Course Description Form of Soil Microorganisms

1. Course Name:	
Soil Microorganisms	
2. Course Code:	
SOIM410	
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: Faris Mohammed Suhail Email: farissuhail@uodiyala.edu.iq Assi. Teacher Asmaa Hussun Abid	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	1- Identify the groups of microorganisms that grow and are active in the soil. 2- Study the biochemical activities that take place in the soil, which lead to analysis of original and added organic materials to the soil and the preparatio nutrients for plants and the role of this in soil activity and productivity. 3- Identifying the environmental conditions that increase the activity of econo microorganisms and benefiting from them to improve soil fertility. 4- Identify the benefits of biofertilization to reduce the addition of chemical fertiliz and reduce costs and pollution. 5- Identify the possibility of using soil revitalizers to remove mineral and org pollutants from 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 Name	Learning Method	Evaluation Method
1	**2**	Historical overview, definition, importance of studying soil microbiology	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Sections of soil microbiology	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Soil microbial groups: bacteria, fungi, algae, actinomycetes, archaea, mycorrhizae.	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Organic matter: carbon cycle, enzymatic activity in soil	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Historical overview, definition, importance of studying soil microbiology	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	First Semester exam	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	Biological nitrogen fixation	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Biological transformations of phosphorus: its cycle and the role of microorganisms in its transformations	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Biotransformations of sulfur: sulfur cycle, mineralization, microbial metabolism, oxidation, and reduction of inorganic sulfur compounds.	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

10	**2**	Biotransformations of iron: oxidation, reduction, and decomposition of organic iron compounds	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	Decomposition of pesticides in soil	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	Relationships between microorganisms: the area surrounding the roots (rhizosphere) and the activity of microorganisms in this area	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	Relationships between microorganisms: the area surrounding the roots (rhizosphere) and the activity of microorganisms in this area	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Factors affecting the growth of microorganisms, growth of microorganisms	**Soil Microorganisms**	**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**	Methods of taking soil samples for microbiological studies, studying the function of microorganisms using the buried slide method	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Estimating the numbers of bacteria, actinomycetes, and fungi at different depths of soil using the serial dilution method (dilution and plate counting)	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Count and isolate algae and protozoa from soil	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Estimating the number of Azotobacter in different soils using the most probable MPN count method, isolating and	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

		purifying some species and studying their morphological properties.			
5	**3**	Measuring the speed of decomposition of organic compounds with different percentages of carbon and nitrogen in different soils	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Study of nitrogen transformations (nitrification and nitrification processes) in nutrient media and soil	**Soil Microorganisms**		
7	**3**	Isolating root nodule bacteria from different leguminous plants, studying their properties, then multiplying them, and conducting inoculation experiments with their leguminous plants.	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Isolating root nodule bacteria from different leguminous plants, studying their properties, then multiplying them, and conducting inoculation experiments with their leguminous plants.	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Study of biological sulfur transformations	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Study of biological phosphorus transformations, phosphate solubilizing biology	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	The role of microorganisms in the formation of soil aggregates	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	A study on bacteriophages in some soils	**Soil Microorganisms**		
13	**3**	The effect of some pesticides on the revival of displaced soil, especially economic soil	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Methods of isolating nematodes from soil	**Soil Microorganisms**	**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 Microbiology Revival, Radi Al-Rashidi, University of Basra, 1987
Main References (Sources)	2- Soil Microbiology, Ghayath Muhammad Qasim and Mudar Abdel Sattar. University of Mosul 1989
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic Journal
Electronic References, Websites	Soil Science Society of America Library Genesis