Biology 359
Plant Biology
Fall 2014

Instructor: Matt Streisfeld
Office: 267A Onyx Bridge
Office hours: Tuesday, 9:00-10:00 or by appointment
Phone: 346-4816
email: mstreis@uoregon.edu

Meeting Times and Locations:
Lecture: T/R 4:00-5:20 Lillis 111
Discussion: Thurs: 12:00-12:50
Thurs: 1:00-1:50
KLA 33

GTF: Lucas Nebert
email: lnebert@uoregon.edu

Course Description: Plants play an integral, yet often overlooked role for the health of our environment, the global economy, and our ability to live on earth. Plants fix carbon and provide oxygen to the atmosphere; plants are a critical piece to the food chain; and plants are amazingly diverse. Moreover, because of the sessile nature of plants, they are intimately connected to changes in their environment; much more so than animals. Therefore, a comprehensive understanding of the biology of plants and how they respond to changes in their environments is critical for any undergraduate biology major. The main goal of this course will be to provide you with an overview of the unique biology of plants. The topics we will cover include the ecology, physiology, developmental genetics, and evolutionary biology of land plants, focusing primarily on the angiosperms (or flowering plants). I plan to integrate these areas to provide you with a detailed view of how land plants overcome many of the challenges they experience on a daily basis. By the end of the term, you should have an appreciation for why biologists study plants and how they do it.

Learning Outcomes:

- Provide a broad-based knowledge of physiology, development, ecology, and evolution of land plants
- Evaluate the unique aspects of the biology of plants relative to animals
- Analyze and interpret quantitative datasets from the primary literature
- Develop verbal and written communication skills through in-class discussion and assignments

Lectures: My lectures will be posted on Blackboard prior to class time. I would like to stress that attendance in lecture is critical for your success in this course.

Readings and supplements: To supplement my lectures, you will be responsible for completing reading assignments on each topic that we cover. Readings should be completed by the time of the class meeting in which they will be discussed. Because there is no one book that includes all of these topics, I have chosen appropriate chapters from different sources. In addition to the readings, there will also be occasional videos of public lectures from some influential plant biologists that cover some of the topics that we will discuss. These lectures will be an excellent way for you to supplement what we discuss in class, and I encourage you to watch and study them.

Discussion: You will each attend a 50 minute discussion section per week that will be run by your GTF (beginning in Week 1). During this period, you will read and discuss selected papers from the primary literature on plant biology. All of the information that we will talk about in lecture comes originally from experimental data collected by researchers and published in scientific journals. I have chosen these papers because they represent recent highlights of the evolutionary biology, ecology, and genetics of plants relevant to the topics that we will discuss in lecture. An important skill as a scientist is being able to read and critically evaluate papers from the primary literature. The main goal of these discussion sections is for you to have open discussions about the papers you read with your classmates and GTF.

Many of the papers will contain lots of technical information. It is OK if you don't understand everything when you read the paper. The purpose of the discussion is for the entire class to work through the papers to gain a better

understanding of the material. You should come to class prepared with questions about what you didn't understand. Some questions to ask yourself when you read each paper:

- What is the purpose of this paper?
- What is the main question that the authors ask?
- What are the main findings? Can I explain what each figure represents?
- Do the findings support the conclusions that the authors draw?

Quizzes: There will be a series of 5 short pop-quizzes spread throughout the course and administered during your discussion section. The quizzes will test your careful reading of the papers assigned for section. Their purpose is to ensure that you come prepared to section each week and have critically read and evaluated the papers. If you read the papers carefully and come to section each week, the quizzes will be easy. Each quiz should take no more than 5 minutes to complete. I will drop the lowest score from your final grade. There will be no make-up quizzes without medical justification.

Assessment: There will be two midterms and a comprehensive final examination. Exams will consist of problems and short answer questions to test your conceptual understanding of the material.

Practice Problems: My exam questions often require you to synthesize material from multiple lectures – this is the best way to test your conceptual understanding of the material. To ensure that you have adequate practice with these types of questions, I will present practice questions at the end of most lectures that you can work on outside of class. I will go over the answer to the question(s) at the beginning of the following lecture. These questions will only be distributed in lecture – they will not be posted on Blackboard. Thus, if you want to have practice at these questions, it is imperative that you come to class each period! In addition to these practice questions (which do not count toward your grade), there will be two problem sets due during the term containing questions similar to the practice problems (and exams). These two problem sets will be worth a total of 10% of your grade.

Evaluation: Your final grade will be determined as follows:

Assignment	% of your Final Grade
Midterm 1	20
Midterm 2	25
Problem Sets	15
Quizzes	10
Final Exam	30

Academic Integrity: I have a zero tolerance policy for cheating, plagiarism, and any other form of academic dishonesty. For this course, that means your assignments must be your work. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures.

Students with Disabilities: The University of Oregon is working to create inclusive learning environments. Please notify me during the first week of the term if there are aspects of the instruction or design of this course that result in barriers to your participation. You may also wish to contact Disability Services in 164 Oregon Hall at 346-1155 or disabsrv@uoregon.edu.

Date	Lecture Topic	Readings (paper for discussion section in parentheses)
30-Sept	Course introduction; Why study plants? Major lineages of plants I	Plant lineages 1
2-Oct	Major lineages of plants II; Review of plant structure and growth	Plant Lineages 2 Plant structure and growth (100 questions for plant science)
7-Oct	Physiological ecology I: Light	Photosynthesis and light
9-Oct	Physiological ecology II: Water	Water relations (Gowick – C3/C4)
14-Oct	Life history strategies	Life history
16-Oct	Ecological genetics I **Problem Set 1 Due**	Ecological genetics (Wu et al. Mimulus drought.pdf)
21-Oct	Ecological genetics II + Review	---
23-Oct	**Midterm 1**	(Review)
28-Oct	Introduction to angiosperm reproduction and floral biology	Floral biology
30-Oct	Intro to plant developmental genetics; Transition to reproduction: flowering time pathways I	Developmental genetics (Rieseberg.pdf)
4-Nov	Transition to reproduction: Flowering time pathways II	Flowering time
6-Nov	Transition to reproduction: flowering time III and floral development	Flower development Supplemental reading: Flowering Supplemental video: Flower development (Ballerini and Kramer.pdf)
11-Nov	Transition to reproduction: conclusion and review	---
13-Nov	**Midterm 2**	(Review)
18-Nov	Floral Biology I: Pollination ecology	Pollination ecology
20-Nov	Floral Biology II: Sexual Interference Mating Systems I: Sex or no sex;	Mating_systems1 (Schemske&Bradshaw1999.pdf)
25-Nov	Mating systems II: Self-fertilization or outcrossing	Mating_systems2
27-Nov	*Thanksgiving - no class*	---
2-Dec	Mating Systems III: Combined vs. separate sexes + herbivory and GMOs **Problem Set 2 Due**	Herbivory
4-Dec	Plant speciation: patterns and processes; Polyploidy	Speciation and polyploidy (Spigler and Ashman.pdf)
9-Dec Final's Week	**Final Exam: 12:30 (Tuesday)**	---