

## Course Description Form

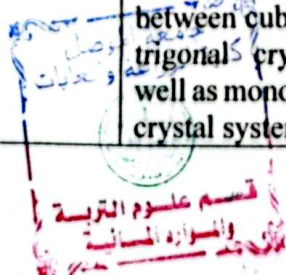
1. Course Name:	
Soil Minerals	
2. Course Code:	
SOMI356	
3. Semester / Year:	
The Second Spring Semester	
4. Description Preparation Date:	
2025/2/1	
5. Available Attendance Forms:	
My presence + electronic	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 theoretical +3 practical /3.5 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Abdalkader Absh Shak	
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Name: Ahmed Sameer Ghanim	
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8. Course Objectives	
<p><b>Course Objectives</b></p> <p><b>Theoretical :</b></p> <p>1- Enabling the student to understand And comprehend the relationship Between the crystal and its systems And axes</p> <p>2- Enabling the student to know the structural composition of silicate minerals</p> <p>3- Enabling the student to understand and know the most important structural properties of minerals</p> <p style="padding-left: 20px;">- Clay</p> <p>4- Identify the transformations that occur in clay minerals</p>	<p><b>practical :</b></p> <p>- Enabling the student to recognize the most important methods of detection Identification of clay minerals and procedures for diagnosing minerals the soil</p> <p>Enable the student to identify the crystalline structure of minerals</p>
9. Teaching and Learning Strategies	
<p><b>Strategy</b></p> <p><b>Theoretical:</b></p> <p>- The lecture is interactive</p>	<p><b>practical :</b></p> <p>- Assigning group work to reveal</p>



<ul style="list-style-type: none"> <li>- Brainstorming</li> <li>- Dialogue and discussion</li> <li>- Assigning tasks and reporting</li> <li>- Presentations of models of clay samples mounted on slides</li> </ul> <p>The student is assigned to prepare a report entitled from his own diligence and prepare it for discussion With the students</p>	<p>skills</p> <p>Leadership</p> <ul style="list-style-type: none"> <li>- Assigning tasks and reporting for each experiment</li> </ul>
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## 10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2Theoretical	A1: The student identifies the most important rocks that make up the Earth's crust. B1: The student distinguishes between types of rocks (igneous, sedimentary, metamorphic). B2: The student distinguishes between chemical and physical weathering.	Mineral composition of the Earth's crust	Interactive lecture, brainstorming, dialogue discussion, self-learning	Midterm Exam 1, Final Exam
	3practical	C7: The student collects various soil samples. C8: Grinds and sieves soil samples. C9: Prepares soil samples for mineral analysis.	Preparing soil samples for mineral analysis	Interactive lecture, brainstorming, dialogue and discussion, field training, self-learning	Short practical 1
2	2Theoretical	A2: The student identifies the main parts of a crystal. C1: The student describes crystal axes with a diagram.	Crystal structure of minerals	Interactive lecture, brainstorming, dialogue discussion, self-learning	Midterm Exam 1, Final Exam
	3practical	C10: The student uses the siphon method to separate clay from the other separates.	Clay separation	Interactive lecture, brainstorming, dialogue and discussion, field training, self-learning	direct drawing
3	2Theoretical	A3: The student differentiates between crystal systems by the number of faces, axis length, and interfacial angle. A4: The learner differentiates between cubic, hexagonal, trigonal crystal systems, well as monoclinic and triclinic crystal systems.	Crystal systems	Interactive lecture, brainstorming, dialogue discussion, self-learning	Midterm Exam 1, Final Exam





	3practical	C11: The learner uses distilled water to wash the soil from salts.	Removal of dissolved salts	Interactive lecture, brainstorming, dialogue and discussion, field training, self-learning	Field evaluation
4	2Theoretical	B3: The student uses relationship between arrangement of atoms make up a mineral crystal. Determine the type of bond the strength and hardness of mineral.	Structural composition of minerals	Interactive lecture, brainstorming, dialogue discussion, self-learning	Midterm Exam, Final Exam, Report
	3practical	C12: The student removes carbonate minerals using HCl. A12: The student uses a hydrogen peroxide solution to remove organic matter.	Removal of calcium carbonate and organic matter	Interactive lecture, brainstorming, dialogue and discussion, field training, self-learning	Short Practice Test 2, Direct Drawing
5	2Theoretical	A5: The student is familiar with the most important rules governing the distribution of ions in the minerals of the Earth's crust. B4: The student distinguishes silicate minerals based on type of structural unit.	Structural composition of silicate minerals	Interactive lecture, brainstorming, dialogue discussion, self-learning	Midterm Exam, Final Exam, Report
	3practical	C13: The student uses DCE to remove iron oxides from the clay separator.	Removal of iron oxides	Interactive lecture, brainstorming, dialogue and discussion, field training, self-learning	Field evaluation
6	2Theoretical	B5: The student judges the type of clay mineral from a soil sample. B6: The student distinguishes primary minerals from secondary minerals by their resistance to weathering.	soil minerals	Interactive lecture, brainstorming, dialogue discussion, self-learning	short test, final test
	3practical	B11: The student examines clay slices with an X-ray machine.	Preparing clay slices for examination	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Live drawing homework
7	2Theoretical	A6: The student differentiates between silicate minerals	Silicate Minerals	Interactive lecture, brainstorming, dialogue	Midterm Exam 2, Final Exam

