Course Description Form

1. Course Name:
Computer applications2
2. Course Code:
COMA203
3. Semester / Year:
Second semester(Autumn) / 2024-2025
4. Description Preparation Date:
2024/9/1
5. Available Attendance Forms:
Integrated
6. Number of Credit Hours (Total) / Number of Units (Total):
45 working hours/1.5 units
7. Course administrator's name (mention all, if more than one name)
Name: Ahmed Nazar Hassan Email: ahmadccniit@uomosul.edu.iq
8. Course Objectives

Course Objectives	• Teaching the student the fundamentals of utilizing a computer and its apps (Word, Excel), as well as expanding his understanding of these tools to apply the methods and steps needed to use them in analyses of agricultural experiments. • Enhancing his service program management, helping him to finish tasks and reports, and fixing any grammatical or language faults that crop up. • The learner gains the ability to handle various data kinds, print, prepare statistics, and identify pre-made functions, graphs, chart designs, etc. at the same time. The student can thus read, comprehend, and evaluate program outputs and outcomes, including Excel. On the other hand, the availability of Internet connection has made it

	imperative that students acquire computer skills and knowledge of essential service applications.

9. Teaching and Learning Strategies

Strategy	- Interactive lecture - Brainstorming - Dialogue and discussion - Field Training - Practical exercises - Field project - Self-education

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3 practical	a1: The student learns about the Word program and the importance of using it in writing reports and reports in terms of explaining the basic elements that make up its windows as well as understanding the function of the launch bar, learning how to create a new document bar and adding text inside it, how to store and retrieve information, and learning how to form letters in the language. Arabic, select text or text. Identify the new and deleted version, and know other features such as the font type and how to change its appearance Attractive.	What is WORD program? The basic elements that make up the rose window	Interactive lecture, brainstorming, dialogue and discussion, assigning tasks and reporting	Evaluation of dialogue and discussion, quick questions, assignment of a report, semester exam 1, and final exam

2	3 practical	a2: Uses numbering, bullets, multi-level lists, indentation, paragraph and line spacing, search and replace methods, and steps for inserting a cover page and a blank page.	Explanation of the command bar for menus	Present interactive, brainstorming, dialogue and discussion	Quiz, written test, assignment of semester exam 1, final exam
3	3 practical	b1: Applies to inserting a table into the document and converting the text into a table.	Tables and shortcuts in Word	Interactive lecture, brainstorming, dialogue and discussion, assigning tasks and reporting	Evaluation of dialogue and discussion, quick questions, practical application, semester exam 1, and final exam
4	3 practical	c1: Tests inserting charts to display results and hyperlinks, inserting technical text, and making signatures in the document.	Charts, links and technical texts	Interactive lecture, brainstorming, dialogue and discussion	Dialogue and discussion evaluation, short test, Quiz, assignment of semester exam assignment 1, and final exam
5	3 practical	d1: Implements the insertion of caps, the date, how to set up the index, and printing with file types.	Insert, date and print operations	Interactive lecture, brainstorming, dialogue and discussion + scientific visit	Dialogue and discussion evaluation, quick questions, Semester exam 1, final exam
6	3 practical	d2: Try inserting an image from the Internet and	Processes of inserting an image from the Internet and its patterns	Interactive lecture, brainstorming, dialogue and	Dialogue and discussion evaluation, short

