

# PLANT PHYSIOLOGY

BOT 4503  
3 credits, Fall 2018

## Course Instructor

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## Course Description

Covers core concepts in plant physiology, with specific focus on photosynthesis, respiration, water relations, mineral nutrition, growth and allocation, hormones, secondary metabolites, reproduction, and stress physiology. Students will develop an understanding of the integration of plant physiological traits and their role in plant-environment interactions, as well as gain skills in the assessment of key plant physiological traits through hands-on practice. Course format will consist of lectures, and an accompanying laboratory section where students will assess plant traits and responses to key stimuli.

## Course Goals and Learning Objectives

Upon completion of the course, students will be able to:

- Understand the role of plant traits in the environment.
- Identify and judge adaptation versus acclimation.
- Think critically about physiological questions and evidence.
- Design appropriate experiments to address questions about plant physiology.
- Select appropriate methods to assess plant responses.
- Confidently perform common methods to assess plant physiology.
- Interpret graphs and figures related to gas exchange.
- Understand basic experimental design and how research findings are disseminated.

## Prerequisites

A grade of "C" or better in both BSC 2011C and BOT3015, and a grade of "C" or better in either PCB 3044 or PCB 3063, or permission of course instructor.

## Class Meetings

Lectures once per week (Tu) with a laboratory section once per week (Th).

## Webcourses Site

There is a course website available through Webcourses (<https://webcourses.ucf.edu>) that will be used to post materials for the course, including the syllabus, lecture slides, and grades.

## Course Text

This course will use the following text: "Plant Physiology and Development" by Taiz and Zeiger (6<sup>th</sup> edition) OR "Plant Physiology" by Taiz and Zeiger (4<sup>th</sup> or 5<sup>th</sup> edition). These texts are largely equivalent and any edition can be used, though they are organized differently. Note that I have listed assigned chapters to read for each edition in the course schedule. Additional supplementary reading materials (e.g. journal articles) will be provided by the instructor through Webcourses.

## Methods of Evaluation and Grading System

Grades will be assigned on the following scale without rounding or the use of plus/minus grades:

A: 90-100%    B: 80-89%    C: 70-79%    D: 60-69%    F<60%

The grade for this course will be based on the following components:

(1) Three regular **exams**, given in lecture on the dates indicated on the schedule, and one cumulative **final exam** (10% each, 40% total). These closed-book, closed-note exams will consist of short answer and essay questions.

(2) **Laboratory assignments** based on activities in lab (40% total, 4% each, 11 assignments). One lab assignment will be dropped. You will be expected to have read the laboratory assignment before lab begins.

(3) Participation in semester-long **research projects** led by graduate students (18% total). This will consist of at least 12 hours of scheduled out-of-class participation in data collection, analysis, and other aspects of experiments on topics in plant physiology.

(4) **Pre- and post-quizzes** on Webcourses (1% each, 2% total).

## Course Policies

1. Attendance is vital to success in this course. A large portion of the course grade will be based on laboratory assignments which cannot be made up, and exams will cover material not available outside of class.
2. Make-up exams will be given only with valid documentation of illness, mandatory religious observance, or required participation at an authorized university activity prior to the absence or within 24 hours of the exam. Make-ups for laboratories cannot be provided.
3. Students are highly encouraged to discuss any and all portions of this course with me. If you are struggling, please do not wait until you fall behind to meet with me. I am available during my weekly office hours or by appointment and will always be happy to discuss the course.
4. Written communication with the instructor should be sent via UCF email (e.g. Knightsmail). Note that I will not be able to respond to course inquiries sent from third-party email addresses (e.g. Gmail) where student identity cannot be confirmed, in order to comply with FERPA regulations.
5. Academic dishonesty (e.g. plagiarism or cheating) is governed by the UCF Golden Rule. Students found to have committed academic dishonesty will receive a minimum of an "F" for the assignment in question, and at the instructor's discretion based on severity of the violation, an "F" for the entire course with referral to the Office of Student Conduct.

