



Course Syllabus: Plant Physiology & Adaptation - PS 202

Division	Biological and Environmental Sciences & Engineering Division
Course Number	PS 202
Course Title	Plant Physiology & Adaptation
Academic Semester	Spring
Academic Year	2018/2019
Semester Start Date	01/27/2019
Semester End Date	05/23/2019
Class Schedule (Days & Time)	01:00 PM - 02:30 PM Mon Thu

Instructor(s)				
Name	Email	Phone	Office Location	Office Hours
Mark Alfred Tester	Mark.Tester@KAUST.EDU.S A	+966128025258	3233, 2, Ibn Al-Haytham (bldg. 2)	I can be contacted any time by email, at mark.tester@kaust.edu.sa . We can usually make a time talk within 24 hours, either directly or via Skype.

Teaching Assistant(s)	
Name	Email

Course Information	
Comprehensive Course Description	In this course, a broad overview of plant structure and function will be provided. The course will start with an introduction to plant architecture and anatomy, then move on to cover the fundamental plant processes of water and nutrient transport, and the central plant operations of photosynthesis and C metabolism. Control of stomatal apertures will be studied in more depth, as will the translocation of photosynthates in the phloem, culminating with a look at lipid metabolism and the assimilation of inorganic nutrients. There will then be a significant section on plant development, introducing the processes of how plants grow. The course will then move on to a more detailed examination of plant responses to the environment, and how plants adapt to abiotic stresses in their environment.
Course Description from Program Guide	The aim of this course is to provide an overview of plant structure and function, covering a range of plant processes such as water and nutrient transport and the central plant operation of photosynthesis and C metabolism. The course will end with an introduction to the interactions of plants with their environment, studying responses to challenges from both the biotic and abiotic world.
Goals and Objectives	By the end of this course, students will have a good fundamental knowledge of several aspects of plant function, and will be able to apply this to understand mechanisms employed by plants to tolerate a range of abiotic stresses.
Required Knowledge	A basic knowledge of chemistry is assumed, and the fundamentals of molecular and cellular biology are required. No previous knowledge of plants is necessary.
Reference Texts	The course will closely follow the textbook: "Plant Physiology and Development", 6th ed. by Lincoln Taiz, Eduardo Zeiger, Ian Møller, Angus Murphy (2015, Sinauer).

Method of evaluation	40.00% - Research Project 30.00% - Scientific review article presentation 30.00% - Exam 1
Nature of the assignments	Students will present several informal oral presentations through the course, based on the material presented in the textbook. In addition, students will give an oral presentation of a research paper; submit a written research proposal, and complete an exam at the end of the course.
Course Policies	Unexplained absences for any class will result in 1 percentage point being deducted from the final grade.
Additional Information	

Tentative Course Schedule

(Time, topic/emphasis & resources)

Week	Lectures	Topic
1	Mon 01/28/2019 Thu 01/31/2019	Introduction to the course Plant and cell architecture
2	Mon 02/04/2019 Thu 02/07/2019	Water and Plant Cells, water balance of plants Discussion: research proposal, paper presentation
3	Mon 02/11/2019 Thu 02/14/2019	Mineral Nutrition Solute Transport
4	Mon 02/18/2019 Thu 02/21/2019	Photosynthesis and processing the products: - Photosynthesis: The Light Reactions - Photosynthesis: Carbon Reactions; physiol & ecol
5	Mon 02/25/2019 Thu 02/28/2019	- Stomatal Biology - Translocation in the Phloem
6	Mon 03/04/2019 Thu 03/07/2019	Respiration: lipids; inorganic nutrient assimilation Tutorial - Q&Q, discussion of papers being studied
7	Mon 03/11/2019 Thu 03/14/2019	Tutorial - Time to consult and prepare for presentations PRESENTATIONS of research papers by students
8	Mon 03/18/2019 Thu 03/21/2019	Cell Walls: Structure, Formation, and Expansion Cell cycle and vegetative growth
9	Mon 03/25/2019 Thu 03/28/2019	Control of flowering, floral development Senescence and death
10	Mon 04/01/2019 Thu 04/04/2019	Spring Break - No classes
11	Mon 04/08/2019 Thu 04/11/2019	Embryogenesis Seed dormancy, germination, seeding establishment
12	Mon 04/15/2019 Thu 04/18/2019	Responding to the environment - abiotic stresses High and low light High and low temperature
13	Mon 04/22/2019 Thu 04/25/2019	Low nitrogen - incl. N ₂ fixation Low phosphorus - incl. mycorrhizal fungi
14	Mon 04/29/2019 Thu 05/02/2019	Acidic soils - Al toxicity; heavy metal toxicities Low water
15	Mon 05/06/2019 Thu 05/09/2019	Excess water Saline soils
16	Mon 05/13/2019 Thu 05/16/2019	Saline soils Tutorial session, on research proposals
17	Mon 05/20/2019 Thu 05/23/2019	Tutorial - Q&A, exam preparation Exam

Note

The instructor reserves the right to make changes to this syllabus as necessary.