		identifying its patterns.		discussion, assigning tasks and reporting	test, Quiz, assignment of semester exam assignment 1, and final exam
7	3 practical	b2: Uses structural diagrams, artistic stills, and videos.	Insert diagrams, snapshots and movies	Interactive lecture, brainstorming, dialogue and discussion	Evaluation of dialogue and discussion, quick questions, practical application, semester exam 2, and final exam
8	3 practical	b3: It is used to insert an equation with examples as well as symbols, convert text into columns, and page margins, settings, and attributes.	Header, footer, margins and page settings	Interactive lecture, brainstorming, dialogue and discussion	Short test, final exam, second semester exam assignment, final exam
9	3 practical	a3: identifies the basic elements that make up the Excel window and what the cell is And selection and navigation shortcuts, how to edit rows and columns, and the benefit of the auto-fill box.	An introductory introduction to Excel	Interactive lecture, brainstorming, dialogue and discussion, assigning tasks and reporting	Evaluation of dialogue and discussion, quick questions, practical application, semester exam 2, and final exam
10	3 practical	b4: Experiments with basic mathematical equations and how to include basic functions.	Mathematical equations and basic states	Interactive lecture, brainstorming, dialogue and discussion + scientific visit	Evaluation of dialogue and discussion, assignment of semester exam assignment 2, and final exam
11	3 practical	c2: tests the use of functions in Excel.	Types of basic functions	Interactive lecture, brainstorming, dialogue and discussion	Evaluation of dialogue and discussion, quick questions, practical application, semester exam 2, and final exam
12	3 practical	d3: controls the use of Excel's conditional counting function.	Conditional counting function	Interactive lecture, brainstorming, dialogue and discussion	Short test, final exam, second semester exam assignment, final exam
13	3 practical	b5: Finds or replaces specific data and methods for dealing with worksheets in Excel.	Search, replace and manage worksheets	Interactive lecture, brainstorming, dialogue and discussion, assigning tasks and reporting	Dialogue and discussion evaluation, quick questions, assignment of a 2nd semester exam report, and a final exam

14	3 practical	b6: Benefits from finding quick and reliable ways to deal with a set of data by learning methods of sorting and filtering in Excel.	Sorting and filtering data	Interactive lecture, brainstorming, dialogue and discussion	Evaluation of dialogue and discussion, short test (Quiz), assignment of semester exam assignment 2, and final exam
15	3 practical	b7: Employs inserting a chart, how to print, and page layout in Excel.	Chart and printing	Interactive lecture, brainstorming, dialogue and discussion	Evaluation of dialogue and discussion, quick questions, semester exam 2, and final exam

11. Course Evaluation

t	Evaluation methods	Evaluation date (one week)	Grade	Relative weight %
1	Report 1	The first week	1	1
2	Report 2	The thirteenth week	1	1
3	Short test Quiz1	second week	2	2
4	Short test Quiz2	fourth week	2	2
5	Short test Quiz3	the sixth week	2	2
6	Short test Quiz4	The eighth week	2	2
7	Short test Quiz5	The twelfth week	2	2
8	Short test Quiz6	The fourteenth week	2	2
9	Practical application1	the third week	1.5	1.5
10	Practical application2	Seventh week	1.5	1.5
11	Practical application3	Week nine	1.5	1.5
12	Practical application4	Week eleven	1.5	1.5
13	Semester test1	The fifth week	10	10
14	Semester test2	The tenth week	10	10
15	Final practical test	Final semester exams	60	60
	The total		%100	%100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Basic computer and software skills Prof. Dr. Muhammad Bilal Al-Zoghbi Prof. Dr. Ahmed Al-Sharay'a (University of Jordan)
Main references (sources)	1. Introduction to Computer and Information Systems / L.Long / Forth Edition-Prentice-Hall , 1944.

	2.Projects for DOS 6 & Windows 3.1 / Fox , Metzeelaer and Scharpf / Benjamin / Cummings Pub. 1995. 3. Different websites
Recommended books and references (scientific journals, reports...)	lectures from the university library available to other British universities
Electronic References, Websites	Numerous scientific websites on the web

Theoretical and Practical subject teacher:

Dr. Ahmed Nazar Hassan

Chairman of the Scientific Committee:

Dr. Abdul Qader Abash Sabak

Head of the Department:

