Course Description Form

1. Course Name:
Soil fertility
2. Course Code:
SOFE348
3. Semester / Year:
The first / Autumn semester / 2024-2025
4. Description Preparation Date:
1 / 9 / 2024
5. Available Attendance Forms:
In presence
6. Number of Credit Hours / Number of Units /
2 theoretical + 3 Practical / units / 3,5
7. Course administrator's name (mention all, if more than one name)
Name: Dr. ammar younis kashmolah Email: ammaryajk60@uomosul.edu.iq Assist. Lecturer: Reem Walid Al-Saffar
8. Course Objectives
• The student learns about the methods of taking soil samples and preparing them for chemical analysis and soil fertility evaluation. • Enable the student to know the concepts of soil fertility and how to evaluate soil fertility and prepare fertilizer recommendation. • Introducing the student to the methods of detecting different fertilizers and calculating the quantities of added fertilizers and the method and time of their addition. • Introduce the student to the different physiological functions of these elements and their role in plant growth. • Enable the student to identify the sources and images of nutrients and the factors that affect their availability. • Introducing the student to the most important methods of measuring nutrient concentrations in the soil. • Enable the student to diagnose the symptoms of nutrient deficiency and treat them in the appropriate way and time.

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9. Teaching and Learning Strategies

- Interactive Lecture
- Brainstorming
- Dialogue and discussion
- Field Training
- Practical exercises
- Field Project
- Self-learning

10. Course Structure

Evaluation method	Learning method	Unit or subject name	Required Learning Outcomes	Hours	The week
Semester Exam 1, Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning.	Introduction to the importance of soil fertility, general definitions, the origin and development of science	A1: The student gets to know the importance of soil fertility ,the emergence of soil fertility science and its development	2 Theoretical	1
Practical quiz ،1	Interactive lecture, brainstorming, dialogue and discussion, field training, self-learning.	nitrogen fertilizers, standard specifications, detection of fertilizer, determination of N percentage in manure	B3: The student learns how to detection of urea and ammonium sulfate and estimation of N percentage in fertilizers and their conformity for standard specifications	3 Practical	
Semester Exam 1, Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning.	Growth and the factors affecting it.	A2: The student learns about growth how to measure it and factors affecting him	2 Theoretical	2
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, Practical exercises, self-learning	phosphate fertilizers, standard specifications, Detection, determination of P ratio in fertilizers	B4: The student can detection Superphosphate and estimation of P the percentage in the fertilizer and its conformity for standard specifications	3 Practical	
Semester Exam 1, Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Quantitative relationships between plant and nutrients. The equations of Mecherlich and Powell. and Bray's theory for the movement of elements	C1: The student is able to express about plant growth Using growth equations different depending on Nutrient determinant for growth	2 Theoretical	3
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, self-learning	Potash fertilizers, standard specifications, Detection, determination of K-percentage in fertilizer	B5: The student can fertilizers detection Potash and Appreciation K ratio in fertilizers and its conformity for standard specifications	3 Practical	
Semester Exam1, Final Exam, Report	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Preliminary foundations and concepts in soil fertility Fertilization, a soil medium for plant growth, qualities Soil and its relationship to nutrient availability, the concept of nutrient availability and divisions Nutrients	C2: The student recognizes the impact of pH and soil exchange capacity on the nutrient availability	2 Theoretical	4

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Practical quiz ،2	Interactive lecture, brainstorming, dialogue and discussion, field training, Practical exercises, self-learning	Taking soil samples from the field and preparing for chemical analysis	B4: The student gets to Know methods of taking the sample and preparing it for chemical analysis	3 Practical	
Semester Exam1, Final Exam, Report	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Nitrogen, its importance for the plant, nitrogen in Soil, nitrogen mineralization, influencing factors, symptoms of nitrogen deficiency.	A3: The student gets to know the importance of nitrogen and the way it is absorbed and the symptoms of its deficiency and methods Processed and the most important Nitrogen fertilizers	2 Theoretical	5
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, Practical exercises, self-learning	Extraction and determination of available nitrogen in the soil	C4: Familiarizes the student extraction and estimation Nitrogen in a way Kjeldal and how to calculate concentration in different units	3 Practical	
Quiz 1, Final Quiz	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Phosphorus - its importance to the plant and its transformations, factors affecting the conservation phosphorus in the soil, symptoms of phosphorus deficiency	A4: The student gets to know the importance of phosphorus and the way it is absorbed and its transformations within the plant and the symptoms of its deficiency and methods Processed and the most important Phosphate fertilizers	2 Theoretical	6
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, Practical exercises, self-learning	Extraction and determination of available phosphorus in the Soil	C6: Familiarizes the student in ways extraction and estimation method available phosphorus and how to calculate conc. in different units	3 Practical	
Semester Exam 2, Final Exam, Report	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Potassium, its importance for the plant, and its transformations, factors affecting it, symptoms of potassium deficiency Potassium fertilizers	A5: The student knows the importance of potassium and the way it is absorbed and its transformations within the plant, the symptoms of its deficiency and methods Processed	2 Theoretical	7
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, Practical exercises, field project, self-learning	Extraction and determination of available potassium in the soil	C7: Familiarizes the student in ways extraction and estimation method available potassium and how to calculations in different units	3 Practical	
Semester Exam 2, Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Calcium, importance of calcium for plants, factors affecting calcium, symptoms deficiency, calcium fertilizers	A6: The student gets to know the importance of calcium and the way it is absorbed, the symptoms of its deficiency and methods Processed and the most important Calcium fertilizers	2 Theoretical	8
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, Practical	Extraction and determination of soluble calcium in soil	C8: The student can estimate soluble calcium with chelating substance	3 Practical	