## Accessibility

It is my goal that this class be an accessible and welcoming experience for all students, including those with disabilities that may impact learning in this class. If anyone believes the design of this course poses barriers to effectively participating and/or demonstrating learning in this course, please meet with me to discuss reasonable options or adjustments. You may also contact SAS (Ferrell Commons 185; 407-823-2371; sas@ucf.edu) to talk about academic accommodations.

## Course Schedule

Course schedule is an approximation and subject to change at any time by the instructor. Readings should be completed before attendance at lecture on the week specified. Lab assignments are typically due in lab the week after the laboratory occurs, but check the schedule.

Week	Meeting	Day	Description	Due	Readings (6 <sup>th</sup> ed.)	(4 <sup>th</sup> or 5 <sup>th</sup> ed.)
1	Lecture	8/21	Structure/Function, Adaptation/Aclimation Plant Cells, Tissues, and Organs		Ch. 1 + 24	Ch. 1 + 26
	Lab	8/23	<b>#1: Characterization of Plant Pigments</b>			
2	Lecture	8/28	Photosynthesis I	<b>Lab #1</b>	Ch. 7 + 8	Ch. 7 + 8
	Lab	8/30	<b>#2: Photosynthesis – Light</b>			
3	Lecture	9/4	Photosynthesis II	<b>Lab #2</b>	Ch. 9 + 10	Ch. 9 + 18
	Lab	9/6	<b>#3: Photosynthesis – CO<sub>2</sub></b>			
4	Lecture	9/11	Respiration	<b>Lab #3</b>	Ch. 12 + 16 + 18	Ch. 11 + 17
	Lab	9/13	<b>#4: Seed Germination and Respiration</b>			
5	Lecture	9/18	<b>*EXAM I*</b> Water Relations I	<b>Lab #4</b>	Ch. 3 + 4	Ch. 3 + 4
	Lab	9/20	<b>#5: Water Relations I – Solutes + Water Potential</b>			
6	Lecture	9/25	Water Relations II	<b>Lab #5</b>		
	Lab	9/27	<b>#6: Water Relations II – Conductance/Transpiration</b>			
7	Lecture	10/2	Mineral Nutrition I	<b>Lab #6</b>	Ch. 5 + 13	Ch. 5 + 12
	Lab	10/4	<b>#7: Mineral Nutrition Lab Part 1</b>			

8	Lecture	10/9	Mineral Nutrition II, Solute + Phloem Translocation		Ch. 6 + 11	Ch. 6 + 10
	Lab	10/11	<b>#8: Nutrient Analysis Lab</b>			
9	Lecture	10/16	Growth, Cell Walls, and Meristems	<b>Lab #8</b>	Ch. 14 + 17	Ch. 15 + 16
	Lab	10/18	<b>#7: Mineral Nutrition Lab Part II</b>			
10	Lecture	10/23	<b>*EXAM II*</b> Hormones and Plant Architecture	<b>Lab #7</b>	Ch. 15 + 19	Ch. 19 + 20 + 21
	Lab	10/25	<b>#9: Hormone Lab Part I</b>			
11	Lecture	10/30	Senescence and Life History		Ch. 22	Ch. 22 + 23
	Lab	11/1	<i>*no lab – Campus closes at 3pm*</i>			
12	Lecture	11/6	Reproduction and Phenology		Ch. 20 + 21	Ch. 25
	Lab	11/8	<b>#9: Hormone Lab Part II</b> <b>#10: Plant Pathology Lab Part I</b>			
13	Lecture	11/13	Secondary Metabolism + Biotic Interactions	<b>Lab #9</b>	Ch. 23	Ch. 13
	Lab	11/15	<b>#10: Plant Pathology Lab Part II</b> <b>#11: Secondary Metabolite Analysis Lab</b>			
14	Lecture	11/20	Adaptation, Acclimation, and Abiotic Stress Redux		Ch. 24	Ch. 26
	Lab	11/22	<i>*no lab – Thanksgiving*</i>			
15	Lecture	11/27	<b>*EXAM III*</b>	<b>Lab #10</b> <b>Lab #11</b>		
	Lab	11/29	<b>Presentation of Projects, Final Exam Review</b>			