Dr. Khaled Anwar Khaled

Course Description

1. Course Name:
English Language 2
2. Course Code:
ENGL 201
3. Semester / Year:
2024/2025
4. Description Preparation Date:
01/02/2025
5. Available Attendance Forms:
Presence + Electronic
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours 2 Unit
7. Course administrator's name (mention all, if more than one name)
Name: A.L. Sarmed Hashim Taha sarmed.almaula@uomosul.edu.iq
8. Course Objectives

Course Objectives	• **To going on studying the English language in special the scientific language** • **Widening student mind about scientific and literature English vocabularies** • **Helping the students to think and write in English**
9. Teaching and Learning Strategies	
Strategy	Making use of the electronic available methods alike the auditory or the visual in addition to the white board

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2hours Presence	(A)The student should be able to know the basics of the English language	Introduction to Learning English with the new Oxford headway for Pre-Intermediate students+ point of view and mapping the way	Electronic lectures, videos, posters and other methods related to learning	Exams Reports Discussions quiz
2	2hours Presence	(A)The student should be able to know the tenses of the English language	Practicing English with "The Great Communicators" + Reading out clearly and learning pronunciation + Vocabulary	Electronic lectures, videos, posters and other methods related to learning	Exams Reports Discussions quiz
3	2hours Presence	(A)The student should be able to	Spoken English informal Language	Electronic lectures, videos, posters and	Exams Reports

		know the rules of the English language	+ conversation with students	other methods related to learning	Discussions quiz
4	2hours Presence	(A)The student should be able to know the basics of the English language	Practicing English with "A Walk with Death" + Reading out clearly and learning pronunciation + Vocabulary	Electronic lectures, videos, posters and other methods related to learning	Exams Reports Discussions quiz
5	2hours Presence	(A)The student should be able to know the basics of the English language	Practicing English with "Flying for a living" + Reading out clearly and learning pronunciation + Vocabulary	Electronic lectures, videos, posters and other methods related to learning	Exams Reports Discussions quiz
6	2hours Presence	(A)The student should be able to know the basics of the English language	Dealing with English in Agriculture within different specialties (reading and pronunciation) Language Focus Part 1 (The Parts of a Plant and their Functions)	Electronic lectures, videos, posters and other methods related to learning	Exams Reports Discussions quiz
7	2hours Presence	(A)The student should be able to know the basics of the English language	Definition of the best ways to study English	Electronic lectures, videos, posters and other methods related to learning	Exams Reports Discussions quiz
8	2hours Presence	(A)The student should be able to know the basics of the English language	Definition of the Best ways to study English	Electronic lectures, videos, posters and other methods related to learning	Exams Reports Discussions quiz
9	2hours Presence	(A) The student should be able to know the basics of the English language	Definition of the Best ways to study English.	Electronic lectures, videos, posters and other methods related to learning	Exams Reports Discussions quiz
10	2hours Presence	(A) The student should be able to know the basics of the English language	Definition of the Best ways to study English	Electronic lectures, videos, posters and other methods related to learning	Exams Reports Discussions quiz
11	2hours Presence	(A) The student should be able to know the basics of the English language	Definition of the Best ways to study English.	Electronic lectures, videos, posters and other methods related to learning	Exams Reports Discussions quiz
12	2hours Presence	(A)The student should be able to know the basics of	Definition of the Best ways to study English.	Electronic lectures, videos, posters and other methods	Exams Reports Discussions

		the English language	Scientific Tour	related to learning	quiz
13	2hours Presence	(A)The student should be able to know the basics of the English language	Definition of the Best ways to study English	Electronic lectures, videos, posters and other methods related to learning	Exams Reports Discussions quiz
14	2hours Presence	(A)The student should be able to know the basics of the English language	Definition of the Best ways to study English	Electronic lectures, videos, posters and other methods related to learning	Exams Reports Discussions quiz
15	2hours Presence	(B)The student should be able to know the basics of the English language	Definition of the Best ways to study English.	Electronic lectures, videos, posters and other methods related to learning	Exams Reports Discussions quiz