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	exercises, self-learning				
Semester Exam 2, Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Magnesium, the importance of magnesium for the plant, factors Affecting, Symptoms Deficiency, fertilizers	A7: The student gets to know the importance of magnesium and the way it is absorbed, the symptoms of its deficiency, methods Processed and the most important Magnesium fertilizers	2 Theoretical	9
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, Practical exercises, self-learning	Extraction and determination of magnesium dissolved in soil	C8: The student can estimate Magnesium with chelating substance	3 Practical	
Semester Exam 2	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Sulfur, the importance of sulfur for plants, cycle sulfur in the soil, sulfur sources, Symptoms of sulfur deficiency, sulfur fertilizers	A8: The student knows the importance of sulfur and the way it is absorbed and the symptoms of its deficiency and methods Processed and the most important sulfur fertilizers	2 Theoretical	10
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, Practical exercises, self-learning	Extraction and determination of available sulfur in the soil	C9: The student knows the method of appreciation available sulfur in a way Turbidity and how to calculate Conc. in different units	3 Practical	
Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Microelements, iron, zinc, copper, Its importance to the plant, and the symptoms of its deficiency.	A9: The student gets to know the importance of Al-micro nutrient and the symptoms of its deficiency and methods Processed and the most important Fertilizers of micro elements.	2 Theoretical	11
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, Practical exercises, self-learning	extracting and estimating micro elemental cations - in the soil	C10: The student can estimate micro-Element	3 Practical	
Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Microelements, manganese and boron and molybdenum, its importance for the plant , the symptoms of its deficiency on the plant	A10: The student gets to know the importance of manganese, boron, molybdenum and Symptoms deficiency and its most important fertilizers	2 Theoretical	12
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, Practical exercises, self-learning	Extraction and determination of available boron in the soil by hot water method	C11: The student can estimate Boron using Chromatography method	3 Practical	
Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Organic matter in the soil	C3: The student learns about the importance of organic matter for soil and plants and the factors affecting their decomposition	2 Theoretical	13
Home work	Interactive lecture, brainstorming, dialogue and discussion, field	Measurement of soil organic matter and calculation of C|N	B7: The student gets to know the importance of organic matter For soil, plant and Factors affecting its decomposition	3 Practical	

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	training, Practical exercises, self-learning				
Quiz 2, Final Quiz, Report	Interactive lecture, brainstorming, dialogue and discussion, field training, Practical exercises, self-learning	The student is familiar with the types of aquaculture farms, their design methods, their advantages and disadvantages	B1: The student learns about hydroponic farms	2 Theoretical	14
Practical quiz3	Interactive lecture, brainstorming, dialogue and discussion, field training, Practical exercises, self-learning	Preparing nutritional solutions In hydroponic farms	B8: The student can prepare Nutrient solution	3 Practical	
Quiz 3, Final Quiz	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Soil Fertility Assessment	B2: The student is familiar with the methods of evaluation soil	2 Theoretical	15
Homework	Interactive lecture, brainstorming, dialogue and discussion, field training, Practical exercises, self-learning	Soil fertility assessment by its general characteristics	B9: Enabling the student to judge on soil fertility during its general properties	3 Practical	

11.Course Evaluation

Seq.	Evaluation methods	Evaluation date (one week)	degree	Relative weight %
1	Report 1	Fourth week	2.5	2.5
2	Report 2	Fifth week	2.5	2.5
3	Quiz (1)	Sixth week	2	2
4	Quiz (2)	Fourteenth week	2	2
5	Quiz (3)	Fifteenth week	1	1
6	Semester Exam (1)	Sixth week	7.5	7.5
7	Semester Exam (2)	The first week is difficult	7.5	7.5
8	Final theoretical test	Final Semester Exams	40	40
9	Report3	seven Week	5	5
10	Report4	Fourteenth week	2	2
11	Practical Quiz (1)	First week	1	1
12	Practical Quiz (2) Quiz	Fourth week	0.5	0.5
13	Practical Quiz (3) Quiz	Fourteenth week	1	1
14	and homework	weeks 14,13,12,11,10,9,8,7,6,5,3	5.5	5.5
15	Final Practical Test	Final Semester Exams	20	20
	Total	100	100 %	%100

12. Learning and Teaching Resources

Required textbooks (methodology, if any)	Fertilizers and soil fertility - Dr. Saad Allah Al-Nuaimi
Main references (sources)	Soil fertility and fertilization-d.Kazem Mashhoot Awad
Recommended books and references (scientific journals, reports...)	Fertilizer technologies and their uses - dr. Nouredd Shawky Ali Plant physiology. Doctor Abdul azim Kazem
Electronic References, Websites	FAO

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Theoretical subject lecturer:
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