



**Jordan University of Science and Technology**  
**Faculty of Agriculture**  
**Natural Resources & Environment Department**

NR306 Soil-Water-Plant Relations

Second Semester 2021-2022

**Course Catalog**

3 Credit Hours. The main objective of this course is to introduce the students to the basic concepts of soil-water, plant-soil, and plant-water relations. Soil and water properties and functions. Water retention and transport in soil. Soil-plant-atmosphere continuum. Physical, biochemical, and environmental processes in soil-plant-water relations. Plant roots and water flux in the soil-root continuum, Evapotranspiration, Water use efficiency. Response of plants to environmental stresses.

**Text Book**

<b>Title</b>	Water Relations of Plants and Soils
<b>Author(s)</b>	Kramer, P. J. and J. Boyer
<b>Edition</b>	2nd Edition
<b>Short Name</b>	REF#1
<b>Other Information</b>	

**Course References**

Short name	Book name	Author(s)	Edition	Other Information
REF#2	Plant Physiological Ecology.	Lambers, H., Chapin III, F.S, and Pons, T.L.	2nd Edition	
REF#3	Plant physiology and Development.	Taiz, L, Zeiger E, Moller, I.M and Murphy A.	6th Edition	

**Instructor**

Name	<b>Prof. Osama Mohawesh</b>
Office Location	-

Office Hours	Sun : 12:00 - 14:00 Mon : 10:00 - 12:00 Tue : 12:00 - 14:00 Wed : 10:00 - 12:00
Email	oemohawesh@just.edu.jo

<b>Class Schedule &amp; Room</b>	
Section 1:	Lecture Time: Mon : 10:00 - 11:30 Room: C5020
Section 2:	Lecture Time: Wed : 10:00 - 11:30 Room: C5020

<b>Tentative List of Topics Covered</b>		
<b>Weeks</b>	<b>Topic</b>	<b>References</b>
Week 1	Course Introduction	From <b>REF#1</b> , From <b>REF#2</b> , From <b>REF#3</b>
Week 1	Soil Functions and Properties	From <b>REF#1</b> , From <b>REF#3</b>
Week 2	Water functions and Properties	From <b>REF#1</b>
Week 2	Plants : Root and Root System	From <b>REF#1</b> , From <b>REF#2</b>
Week 3	Cell Water Relations	From <b>REF#1</b> , From <b>REF#2</b> , From <b>REF#3</b>
Week 4	The absorption of water, root & Stem pressures	From <b>REF#1</b> , From <b>REF#3</b>
Week 5	Transpiration and the Ascent of Sap	From <b>REF#1</b> , From <b>REF#3</b>
Week 6	Stomata and Gas Exchange	From <b>REF#1</b> , From <b>REF#3</b>
Week 7	Water Use Efficiency and its application in crop water management	From <b>REF#1</b> , From <b>REF#2</b> , From <b>REF#3</b>
Week 8	Response of plants to environmental stresses	From <b>REF#1</b> , From <b>REF#2</b> , From <b>REF#3</b>

<b>Mapping of Course Outcomes to Program Student Outcomes</b>	<b>Course Outcome Weight (Out of 100%)</b>	<b>Assessment method</b>
The students will be able to fully understand how soil solution (water and solutes) moves through the soil. 10	10%	
The students will learn about the factors affecting water movement in the soil.	20%	
The students will be able to understand the mechanisms of water movement from the soil to the plant through the root system.	20%	
The course will provide student with the knowledge on the mechanisms of water movement through the shoot up the stem throughout the leaves.	15%	
Students are taught the physiological processes such as transpiration through the plant.	20%	
In addition, students will be introduced to the concept of water use efficiency and the environmental stresses (water, nutrient, radiation, temperature stresses, and plant competition) affecting plant soil water relationship. 15	15%	

<b>Relationship to Program Student Outcomes (Out of 100%)</b>								
PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9

<b>Evaluation</b>	
<b>Assessment Tool</b>	<b>Weight</b>
Midterm	50%
Final Exam	50%

<b>Policy</b>	
Exams	All exams are closed book and notes. The final exam is comprehensive (covering all teaching materials). Incomplete exams need approval from the department chair and the faculty dean.
Cheating	Prohibited; and in case of cheating the student will be subject to punishment in according with the university regulations
Attendance	Students are expected to attend all class meetings regularly. If the student is absent for more than 20% of the course, the student will be prevented from taking all subsequent exams and assigned an F (Failure) grade in the course (deprived by absence). This maximum includes both excused and unexcused absences.
Participation	Participation is highly encouraged
Withdraw	The student can withdraw from the course in accordance with the timeline defined by the university regulations