11. Course Evaluation

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)	
Main references (sources)	Rapid Review of English Grammar 1957
Recommended books and references (scientific journals, reports...)	New Headway - English course English in agriculture1985 oxford bookworms
Electronic References, Websites	https://translate.yandex.com/ https://ar.youglish.com/ https://readlang.com/ www.reverso.net https://elevenlabs.io/app/home /The Library Genesis junkybooks / cole13 / pdfdrive

A.L. Sarmed Hashim Taha

Head Of Department

أ.م.د. خالد انور خالد

Chairperson of the Scientific Committee

د. عبد القادر عيش سعدان

Course Description Form

1. Course Name:
Plant Soil and Water analysis
2. Course Code:
PSWA235
3. Semester / Year:
Second course 2024- 2025
4. Description Preparation Date:
1\ 2 \ 2025
5. Available Attendance Forms:
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: mooatasim . D.S.Agha Dr: Mohamad Ayad harbawee Mr: Osama Hosam Fadl M.M. Ghada Ahmed Mohammed
8. Course Objectives

theoretical: - Enabling the student to understand and comprehend what is related to the equipment and tools present in the laboratory - Enabling the student to become familiar with how to take a soil sample - Enabling the student with the ability to estimate the dry weight of a soil sample - Enable the student to know what the chemical properties of soil . - Enable the student to know the characteristics of irrigation water. - Enable the student to take and analyze plant samples	**Practical** **- Enabling the student to understand how to take soil sample.** **- Enabling the student to estimate the dry weight soil sample.** **- Enabling the student to understand the chemica properties of soil.** **- Enabling the student to understand the characteristics of irrigation water.** **- Enabling the student to take and analyze a p sample.** .....

9. Teaching and Learning Strategies

theoretical: - Interactive lectures - Brainstorming - Dialogue and discussion - Assigning tasks and reporting	**Practical** - Interactive lecture - Brainstorming - Dialogue and discussion - Assignment and report

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	2 Theoretical 3 practical	Theoretical: The student explains w the soil is and wha the depths, horizo and beds a	theory: the soil and dividing the soil sample	theory: Audio method writing style o the blackboar direct dialogu method practical	Short exams, assignments, discussions
2	2 Theoretical 3 practical	Estimate the moistu content of the soil, a know the weight of t dry soil sample for moist soil	theory: Preparing the soil sample for analysi	Audio methods writing style or blackboard, dir dialogue metho practical	Short exams, assignments, discussions
3	2 Theoretical 3 practical	My theory: The student is famili with the classificatio soil analysis method	The student learns about the divisions o soil analysis method and their purpose	Audio methods writing style or blackboard, dir dialogue metho	Short exams, assignments, discussions
4	2 Theoretical 3 practical	My theory: The student is introduced to device for determining elements, mechanica methods, and chemi methods for soil analysis	My theory: The student is introduced to device for determining elements, mechanica methods, and chemi methods for soil analysis	Audio methods writing style or blackboard, dir dialogue metho	Short exams, assignments, discussions
5	2 Theoretical 3 practical	The student will b able to estimate so analyzes descriptiv using quantitative gravimetric and volumetric analysi methods	Analysis method chemical anal methods - descrip methods quantitative meth	Audio meth writing style or blackboard, di dialogue metho	Short exams, assignme discussions
6	2 Theoretical 3 practical	My theory: The student learns what a standard solution is and wh its specifications a practical	Standard solutions	Audio meth writing style or blackboard, di dialogue metho	Short exams, assignme discussions
7	2 Theoretical 3 practical	My theory: The student is able t prepare an original standard solution an	The original stand solution and solutio different concentrat	Audio meth writing style or blackboard, di dialogue metho	Short exams, assignme discussions

