Course Description Form of Organic matter in the soil

1. Course Name:	
Organic matter in the soil	
2. Course Code:	
ORMS305	
3. Semester / Year:	
first 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: Basem R.Bader Email: basemrbader@uodiyala.edu.iq	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	Studying the concept of defining organic matter, distinguishing between types of soil according to their organic content, identifying the transformations of organic matter, the relationship between the organic and mineral complex, the nature of the carbon groups and their implications for the agricultural and environmental value of the 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**	Defining organic matter and determining its origin and nature in the soil	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Distinguish between types of soils according to their organic content and its relationship to climatic and environmental conditions	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	. The concept of soil environment, biological activity, and the food web in it	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Processes of transformation of organic matter in soil, such as decomposition and mineralization	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Classification of organic matter in the soil according to the speed of its decomposition, the degree of its dissolution, and the ratio of carbon to nitrogen	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Factors affecting the formation of humus in soil	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	Soil environment, nature of the main components of organic matter and microbial mass	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Types of humus according to the type of vegetation cover, the degree of its solubility with alkaline	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

		solvents, and its saturation .with basic cations			
9	**2**	Physical and chemical properties of humic acids and humene	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	The organometallic complex and the relationship between active groups	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	The ratio of fulvic acid to humic acid in soil composition	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	The nature of carbon categories and their implications for the agricultural value of soils	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	How to preserve the organic stock in the soil and manage it sustainably	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	The necessity of fertilizing with animal waste and compost to preserve agricultural soil	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
15	**2**	Sustainable agriculture and its relationship with the environment and matter	Organic matter in the soil	**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**	Examining and distinguishing the organic layers in a cross-section of cultivated and uncultivated soils and collecting soil samples	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Prepare samples by sifting and grinding, then estimate soil moisture and calculate the dry weight at 105°C	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Estimating the percentage of organic matter in the soil by dry oxidation at 450°C	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

4	**3**	Measurement of organic carbon in soil using the wet oxidation method (Walkley Black)	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Extracting organic matter that is easy to decompose with cold and hot water	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Physical fractionation of organic matter in soil according to its bulk density with sodium iodide solution	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
7	**3**	Physical fractionation of organic matter in the soil according to its size by separating it using acoustic vibrations	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Chemical fractionation of organic matter in soil with alkaline and acidic solvents	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Qualitative analysis of humic substances through the identification of active aggregates by spectrophotometry	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Extracting fatty substances from the soil with chloroform using a Soxhlet device	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Testing the degree of solubility in water (wettability) of the extracted fatty organic matter	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Extraction of proteins and amino acids in soil using chromatography	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
13	**3**	Choose the speed of water permeation and soil erosion with different levels of organic content	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Applications in how to calculate the percentage of organic matter in the soil	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
15	**3**	Estimation of the percentage of humic acid	Organic matter in the soil	**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)	1-Soil Chemistry, Ahmed Abdel Hadi Al-Rawi, Ahmed Haider Al-Zubaidi, and Nazima Saleh Qaddouri, 1991, Ministry of Higher Education and Scientific Research 2-Tseel and Nelson, Soil Fertility and Fertilizers, translated by Nizar Yahya Nazhat, 1991, Ministry of Higher Education And scientific research
Main References (Sources)	Magdoff, F. and R.R.Weil.2004. Soil organic matter in sustainable agriculture. CRC
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic journal
Electronic References, Websites	**www.noor-book.com.** **www.youtube.com.**