

Course Description Form of Soil Mineralogy

1. Course Name:	
Soil Mineralogy	
2. Course Code:	
SOMI313	
3. Semester / Year:	
Second semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Prof. Dr. Raad Abdel-Kareem Himdan Email : raadaltamimi@uodiyala.edu.iq	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	<ol style="list-style-type: none">1 It deals with primary and secondary minerals of soil.2 Study the concept of primary and secondary soil minerals origin.3 The student will learn the crystallography of soil minerals.4 Teach the general classification of minerals and silicates minerals structure.5 Study some primary minerals and clay minerals and its importance in soil..
9. Teaching and Learning Strategies	
Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure**Theoretical part**

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	2	The importance of studying soil mineralogy and their relation with soil properties.	Soil Mineralogy	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
2	2	Minerals – classification of minerals- components of earth crust	Soil Mineralogy	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
3	2	Magma – chemical composition of magma – crystallization process and formation of primary minerals	Soil Mineralogy	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
4	2	Crystal structure of minerals: Unit cell – types of chemical bonds	Soil Mineralogy	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
5	2	Ionization energy- electrical affinity - electronegativity- isomorphism- polymorphism	Soil Mineralogy	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
6	2	Semester 1 st exam			
7	2	Unit cell of silicate structure- Tetrahedra - Octahedra	Soil Mineralogy	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
8	2	Silicate minerals structure systems	Soil Mineralogy	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
9	2	Primary soil minerals: Quartz, Feldspars, Olivine, pyroxenes, amphiboles	Soil Mineralogy	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
10	2	Clay mineralogy: Amorphous clay minerals, 1:1 crystalline clay minerals	Soil Mineralogy	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
11	2	2:1 crystalline clay minerals: Mica, its structure, types and properties	Soil Mineralogy	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
12	2	Semester 2 nd exam			
13	2	Smectite minerals: formation, types, importance and its relation with soil properties	Soil Mineralogy	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
14	2	Soil chlorites: types and identification – Fibrous clay minerals	Soil Mineralogy	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports

Practical part

Week	Hours	Required learning outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	3	Soil sampling and preparation for analysis	Soil Mineralogy	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
2	3	Sand separation by wet sieving	Soil Mineralogy	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
3	3	Heavy and light minerals separation	Soil Mineralogy	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
4	3	Glass slide preparation for examination of heavy and light minerals	Soil Mineralogy	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
5	3	Examination of heavy and light minerals by optical microscope	Soil Mineralogy	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
6	3	Semester 1 st exam			
7	3	Cementing agent removal from soil sample: removal of carbonate & OM	Soil Mineralogy	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
8	3	Cementing agent removal from soil sample: removal of free iron oxides	Soil Mineralogy	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
9	3	Separation of silt from clay	Soil Mineralogy	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
10	3	Soil separates saturation with Mg	Soil Mineralogy	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
11	3	Preparation of glass slides for XRDA	Soil Mineralogy	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
12	3	Semester 2 nd exam			
13	3	Bragg's law	Soil Mineralogy	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
14	3	XRDA & identification of clay minerals in specimen	Soil Mineralogy	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports

11. Course Evaluation

Examination Monthly & daily exams with discussion questions inside the lecture.
The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources

Required Textbooks (Curricular Books, If Any)	Dixon, J.B. et. al., 1989. Minerals in Soil Environment. S.S.S.AM
Main References (Sources)	
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic journal
Electronic References, Websites	www.noor-book.com . www.youtube.com .