American University of Beirut
Faculty of Arts and sciences
Department of Biology
Course Number and Title: BIOL 270 Plant Physiology

Fall semester 2009-2010

Instructor: Elias Baydoun
Office: Biology Bldg. Room 319
Office Hours: TTh 11:00 am - 12:00 noon or by appointment.
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Meeting Time: TTh 08:00 - 09:15 am
Place: Biology Bldg Room 004
Course Pre-requisite: Biol 220

1.Course Learning Outcomes

Students successfully completing the course will be able to:

1. Realize the importance of plants in the existence and development of humans.
2. Explain how plant physiology deals with plant processes and functions, their response to the environment, as well as detail the experimental methods by which plant research advances.
3. Understand structure-function relationships of plant cells.
4. Describe the unique physical and chemical properties of water that make it suitable for life.
5. Explain the physical processes that underpin water movement and transpiration in plants and the concept of water potential.
6. Describe how photoassimilates and nutrients are translocated and distributed in plants.
7. Describe the nutritional requirements of plants and nutrient assimilation, with special emphasis on the roles of nitrogen and sulfur.
8. Explain the major processes of the biochemical nitrogen cycle.
9. Explain how solar energy is trapped by plants and used to synthesize organic compounds.
10. Describe the role of the chloroplast in photosynthesis, detailing both light and carbon reactions.
11. Describe how plant cells grow and overcome constraints on cell expansion.
12. Describe the principal stages of plant development and the kinetics of plant growth.

2.Resources Available to Students

Textbook

Taiz, L. and Zeiger, E. 2006. *Plant Physiology*. 4th ed. Sinauer Associates, Inc. Publishers.

Other Resources

Hopkins, G. and Huner, N. 2008. *Introduction to Plant physiology.* 4th ed. John Wiley & Sons.

Scott, P. 2008. *Physiology and Behaviour of Plants*. John Wiley & Sons.

3.Grading Criteria

Midterm Exam	November 25, 2009	20%
Term paper & presentation		20%
Laboratory		20%
Final Exam		40%

4.Schedule

Week	Topic	Assignments
1 & 2	**A. INTRODUCTION**	
	The science of plant physiology	
	Plant cells: structure and function	chapter 1
	Energy and enzymes *	2
	B. TRANSPORT AND TRANSLOCATION	
3	Water as a plant constituent	3
3	Absorption and translocation of water	4
4	Water loss: transpiration and stomatal physiology	4
4	Ion uptake	6
5	Mineral nutrition	5
5	Translocation in the phloem	10
	C. PLANT METABOLISM	
6	Assimilation of mineral nutrients	12
7	Photosynthesis: pigments and photosynthetic apparatus	7
7	Photosynthesis: the light reactions	7
8	Photosynthesis: carbon reactions	8
8	Photosynthesis: physiological and ecological considerations	9
9	Secondary metabolites and plant defense	13
	D. GROWTH AND DEVELOPMENT	
10	Gene expression and signal transduction*	14
10	Cell walls: structure, biogenesis and expansion	15
11	Interpretation of growth and development	16
11 - 13	Plant growth regulators (auxins, gibberellins, cytokinins, ethylene, abscisic acid & brassinosteroids)	19-24
14	The physiology of flowering	25
14	**E. STRESS PHYSIOLOGY**	26

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* Content available at www.plantphys.net