

Republic of Iraq  
The Ministry Of Higher  
Education  
& Scientific Research



University: Diyala  
College: Agriculture  
Department: Soil and Water  
Resources Department  
Stage: Third  
Lecturer name: Dr. Raad  
Abdel-Kareem Al-Tamimi  
Qualification: Ph. D.

Course Instructor	Prof. Dr. Raad Abdel-Kareem Al-Tamimi				
E-mail	<a href="mailto:raadaltamimi@uodiyala.edu.iq">raadaltamimi@uodiyala.edu.iq</a>				
Title	Soil Mineralogy				
Course Coordinator	Third class				
Course Objective	Definition of Soil mineralogy to 3 <sup>rd</sup> class student at soil science and Water Resources Department at the college of Agriculture.				
Course Description	The curriculum items included an introduction to soil mineralogy, The importance of studying soil mineralogy, Concept of origin and formation of primary and secondary soil minerals , Identifying the crystal structure of minerals, General classification of minerals and construction of silicate minerals, Studying of some primary and clay minerals groups, Soil problems associated with the type of clay minerals				
Textbook	J.B. Dixon (editors), 1979, Minerals in Soil Environment. American Minerals Society and American Soil Sci. Society.				
Course Assessments	Term Tests	Laboratory	Quizzes	Project	Final Exam
	20%	15%	5%		60%
General Notes					

week	Date	Topics Covered	Practical Part
1		The concept of soil Mineralogy and its relationship to soil properties.	Methods of taking soil samples for mineralogical studies.
2		Magma and its components, Bowen series.	Removal of cementing agent: 1- Removal of carbonate
3		Crystallography, Crystallization processes and crystal system, crystal axes.	Removal of cementing agent: 2- Organic matter oxidation
4		Construction system of silicate minerals	Removal of cementing agent: 3- Free oxides removal
5		Unit cell, Tetrahedral and octahedral units	Sand separation by wet sieve.
6		Mineral composition of sand and silt fractions	Separation of heavy and light minerals
7		Mineral composition of clay minerals:	Examination of heavy and light minerals by optical microscope
8		Electrical negativity, Ionization energy, Isomorphism and polymorphism.	Methods of studying and clay mineral identification
9		Mineral classification	Separation of clay from silt by siphon or centrifugation
10		Types of charges on clay mineral surfaces, isomorphous substitution	Saturation of clay sample with Mg and K
11		Kaolinite group: General characteristics and formation, method of identification.	Slide of clay sample preparation for XRD examination
12		Mica, Illite and Vermiculite: General characteristics and formation, method of identification.	Brag's law, basal space of minerals, X-ray incident angle
13		Smectite clay minerals: General characteristics and formation, method of identification.	X-ray diffraction exam and clay mineral identification
14		Chlorite minerals: General characteristics and formation, method of identification.	
15		Fibrous minerals	Calculating the area under peaks to determine minerals dominance