

## Botany 4200 Plant Physiology (Fall 2011)

### I. General Information

Professor: Dr. Stuart Wooley  
Office Hours: Monday 9-10; Wednesday 1-3  
Phone: 664-6926  
Email: [wooley@biology.csustan.edu](mailto:wooley@biology.csustan.edu)  
Required Text: *Plant Physiology*, 5<sup>th</sup> ed, Taiz and Zieger. (You can also buy the electronic version for ~\$75.  
Lecture: MWF 8-8:50  
Lab W 9-11:50  
Class Blackboard Page—check it for assignments, lectures, examples of assignments, etc.

For a reduced text price, try this URL

[http://www.coursesmart.com/9780878938667?\\_professorview=false&\\_instructor=2917269](http://www.coursesmart.com/9780878938667?_professorview=false&_instructor=2917269)

### 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 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.

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 19** is the last day to drop the course. **September 19** is also 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.

Changing your grade in the last 4 weeks of the term is very difficult, so keep up on your grades so you can make adjustments as needed. I will try to grade material and hand it back to you so you can calculate your own grade. Make adjustments in your study to do better and/or come to office hours if you need help.

## V. Assignments, Assignment & Attendance Policies

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

Each weekly 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. Because the lecture and lab will be essentially integrated, no separate lecture/lab grade given, but the entire course (lecture and lab) is graded together.

Assignments need to be turned in on time. You will have 4 class periods 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. This means that you can miss only 4 class dates, before you receive a zero (0) on the assignment. Please turn assignments in on time. In addition, periodically we will have in-class activities. You must be present to earn points on those 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 folks.

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 will be submitted to the university.

Make up work: Make-up work for class is possible, with an excuse note 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 can not 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. Many labs will consist of a discussion of a published plant physiology paper. The discussion will be a 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) by the professor and also (confidentially) by your peers.

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.

### **Group Lab Experiment**

Each group (of 2-3) 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. You will need to develop a proposal to examine a hypothesis and receive approval from the professor for that proposal. A proposal consists of an introduction to the question (including background—why does this need to be tested?), an explicit and testable hypothesis and a description of the methods to be used for testing your hypothesis. Your preliminary research proposal is due by **Friday September 9<sup>th</sup>**.

## VI. Lecture and Lab Schedule

Date	Chapters	Date	Chapters
22-Aug	Intro	2-Nov	17
24-Aug	1	4-Nov	18
26-Aug	1	7-Nov	19
29-Aug	online activity	9-Nov	19
31-Aug	3	14-Nov	20
2-Sep	4	16-Nov	21
7-Sep	5	18-Nov	21
9-Sep	6	21-Nov	exam
12-Sep	exam	23-Nov	22
14-Sep	7	28-Nov	23
16-Sep	7	30-Nov	24
19-Sep	7	2-dec	25
21-Sep	8	5-Dec	25
23-Sep	8	9 dec	26
26-Sep	9	12 Dec	8:30-10:30 AM
28-Sep	9		
30-Sep	10		
3-Oct	11		
5-Oct	11		
7-Oct	11		
10-Oct	12		
12-Oct	13		
14-Oct	13		
17-Oct	13		
19-Oct	exam		
21-Oct	2		
24-Oct	14		
26-Oct	15		
28-Oct	16		
31-Oct	17		

### Lab Schedule

**Week 1** Experimental Design & data collection, Growth expt. Set-up

**Week 2** Plant Anatomy; Water Potential

**Week 3** Chlorophyll extraction & spectroscopy  
Beet Spectroscopy;

**Week 4** First growth measurements; Photosynthesis & Transpiration

**Week 5** Starch Quantification; photosynthesis

**Week 6 (October)** Begin Group projects; Growth measurements; photosynthesis

**Week 15** Student Research Presentations in BioDome