

Jordan University of Science and Technology
Faculty of Agriculture
Department of Natural Resources & the Environment
First Semester 2006/2007
Course Syllabus

Course Information	
Course Title	Advanced Soil Chemistry
Course Code	NR 711
Prerequisites	
Course Website	
Instructor	Dr. Zahir Rawajfih
Office Location	
Office Phone #	
Office Hours	
E-mail	
Teaching Assistant(s)	
Course Description	

Textbook	
Title	<i>Environmental soil chemistry.</i>
Author(s)	Sparks , D.L.
Publisher	Academic Press.
Year	1995
Edition	
Book Website	
Other references	Will be given throughout the course.

Assessment		
Assessment	Expected Due Date	Percentage
Midterm Exam		30%
Final Exam		40%
Assignments		
Participation		30%

Attendance		
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Course Objectives
To facilitate a basic understanding of soil chemical reactions and how the soil relates chemically to the environment; to enhance the student's ability to think and analyze problems; to understand the historical role of soil as a medium of plant growth; and to familiarize the student with literature in the field of soil chemistry, through individual literature search projects and presentations.

Teaching & Learning Methods

Learning Outcomes: Upon successful completion of this course, students will be able to		
Related Objective(s)		Reference(s)
1		Chapter 2 and Handouts
1,2		
1-6		
3,4		
5,6		
6		
5		

Useful Resources

Course Content		
Week	Topics	Chapter in Textbook (handouts)
1	Introduction Characteristics of the soil system Types of reactions in soil chemistry Application of chemical thermodynamics to soils Kinetic Vs thermodynamic approach to changes and equilibrium Basic thermodynamic relationships Redox potential and equilibrium constant Kinetic models	
2	The Soil solid phase Primary soil minerals Secondary soil minerals Specific surface of soil minerals Surface charge of soil minerals Cation exchange capacity of secondary soil minerals Organic components	
3	The Soil solution phase Chemical principles Soil solution characteristics Speciation of soil solution Precipitation-dissolution Ion activity and activity coefficients	
4	Soil Solution-Solid Phase interface Sorption phenomena on soils Adsorption isotherms Ion exchange processes Cation exchange equilibrium constants and selectivity coefficients	
5	Carbonate system	
6	Soil phosphates	
7	Stability diagrams	

Additional Notes

