The Hashemite University
Faculty of Natural Resources and Environment
Department of Lands Management and Environment

Soil-Plant-Water Relations (111202410)

3 Credit hours (3 h lectures). Allow the student to understand the relatinships between soil, plant and water and track water molecules along the SPAC.

Textbooks

Seleshi, B., Philippe, L., Taffa, T. Soil–plant–water relationships, model 3. Jan, 2009. Available at: https://ilri.org/InfoServ/Webpub/fulldocs/IWMI_IPMSmodules/Module_3.pdf. Retrieved Sep 22, 2014.

Blum, A. (2011). Plant breeding for water-limited environments. Chapter 2. New York, NY: Springer. Available at: http://www.springer.com/978-1-4419-7490-7

Instructor's Information

Instuctor: Dr. Salman Al-Kofahi
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Office hours: 11-12 SUN-TUE- THU

Prerequisites

Prerequisites by topic	
Prerequisites by course	**Environmental soil physics (111202310)**
Co-requisites by course	
Prerequisite for	

Topics Covered

Week	Topics	Chapter in Text
1	Introduction to soil, and soil-plant-water relationship	1
2-3	Crop water needs and climatological factors	2
4-6	Irrigation scheduling and plant growth stages	3
7-9	Understanding the Soil-Plant-Atmosphere Contiuum	4
10-14	Understanding the reference evapotranspiration and plant coefficients	5

Evaluation

Assessment Tool	Expected Due Date	Weight
Homework & Quizzes	The next class of assignment	10%
First Exam	According to the University first examination schedule	25 %
Second Exam	According to the University second examination schedule	25 %
Final Exam	According to the University final examination schedule	40 %

Course Learning Objectives [1]

Objectives	Details
1. Understand the soil compostinon and how water interact with soils and plants: [a, b, j, k, l]	1.1. Introduction to soil-plant-water relationships. [b, l] 1.2. Discriminate between soil structure, texture, and soil profile. [k] 1.3. Understand the infiltration rate of different soil structures. [b, k] 1.4. Calculate the available water content in soil, state and explain the

[1] Lower-case letters in brackets refer to the Student outcomes

	climate factors that affect crop water needs [a, b] 1.5. Calcualte the water requirement of crops based on land area. [a, b, j, l]
2. Understand the relationship between water and plants . [b, j, l]	2.1. Understanding the sensitivity of crops developmental stages to water shortage. [b, e, l, j] 2.2. Understanding the energy effects plant water status. [b, j] 2.3. Description of the resistances faced by water molecules along the root, stem, and leaves. [b, l] 2.4. Familiarize the students with the water potential gradient and other physiological factors interfereing with plant water uptake. [b, l, j]
3. Understand the relationship between plant, atmosphere and the relations along the SPAC (soil-plant-atmosphere-Continum). [a, b, e, j, k, l]	3.1. Identify the differences between evaporation and transpiration. [b, k] 3.2. Understand the reference evapotranspiration and crop evapotranspiration. [b, e, l] 3.3. Draw and explain the relationship between evaporation, transpiration and leaf area index . [b, j, k] 3.4. State the factors affecting evapotranspiration. [b, k] 3.5. Calucate the plant water requirments based on reference evapotranspiration and plant coefficients. [a, b, j]

Contribution of Course to Meeting the Professional Component

The student gains knowledge about the relationship between plant-water-soil along the APAC and how to estimate the crops water needs and factors affecting that need.

Relationship to Program Outcomes (%)

A	B	C	D	E	F	G	H	I	J	K	L	M
15	25			10					15	20	15	

Relationship to Lands Management Program Objectives

PEO1	PEO2	PEO3	PEO 4
√	√		√

Prepared by: Dr. Salman Al-Kofahi
Time of lecture: 1-2 pm SUN-TUE- THU
Location: ع 112
Last Modified: Nov. 25th 16

PEO:

1. Our graduates will have successful professional careers in industry, government, academia and environmental rangers as innovative agriculture engineers specialized in soil, plant, water and environmental related issues.
2. Our graduates will be successful in solving agro-environmental problems associated with land and water towards sustainably-managed environment and natural resources.
3. Our graduates will be qualified to continue in the learning process and achieve higher professional knowledge and experience that supports their leadership skills and their advances in their career.
4. Our graduates will be open to the community and urged to help and participate in local, regional and international services to control, monitor and assess the agro-environmental risks.