figures 26.16 and 26.28* 20 – Animal Physiology: Homeostasis *Section 32.1 and 32.2* Reading *"Bat wings and elephant ears: Keeping cool"* **(*3 questions*)**	Lab #9: Tidepool adaptations Choose the day/time that works for you! **Sunday, Mar. 17 – 1:30-3:00** **Monday, Mar. 18 – 2:00-3:30** **Tuesday, Mar. 19 – 2:30-4:00** **(Meet in parking lot on the west side of Rohr)**

	22 - Animal Physiology: Homeostasis *Section 32.3 and 33.4, Figure 33.19*	
Mar. 25	25 – Animal Physiology: Obtaining energy and nutrients *Sections 37.1, 37.2, and 37.3* 27 - Animal Physiology: Obtaining energy and nutrients *Sections 37.4 and 37.5* 29 - **Exam #3**	Lab #8 Quiz Lab #10: Animal reproduction
Apr. 1	1 – Animal Physiology: Transporting materials *Section 36.1 and 36.2* 3 - Animal Physiology: Transporting materials *Section 36.3, 36.4, 36.5, and 36.6* 5 - Animal Physiology: Transporting materials *Section 36.7, 36.8, and 36.9*	Lab #10 Quiz Lab #11: Surface area/Volume and osmolarity/tonicity lab **GMO Assignment due – Discuss in lab**
Apr. 8	8 – Animal Physiology: Removing wastes *Section 37.6* 10 – Animal Physiology: Removing wastes *Section 37.7* 12 – Animal Physiology: Detecting <u>and</u> responding to stimuli *Sections 33.1 and Sections 34.1, 34.2, 34.3, 34.4 and 34.5*	Lab #11 Quiz Lab #12: Organ systems of fetal pig
Apr. 15	15 – Animal Physiology: Detecting <u>and</u> responding to stimuli *Sections 33.2, 33.3, and 33.4* *Reading "Sensing the world around us"* ***(3 questions)*** 17 – Animal Physiology: Responding to stimuli (hormones) *Sections 38.1 and 38.2* *Reading: This is how our world looks to other animals"* ***(3 questions)*** **Course evaluation (second half)** **April 19 - No class – EASTER BREAK**	Lab #13: Field trip to San Diego Zoo
Apr. 22	**April 22 - No class – EASTER BREAK** 24 – Animal Physiology: Responding to stimuli (muscles) *Section 35.2* 26 – Summary of BIO 212 ICA - Plant and animal analogies	**No labs this week**
April 29	**Final exam**: **Wednesday, May 1, 2019 from 10:30 AM – 1:00 PM**	**No labs this week**