POINT 1902 LOMA
NAZARENE UNIVERSITY

Bio 312 Applied Plant Biology

Dr. Dianne Anderson **Spring 2020**

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 and format

This course is designed to promote learning about the myriad of ways in which humans use plants. The course lecture and lab activities are designed to provide multiple opportunities you to learn and to apply ideas and to learn how scientific inquiry is applied to problems in applied plant biology. Lecture sessions provide background information in the form of brief 15-20 minute lectures interspersed with in-class activities to give you a chance to think about and to apply what you are learning. You are expected to do all assigned reading before class, and to come prepared to discuss the content for the day. Biology 2012 is a pre or co-requisite for this course, so you will be expected to know basic concepts related to plant diversity as well as basic plant structure and function. The course is an upper division biology elective for biology and environmental science majors.

If it has been a while since you learned basic plant biology, the lessons on this site provide a good review: https://study.com/academy/topic/basics-of-plant-biology-help-and-review.html

BIO 3012 catalog description

A study of plant structure, function, and phytochemistry through an examination of economically and culturally important plants, including plants used for medicine, food, fuel, fiber, and building materials. Topics include environmental plant physiology, biotechnology, plant propagation, medicinal botany, and sustainable land use. Lecture, lab and fieldwork.

"Innovation in life science will be the major driver of meeting four major societal challenges: challenges of climate, challenges of food, challenges of energy, and challenges of health."
Phillip A. Sharp, Massachusetts Institute of Technology,
Co-chair, National Research Council Committee, A New Biology for the 21st Century

Course learning outcomes:

1. Distinguish between 1) possible benefits to the plant and 2) possible uses by humans for a variety of botanical structures and molecules.
2. Describe the roles of biotechnology, traditional plant breeding, innovative farming methods, and sustainable land use in meeting the needs of a growing world population.
4. Critique primary literature by identifying the research question, and analyzing the methods and results to determine if the conclusions are valid.
5. Develop questions related to overall course themes, then access and summarize appropriate resources to answer those questions, and report findings to the class.
6. Design, carry out, and write up two experiments: #1 Plant propagation and #2 Bacterial inhibition by plant molecules.
7. Describe how plants can be used for food, medicine, fuel, and fibers.

Instructor office hours and contact information
Office hours are held in Rohr Science #146 are Wednesdays & Thursdays 1:30-3:30. I can also set up an appointment if these times do not work for you.

dianneanderson@pointloma.edu Office: 619-849-2705

Class session schedule
Class will be held on Friday afternoons from 2:45-4:45 in Rohr Science 40.

Resources for the course
A variety of handouts (book excerpts, journal articles, etc.) will be posted to Canvas or available online. It may also be very helpful to have the Brooker textbook (used in BIO 2010, 2011 and 2012) to use as a reference from time to time.

I suggest using the "Flipboard" app to follow plant-related articles that connect to BIO 3012.

Grading
Grades will be given on the basis of total points earned. Points are distributed as follows:

Lecture/lab exams (2 @100 points each)		200 pts
Lab summaries	approximately	30 pts
Homework and in-class activities	approximately	50 pts.
Projects (4 @ 25 points each)		100 pts.
Research Project		100 pts.
	approximately	480 pts total

Project information:
- Project #1 – Design, carry out, and analyze a **plant nutrition project** based on either a comparison of fertilizer types, concentrations, or protocols.
- Project #2 – Design, carry out, and analyze a **propagation project** based on either a comparison of methods for the same species and/or a comparison of species using the same method.
- Project #3 - Design, carry out, and analyze a **medicinal botany project** based on analyzing the antibacterial properties of various plants/spices.
- Project #4 - Complete a class-related **service project** (2-3 hours) to benefit someone else and submit a brief written summary as well as before and after pictures (1-2 pages)
- Project #5 – Prepare and present a **summary of current research** (at least two research articles) in an area of applied plant biology, then propose a line of research to extend the work.

You are expected to take the exams on the days scheduled unless you have an excuse cleared by me no later than the Friday preceding the exam. If there is an approved conflict, you will be expected to take the exam **prior to** the scheduled time. If something unexpected happens, we will make appropriate arrangements at that time. Makeup exams may not be the same as the original and will generally be more difficult in nature. Un-excused misses will result in a zero grade.

Grading scale: A 90% B 80% C 70% D 60% F 50%

Final grades will have – added to the lowest 2% and + added to the highest 2% within each range. (91% = A-, 88% = B+)

Final exam policy: All students are required to take the final exam for the course on the day and at the time on the PLNU final exam schedule: Wednesday, May 6, 2020 **from 1:30-4:00.**

Participation and cooperation
In an effect to create the best learning environment possible, all students should work in groups when asked to do so – whether in the lab or lecture. I will often assign groups, and I will shuffle the groups several times during the semester. You may be surprised how much you can learn from one another, especially from people who you may not have chosen to work with on your own.

Cell phones must be muted/on vibrate during class. Only in cases of emergency should you leave class to take a phone call, unless the lab is on a break. Please, NO texting during class as it distracts both you and people around you.

Computers used in class are used only for class activities. Failure to comply with this restriction will result in the loss of your privilege to use a computer during class and may result in the loss of this privilege by all of the students in this class.

PLNU 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 Catalog.

BIO 3012 Applied Plant Biology Class schedule – Spring 2020

Date	Assignments due	Topics
Jan. 17		Intro to class and class projects Plant nutrition Part I
Jan. 24	Syllabus verification due Reading assignment Week #2 due	Plant nutrition Part II
Jan. 31	Reading assignment Week #3 due	Plant production Part I
Feb. 7	Reading assignment Week #4 due	Plant production Part II
Feb. 14	Reading assignment Week #5 due	Plant propagation
Feb. 21	Reading assignment Week #6 due Plant nutrition lab due	New varieties of plants
Feb. 28	Farmer's Market Assignment due	Exam #1
Mar. 6	Reading assignment Week #8 due	Plants as a source of food
Mar. 13		**Spring Break - No class**
Mar. 20	Reading assignment Week #9 due Propagation lab due	Plants as a source of unique molecules Part I
Mar. 27	Reading assignment Week #10 due	Plants as a source of unique molecules Part II
April 3	Reading assignment Week #11 due Antibacterial properties lab due	Plants as a source of fuel
April 10		**Easter break - No class**
April 17	Reading assignment Week #12 due	Plants as a fiber and wood source
April 24	Reading assignment Week #13 due Service project due	Horticultural therapy & landscape design
May 1		Final exam
Wed., May 6	Research project due	Student presentations (Pairs have 6-8 minutes) Wednesday, May 6 from 1:30-4:00