Course Description Form

1. Course Name:
Soil Microbiology
2. Course Code:
SOMI450
3. Semester / Year:
First fall semester / 2024-2025
4. Description Preparation Date:
1\ 9 \ 2024
5. Available Attendance Forms:
In presence
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: Dr. Rand Abdalhade Gazal M.Dr. Mohamad Ayad Harbawee M.Dr. Hesham Saadaldeen Yunis
8. Course Objectives

theoretical 1- Enabling the student to know the microorganisms in the soil 2- Identify the phenotypic characteristics of organisms in the soil 3- Learn how to diagnose bacteria 4- Introducing the student to the role of microorganisms present in the soil 5- Trying to enhance the student's skills in diagnosing and counting bacteria	Practical Enabling the student to count microorganisms in Soil and learning about the most important methods of sterilization Phenotypic and biochemical diagnosis For bacteria and fungi
9. Teaching and Learning Strategies	
Theoretical - Interactive lecture - Brainstorming - Dialogue and discussion - Assigning reports - Conducting monthly and daily examinations	Practical Interactive lecture -Discussion, dialogue, brainstorming -Conducting laboratory experiments -Assigning reports - Conducting daily and monthly examinations

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 Theoretical	Theoretical a1 The student demonstrates a concept Microbiology from the soil	theoretical Historical overview, definition of microorganisms, study of soil microbiology	Interactive lecture, brainstorming, dialo and discussion, self-learning	theoretical audio methods, Writing on the board Direct dialogue style
	3 practical	Practical b3 Taking soil samples and preparing slides	Practical Methods of taking soil samples for microbial studies, studying the function of microorganisms using the buried slide method	Interactive lecture, brainstorming, dialo and discussion, field training, practical exercises, field proje self-learning	practical Assigning tasks and reports
2	2 Theoretical	Theoretical b1 The student explains the most important sections of soil microbiology	Theoretical Sections of soil microbiology	Interactive lecture, brainstorming, dialo and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style
	3 practical	Practical c5 Counting microorganisms f the soil	Practical Estimating the numbers of bacteria, fungi, and actinomycetes at depth Different types of soil and method Serial dilutions (dilution and counting in dishes)	Interactive lecture, brainstorming, dialo and discussion, field training, practical exercises, field proje self-learning	practical Assigning tasks and reports
3	2 Theoretical	Theoretical a2 Identifying microbial groups	Theoretical Soil microbial groups, Bacteria, fungi, algae, actinomycetes, archaea, Mycorrhizal fungi	Interactive lecture, brainstorming, dialo and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style
	3 practical	Practical a10 Isolation of algae and protozoa from the soil	Practical Count and isolate algae and protozoa from the soil	Interactive lecture, brainstorming, dialo and discussion, field training, practical exercises, field proje self-learning	practical Assigning tasks and reports
4	2 Theoretical	Theoretical c1 A study on the role of microorganisms in the decomposition of organic matter and the enzyme activity of microorganisms	Theoretical Organic matter: carbon cycle, enzymatic activity in soil	Interactive lecture, brainstorming, dialo and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style
	3 practical	Practical e1 Determination of bioanalysis of organic matter and measurement of its quantity CO_2 and carbon from soil	Practical Measuring the speed of decomposition of organic compounds with different percentages of carbon and nitrogen in different soils	Interactive lecture, brainstorming, dialo and discussion, field training, practical exercises, field proje self-learning	practical Assigning tasks and reports
5	2 Theoretical	Theoretical a3 Recognize transformations Nitrogen bioavailability and microorganisms that decompose it Urea	Theoretical Biological transformations of nitrogen: nitrogen cycle, urea hydrolysis, nitration proc	Interactive lecture, brainstorming, dialog and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style
	3 practical	Practical c6 Detection of the process of converting ammonium into ammonia then to nitrite	Practical Study of nitrogen transformations and detection of urea, nitrite and nitrate	Interactive lecture, brainstorming, dialog and discussion, field	practical Assigning tasks and reports

