1-2015

BIOO 433.01 - Plant Physiology

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BIOO 433 - PLANT PHYSIOLOGY – SPRING 2015 - LECTURE SYLLABUS (3 Credits)

Instructor: Dr. Anna Sala, NS 117 A; 243 6009; sala@mso.umt.edu

Meeting time and room: Tuesdays, Thursdays 11:10-12:30 LA 338

Recommended Texts:

1. Taiz and Zeiger 5th Ed. Plant Physiology. Sinauer. (Online Supplements)
2. Taiz, Zeiger and Møller. 6th ed. Plant physiology and development. Sinauer

Office Hours: Thursday 3:10-5:00 PM

Electronic Resources: Moodle

Course Description: This course is an introduction to the physiological processes underlying plant growth and development and plant responses to the environment.

Course Objectives:

- Increase student appreciation for plants and their complex, integrated nature
- Increase student understanding of how plants grow, develop and sense their environment
- Appreciate the relevance of the physiology of plants in ecology and agriculture
- Increase student ability to integrate and synthesize scientific information on the physiology of plants

Course Structure:

The course consists of two 1 h 20 min lectures per week. Depending on student demand, additional discussion sessions may be scheduled. From past experience, students benefit a lot from discussion sessions. Because we do not follow any particular textbook (I only recommend one), class attendance is fundamental for this course.

Teaching style:

This is an intense course that covers the most fundamental, core concepts in plant physiology. Realistically, there is much more material than we can cover in one semester. My philosophy is to cover some topics in depth and just brush over other topics. My emphasis is on understanding, critical thinking and integration of core concepts rather than on details and memorization. In some cases, however, memorization helps people register facts that eventually become relevant for the understanding of core concepts. My lectures rely strongly on interaction with students. Therefore, student participation in class is very important. Students are strongly encouraged to ask questions at any time during class. Questions may be to either clarify concepts covered in class or to discuss any other issues related to Plant Physiology (fun discussions often arise this way). Although class discussions are very good, they also compromise our ability to move forward with the material and we may get behind schedule. This is acceptable to a point and I try to find a happy medium where we can have discussions but at the same time cover most of the material. This is why the class schedule is only tentative. I will not post class lectures on EREs, but I will post outlines and graphics so it is easy for you to take notes. I also post study guides and, when necessary, new material used in class before each exam on EREs.

What to expect:
Students generally like this course, but they invariably say that it is hard. Two main reasons make it hard: 1) there is an incredible amount of basic, core material to cover in an introductory plant physiology course; and 2) the material is inherently difficult and complex because it deals with thermodynamics, organic chemistry, cellular biology, molecular biology and a long array of disciplines that are not necessarily intuitive. My point is not to discourage students, but simply to alert students that this is a course that requires commitment. Studying the day before the exam will most likely not be enough. However, if you prepare correctly, you have a high chance of doing well.

Some recommendations:

- Take good notes in class. I will not post lectures on EREs.
- After each lecture or at the end of each main topic rewrite your notes (with an emphasis on understanding) according to your own style of learning. Prevent the accumulation of material to study.
- After rewriting the notes for each main topic, go over the review questions (there may be up to 100 or so per topic!) and have a sense of how easily you could answer them. If you are having a hard time for most of the questions, then you may need to revise your notes and study more. If you can answer most of the questions you are well prepared.
- To help nail down the most important core concepts, try to summarize all your notes before a given exam into a 1 or 2 page condensed summary. This really forces you to focus and extract the core concepts. Again, keep in mind that understanding rather than memorization is the emphasis.
- If, after studying, there are questions which you still do not know how to answer, then come and see me during office hours or make an appointment.
- Going over study questions in groups can be very fun (sort of an academic trivia) and productive.

Depending on student demand, we may dedicate some office hours to discussing questions as a group.