		the number of tetrahedral and octahedral units.		discussion, learning	
	3practical		Mineralogical analysis of clay	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, field project, self-learning (scientific visit to the College of Earth Sciences)	Field Project (Scientific Visit to the College of Earth Sciences)
8	2Theoretical	B7: The student distinguishes silicate minerals from non-silicate minerals through silicon dioxide.	non-silicate minerals	Interactive lecture, brainstorming, dialogue, discussion, learning	Short exams, assignments, discussions
	3practical	A14: Classify clay minerals during a magnesium saturation and air-drying treatment. A15: Classify clay minerals during a magnesium saturation and ethylene glycol treatment. A16: Classify clay minerals during a potassium saturation and air-drying treatment. A17: Classify clay minerals during a potassium saturation and heating at 350°C. A18: Classify clay minerals during a potassium saturation and heating at 550°C. A19: The student identifies the types and proportions of clay minerals in a soil sample.	Practical application for diagnosing and calculating clay mineral ratios	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Live drawing and homework
9	2Theoretical	A7: The student understands the importance of clay minerals. C2: The student judges structural composition by the number of tetrahedral and octahedral units.	clay minerals	Interactive lecture, brainstorming, dialogue, discussion, learning	Midterm Exam, Final Exam
	3practical	A20: The student uses the washing and sedimentation method to separate sand. A21: The learner uses a light microscope to observe crystals of different colors and sizes.	sand separation	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Live drawing and homework





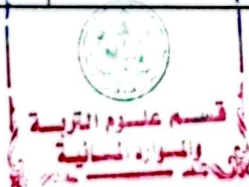
10	2Theoretical	A8: The student classifies minerals into crystalline and amorphous. B8: The student identifies expanded clay minerals with crystal dimension of 18 Angstroms.	Clay mineral classification	Interactive lecture, brainstorming, dialogue discussion, self-learning	Term 2 Exam
	3practical	A16: The student uses bromoform to separate coarse sand from fine sand.	Separating light and heavy minerals from heavy ones	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Live drawing and homework
11	2Theoretical	A9: The student classifies kaolinite as a non-expansive mineral. C3: The student identifies kaolinite by its 7 Angstrom reflectance.	Clay minerals 1:1	Interactive lecture, brainstorming, dialogue discussion, self-learning	Final exam
	3practical	C14: The student uses cannabalsam to stabilize sand grains.	Preparing sand slides for analysis	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Live drawing and homework
12	2Theoretical	A10: The student classifies smectite minerals as expansive minerals. C4: The student identifies smectite minerals by their 1 Angstrom reflection.	Clay minerals 1:2 (expanded)	Interactive lecture, brainstorming, dialogue discussion, self-learning	Final exam
	3practical	A22: The student identifies the type of charges through correction curves.	Estimation of permanent soil charges	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Live drawing and homework
13	2Theoretical	C5: Mica appears hexagonal under an electron microscope. C6: The student identifies mica minerals by their lamellar structure.	Clay minerals 1:2 (non-expanding)	Interactive lecture, brainstorming, dialogue discussion, self-learning	Final exam
	3practical	A23: The student distinguishes between variable charges and permanent charges by the degree of interaction of the medium.		Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Live drawing and homework



				exercises, self-learning	
14	2Theoretical	A11: The student identifies chlorite by the presence of a brucite layer. B9: The student identifies chlorite by the constant reflectance in all parameters 14 angstroms.	Clay minerals 1:1:2	Interactive lecture, brainstorming, dialogue discussion, self-learning	short test, final t
	3practical	B13: The student examines iron oxides extracted using chelating materials.	Estimation of total iron oxides in soil	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Short practical t 3
15	2Theoretical	B10: The student judges the transformations of clay minerals by hydrothermal reactions and weathering.	Clay mineral transformations	Interactive lecture, brainstorming, dialogue discussion, self-learning	short test, final t
	3practical	A24: The student uses an X device to examine crystalline iron oxides.	Estimation of crystalline iron oxide in soil	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, field project, self-learning	Field project

### 11. Course Evaluation

	Calendar methods	Calendar date (week)	degree	Relative weight %	
1	Final theoretical report + practical experience reports	My theory is 15 weeks My work is 15 weeks	7 theoretical + 6 practical	13%	
2	Short test (1) Quiz	week (3)	4 theoretical + 2 practical	6%	
3	Midterm Exam (theoretical and practical)	week (9)	10 theoretical + 5 practical	15%	
4	Short test (2) Quiz	week (12)	4 theoretical + 2 practical	6%	





5	Final practical test	Practical exams week	20	20%
6	Final theoretical test	The week of theoretical exams	40	40%
	total		100	100%

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

## 12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Soil Chemistry book, written by Kazem Mashhout 1986
Main references (sources)	
Recommended books and references (scientific journals, reports...)	The book (Soil Minerals) written by Prof. Dr. Salman is behind Iss
Electronic References, Websites	



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Chair of Scientific Committee



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Head of the Department

