Botany 4200 Plant Physiology

I. General Information
Professor: Dr. Stuart Wooley
Office Hours:
Phone: 664-6926
Email: swooley@csustan.edu
Required Text: *Plant Physiology*, 5th ed, Taiz and Zieger.
Lecture: MWF 8-8:50
Lab   W 9-11:50
Class Blackboard Page—check it for assignments, lectures, examples of assignments, etc.

II. Course Description
Plant Physiology is a course that focuses on the biochemical and physiological functions of plants. Included in those functions are the biochemical causes and effects of growth, water and nutrient transport, plant responses to the environment, including light (photosynthesis), herbivores and soil fertility. The lab associated with the lecture provides an opportunity to test plant physiological principles firsthand. Organic Chemistry is a real pre-requisite.

III. Course Objectives
At the end of the course, students will:
1. Describe how plants work, from the cellular to the whole-plant level.
2. Be able to develop and test hypotheses of plant physiology.
3. Be able to understand and critically evaluate current published plant physiological research.
4. Explain the mode of action of plant hormones on seed germination, plant development, growth, reproduction and senescence or dormancy.
5. Accurately predict plant physiological responses to environmental variables.
6. Explain the implications of photosynthesis to life on the Earth.
7. Describe relationships among different plant systems
8. Be able to describe physiological cycles, enzyme-mediated chemical reactions, negative and positive feedback, electrochemical gradients and osmotically-driven transport and circulation.

A major goal of this course is for you to **integrate** knowledge gained in other courses to help you understand how plants grow, reproduce, cope with their environment, gain nourishment and regulate their systems. The course will be principles-based, so learning the fine details is also important. Because this counts as your upper-division Physiology, I will regularly refer to examples from other organisms. Generally, many physiological *principles* are the same across organisms, even if the *details* are not.

IV. Grading
Grade Calculations
Grades will be based on the percentage of points earned, with no curve. You will earn the grade that reflects how many points you earned out of the total. The entire class could receive As. Grades are posted online when the course is over and you can check them at your leisure. You

are VERY welcome to come to my office periodically to discuss/check your grade during the semester. If you are concerned about your grade, please come sooner than later to talk with me about it. Changing your grade in the last few weeks of the term is very difficult.

A	93-100%	A-	90-93%	B+	87-90%
B	83-87%	B-	80-83%	C+	77-80%
C	73-77%	C-	70-73%	D+	67-70%
D	63-67%	D-	60-63%		
F	0-60%				

Options: **September 21** is the last day to drop the course and the **last day** you may change your grading option (CR/NC). **No exceptions**. Your instructor will strictly follow the grading option indicated on the final grade sheet supplied by Admissions and Records. Consult with your advisor before making your decision. Grades will **not** be changed once they have been submitted.

V. Assignments, Assignment & Attendance Policies

Grades will be based on lecture **quizzes**, exams, paper **reading** and group **discussion**, group **projects** with a major, final research paper due the last week of class.

Each quiz will be comprehensive from all previous information, but will focus on the most recent material. Factual and analytical questions will be asked. You will have to keep up with the lecture and lab material to perform consistently well on quizzes. The lecture and lab are integrated and the entire course (lecture and lab) is graded together.

Assignments need to be turned in on time. You will have 1 week to turn in your assignments including the due date. Later assignments will receive 10% late penalty if they are not turned in on the due date. You will miss 10% for each class day missed beginning after the class is over on the due date.   Please turn assignments in on time. In addition, periodically we will have in-class activities. You must be present to earn points on in-class activities.

Because quizzes will be given at the beginning of class, you must arrive on time, or you will miss the quiz. I do not give make-up quizzes to late students.

You must also present your own work. Presenting someone else's work as your own is dishonest. You will receive an F for the assignment and your name may be submitted to Student Services.

Make up work: Make-up work for class is possible, with documentation from some reliable person (hospital, police, etc). Lab work may NOT be made up, because that is hands-on activities which can't be made up. In-class activities cannot be made up.

Challenge Questions: Occasionally, I will assign paper topics that address a challenging issue in plant physiology. You will have 3 weeks to research and develop a logical, interesting, plausible answer to the question. Each answer should be concise and no more than 3 pages, but complete.

If the answer is unknown, you should analyze the problem and describe what needs to be done to answer the question. (**50 pts each**)

VI. Lab Policies

You will need to attend lab, because you will not be able to make up the lab activity at a later date. No food or drink is allowed in the laboratory.

We have scheduled about 15 lab sessions during the semester. Some labs will consist of a discussion of a published plant physiology paper. The discussion will be student-directed. Students will be divided into groups. Each group will lead discussion for about for 3-4 papers. Students will need to read the paper, find the main point of the paper (why they are hypothesizing that particular hypothesis?), know how the hypothesis was tested and evaluate if that was the best way to test it, interpret the figures/results and understand the implications of the results (the conclusions).

Student presenters will be evaluated on their presentation and participation in the discussion. You will be graded on your contributions (time, effort to understand the paper, accurate comments/points made in the presentation/discussion).

We will have several "standard" lab exercises to familiarize you with available equipment, facilities, and techniques you can use in conducting your own group experiments during the semester.

Class Lab Experiment
Each group (of 2-3) of students will develop, conduct and prepare a written report of an experiment testing a plant physiological hypothesis. You may either conduct your work in the lab, greenhouse or the Biology Field Site (formerly the BioAg site) adjacent to Naraghi Hall. This project will be a class project, with each group contributing data to the project.

Labs will consist of the preliminary work, data collection and analysis, and writing up the project.
GOAL: Development of a poster to present at a regional botany meeting in January. So the work has to be interesting and high-quality. Make a decision that you want to participate and let's see what we can develop and produce this semester!

VI. Lecture and Lab Schedule

Date	Chapters	Date	Chapters
24-Aug	Intro	2-Nov	14
26-Aug	intro	4-Nov	14
28-Aug	1	6-Nov	17
31-Aug	1	9-Nov	17
2-Sep	15	13-Nov	25
4-Sep	15	16-Nov	25
9-Sep	16	18-Nov	Exam
11-Sep	2	20-Nov	19
14-Sep	field work	23-Nov	20
16-Sep	2	25-Nov	21
18-Sep	7	30-Nov	22
21-Sep	7	2-Dec	23
23-Sep	exam	4-Dec	24
25-Sep	8	7-Dec	26
28-Sep	8	9-Dec	Presentations
30-Sep	9	14-Dec	8:30-10:30
2-Oct	4		
5-Oct	6		
7-Oct	6		
9-Oct	10		
12-Oct	12		
14-Oct	exam		
16-Oct	11		
19-Oct	11		
21-Oct	11		
23-Oct	13		
26-Oct	13		
28-Oct	13		
30-Oct	2		

Lab Schedule

Week 1 Experimental Design & data collection processes

Week 2 Plant Anatomy; Water Potential; Photosynthesis data collection

Week 4 Data Management

Week 5 Growth measurements; Photosynthesis & Transpiration

Week 6 Measurements

Week 7 Measurements

Week 8 Measurements

Week 9 Data management

Week 10 Figures

Week 11 Statistics

Week 12-14 Writing

Dec 8 Student Research Presentations in BioDome