I write exams trying to emphasize understanding. This should not be misleading, however. Generally, if you do not know the facts, then there is little to understand. Therefore, knowing the facts precedes understanding. Exam answers should give evidence of both knowledge and understanding. Students must include the most important points in their answers and they must provide a clear and succinct explanation of why important points are important. As in real life, 'good enough' is not enough. If you aim for an A, your work needs to be excellent on all accounts (content, evidence of understanding *and* writing).

Grading: In addition to four short quizzes (or something equivalent; 25 points each), there are two regular session exams and a final exam. The final exam is partially comprehensive. Exams consist of a few very short questions and relatively short essay questions. Short essay questions can be to explain certain processes, interpret some results or make predictions based on information given. Graduate students are also required to write a research review (Guidelines will be provided) on plant responses to climate change. The review is due on the last day of classes.

Make-up exams will be permitted only with compelling and supported reasons. No make-up exams will be permitted without arrangements prior to the scheduled exam. No early final exams will be given, so make any travel plans accordingly. Only students registered with DSS (contact DSS in Lommasson 154) will be considered for disability accommodation during exams. Please contact me one week before each exam if you require any service through DSS.

- Exam 1: 100
- Exam 2: 100
- Final Exam: 150
- Quizzes: 100
- **Total: 450**

Students taking the lecture (450 points) and the lab (210 points) should view them as a single 4-credit course and **will receive the same combined grade for both** where the lab is 30% of the grade.

Letter grade assignments are as usual. A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69 and F < 60%.

Adds, drops and changes of grade: I will follow university policies on drops, adds, and changes of grade. Please check the Registrar's Office Calendar for important deadlines and dates after which course changes are not automatically approved. Requests to drop a course or change the grade basis to benefit a student's grade point average will not be approved. A grade of C or higher will be considered passing for the P/NP option.

Tentative schedule: The table below provides a tentative schedule. Note the quiz/assignment dates may change depending on where we are (I will let you know if so) but exam dates will NOT change. Also note that chapters marked with an asterisk will not be covered in detail during lecture. Reference to these chapters will be made when discussing the corresponding lecture topics.

TENTATIVE LECTURE & QUIZ SCHEDULE

Week	Dates	Topic	Chapter (5^{th} ed.)
1	Jan. 27	Introduction, Characteristics of plants	
1	Jan. 29	Overview plant cells	1
2	Feb. 3	Overview plant cells	1
2	Feb. 5	Cell walls	15
3	Feb. 10	Cell walls	15
3	Feb. 12	Water relations. **Quiz/Assignment**	3, 4, 26*
4	Feb. 17	Water relations	3, 4, 26*
4	Feb. 19	Water relations	3, 4, 26*
5	Feb. 24	Mineral nutrition	5, 26*
5	Feb. 26	**EXAM 1**	
6	Mar. 3	Mineral Nutrition	5, 26*
6	Mar. 5	Solute Transport	6
7	Mar. 10	Photosynthesis: light reactions. **QUIZ/Assignment**	7
7	Mar. 12	Photosynthesis: light reactions	7
8	Mar. 17	Photosynthesis: dark reactions	8
8	Mar. 19	Photosynthesis: dark reactions, ecophysiology	8, 9, 25*
9	Mar. 24	Phloem transport	10
9	Mar. 26	**Exam 2**	
10	3/31-4/2	SPRING BREAK	
11	Apr. 7	Respiration	11
11	Apr. 9	Nitrogen Assimilation	12
12	Apr. 14	Secondary Metabolism. **QUIZ/Assignment**	13
12	Apr. 16	Secondary Metabolism	13
13	Apr. 21	Phytochrome	17
13	Apr. 23	Blue light Responses	18
14	Apr. 28	Flowering. **QUIZ/Assignment**	25
14	Apr. 30	Hormones	19-24
15	May 5	Hormones	19-24
15	May 7	Hormones	19-24
16	May 14	**FINAL EXAM (8:10-10:10)**	