		and nitrate	from soil	training, practical exercises, field projec self-learning	
6	2 Theoretical	Theoretical c2 The student explains how it is done mineralization and nitrogen assimilation	Theoretical Nitrogen mineralization, nitrogen metabolism, C/N ratio	Interactive lecture, brainstorming, dialo and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style
	3 practical	Practical a11 The student learns how Isolation of root nodule-forming bacteria	Practical Isolation of root nodule Bacteria from different leguminous plants	Interactive lecture, brainstorming, dialo and discussion, field training, practical exercises, field proje self-learning	practical Assigning tasks and reports
7	2 Theoretical	Theoretical a4 The student is aware of the importance of nitrogen-fixing microorganisms	Theoretical Biological nitrogen fixation	Interactive lecture, brainstorming, dialo and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style
	3 practical	Practical a12 The student reveals numbers Azotobacter bacteria from the soil	Practical Estimating the numbers of Azotobacter bacteria Azotobacter from different soils by counting the most likely MPN	Interactive lecture, brainstorming, dialo and discussion, field training, practical exercises, field proje self-learning	practical Assigning tasks and reports
8	2 Theoretical	Theoretical b2 The student judges the role Microorganisms that convert phosphorus	Theoretical Biotransformations of phosphorus: its cycle and the role of microorganisms in its transformations	Interactive lecture, brainstorming, dialo and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style
	3 practical	Practical c7 The student reveals numbers Bacillus bacteria	Practical Estimating the number of Bacillus bacteria Isolate it from the soil	Interactive lecture, brainstorming, dialo and discussion, field training, practical exercises, field proje self-learning	practical Assigning tasks and reports
9	2 Theoretical	Theoretical a5 The student learns about the role microorganisms that transform sulfur	Theoretical Biotransformations of sulfur: a role Sulfur, its mineralization, representation Microbial, oxidative stress	Interactive lecture, brainstorming, dialo and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style
	3 practical	Practical c8 The student detects bacteria Which oxidizes sulfur from the soil	Practical Detection of oxidizing bacteria for sulfur from soil	Interactive lecture, brainstorming, dialo and discussion, field training, practical exercises, field proje self-learning	practical Assigning tasks and reports
10	2 Theoretical	Theoretical c3 Determine which student you are doing By reducing inorganic sulfur compounds	Theoretical Reduction of inorganic sulfur compounds	Interactive lecture, brainstorming, dialo and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style
	3 practical	Practical c9 The student examines the neighborhoods that... It quenches soil aggregates	Practical Estimation of microorganisms in the composition of soil aggregates	Interactive lecture, brainstorming, dialo and discussion, field training, practical exercises, field proje self-learning	practical Assigning tasks and reports
11	2 Theoretical	Theoretical a6 The student learns about the role Microorganisms that transform iron	Theoretical Biotransformations of iron: oxidation and reduction, decomposition of iron	Interactive lecture, brainstorming, dialo and discussion, self-learning	theoretical audio methods, Writing on the board direct

			compounds membership		dialogue style
	3 practical	Practical c11 The student is tested on iron-oxidizing bacteria and a method Isolate her	Practical Isolation of iron-oxidizing Bacteria and estimate their numbers	Interactive lecture, brainstorming, dialo and discussion, field training, practical exercises, field proje self-learning	practical Assigning tasks and reports
12	2 Theoretical	Theoretical a7 The student explains the relationship between microorganisms	Theoretical Decomposition of pesticides in soil	Interactive lecture, brainstorming, dialo and discussion, self-learning	theoretical audio methods, Writing on the board Direct dialogue style
	3 practical	Practical c11 The student reveals the nitrogen-fixing microorganism leguminous plants	Practical The effect of some pesticides on organisms Microscopic soils, especially economic ones	Interactive lecture, brainstorming, dialo and discussion, field training, practical exercises, field proje self-learning	practical Assigning tasks and reports
13	2 Theoretical	Theoretical c4 The student learns about an activity Microbiology in The area near the roots Which is known as the rhizosphere	Theoretical The relationship between microorganisms: The area surrounding the roots rhizosphere	Interactive lecture, brainstorming, dialo and discussion, self-learning	theoretical audio methods, Writing on the board Direct dialogue style
	3 practical	Practical c12 The student reveals the bacteriophage	Practical Studying the properties of root nodule bacteria and then multiplying them and conducting inoculation experiments with their leguminous plants	Interactive lecture, brainstorming, dialo and discussion, field training, practical exercises, field proje self-learning	practical Assigning tasks and reports
	2 Theoretical	Theoretical a8 The student is familiar with the role of microorganisms in decomposition of pesticides	Theoretical Activity of microorganisms in the rhizosphere	Interactive lecture, brainstorming, dialo and discussion, self-learning	theoretical audio methods, Writing on the board Direct dialogue style
	3 practical	Practical c13 The student reveals the microorganisms that decompose pesticides	Practical A study on bacteriophage in Some the soil	Interactive lecture, brainstorming, dialo and discussion, field training, practical exercises, field proje self-learning	practical Assigning tasks and reports
15	2 Theoretical	Theoretical a9 The student learns about the most important Factors affecting growth Microbiology	Theoretical Factors affecting the growth of organisms Microscopic	Interactive lecture, brainstorming, dialo and discussion, self-learning	theoretical audio methods, Writing on the board Direct dialogue style
	3 practical	Practical c14 The student reveals nematodes and how to isolate them from the soil	Practical Methods of isolating nematodes from soil	Interactive lecture, brainstorming, dialo and discussion, field training, practical exercises, field proje self-learning	practical Assigning tasks and reports

11. Course Evaluation

	Evaluation	Time of evalution	Degree	Relative weight
1	Theoretical final report + practical experience reports	Theoretical week 15. Practical week 1-15	7 Theoretical + 6 Practical	13%
2	Short test Quiz1	3 Week	4 Theoretical + 2 practical	6%

3	Midterm exam (theoretical and practical)	9 Week	10 theoretical + 5 practical	15%
4	Short test 2 Quiz	12 Week	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%
Sum			100%	100%

12. Learning and Teaching Resources

Required textbooks (methodology, if any)	
Main references (sources)	Soil Microbiology, 1989, written by Dr. Ghayath Muhammad Qasim and Dr. Mud Abdul Salam Ali MICROBIOLGICAL APPLICATIONS, 2007 Alfred E. Brown
Recommended supporting books and referen (scientific journals, reports....)	Bergey's manual of systematic bacteriology
Electronic references, Internet sites	

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