		prepare standard solutions of different concentrations practical :			
8	2 Theoretical 3 practical	theory: The student is able identify the nutritional elemen and classify the nutritional elemen	theory: Identify the nutritio element and nutritio element recipes practical :	Audio meth writing style or blackboard, di dialogue metho	Short exams, assignme discussions
9	2 Theoretical 3 practical	My theory: The student is famili with the properties o the element potassiu its benefits for plants quality in the soil, an an idea of appreciati practical :	Theoretical: Propert of the element potassium practical	Audio meth writing style or blackboard, di dialogue metho	Short exams, assignme discussions
10	2 Theoretical 3 practical	My theory: The student is famil with estimating the concentration of a solution as a percent and in molar and tite expressions practical :	theory: Expressing concentration solutions	Audio meth writing style or blackboard, di dialogue metho	Short exams, assignme discussions
11	2 Theoretical 3 practical	theory: The student is able t identify the importa of organic matter in soil, as well as lime, gypsum, and proble in the soil practical:	theory: Estimation of soil compounds practical :	Audio meth writing style or blackboard, di dialogue metho	Short exams, assignme discussions
12	2 Theoretical 3 practical	theory: Introducing the stud to the degree of soil interaction, special equations, and the importance of the degree of reaction Practical:	theory: Degree of soil reacti	Audio meth writing style or blackboard, di dialogue metho	Short exams, assignme discussions
13	2 Theoretical 3 practical	theory: The student is able t know the effect and extent of the degree soil reaction on the readiness of nutrient and understand the relevant trend	theory: The effect of the deg of soil reaction on th readiness of nutrien practical :	Audio meth writing style or blackboard, di dialogue metho	Short exams, assignme discussions

		practical :			
14	2 Theoretical 3 practical	theory: The student is famili with field water measurements - measurements made the laboratory and a explanation of what hardness and hardne practical :	theory: Water analysis and measurements practical :	Audio meth writing style or blackboard, di dialogue metho	Short exams, assignme discussions
15	2 Theoretical 3 practical	theory: The student will be a to understand the importance of analyz a plant sample and w are the most importa plant parts in the analysis practical :	theory: Plant sample analysi practical :	Audio meth writing style or blackboard, di dialogue metho	Short exams, assignme discussions

11. Course Evaluation

	Evaluation	Time of evalution	Degree	Relative weight
1	Theoretical final report + practical experience reports	Theoretical week 15. Practical week 1-15	7Theoretical + 6Practical	13%
2	Quiz -1-	Week 3	4 Theoretical + 2 practical	6%
3 4	Midterm Exam	Week 9	10 theoretical + 5 practical	15%
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 (curricular books, if any)	Soil, plant, water and air analysis book (Prof. Dr. Muzaffar Ahmed Al-Mousili)
Main references (sources)	Abbawi, Souad Abd and Muhammad Suleiman Has (1990): Scientific Engineering of the Environment. Wa tests. Dar Al-Hekma and Publishing - University of Mos
Recommended books and references (scientific journals, reports…)	Al-Rafidain Agriculture Journal and Al-Anbar Journal Agricultural Sciences
Electronic References, Websites	The World Health Organization, and the US Food and D Administration.

Theoretical subject teacher: . Mooatasim Daood . S,

practical subject teacher: M. Dr. Mohammad Ayad Harbawi

Chairman of the Scientific Committee:
Dr. Abdul Qader Abash sbak

Head of the Department of Soil Science and Water Resources:
Dr. Khaled Anwar Khaled

Course Description Form Biochemistry

1. Course Name:

Biochemistry

2. Course Code:

BICH204

3. Semester / Year:

First semester (fall) / **2024 - 2025** \ 2st

4. Description Preparation Date:

2024 \9\1

5. Available Attendance Forms:

Presence

6. Number of Credit Hours (Total) / Number of Units (Total)

2 theoretical hours + 3 practical hours (75 hours) / 3.5 units

7. Course administrator's name (mention all, if more than one name)

Dr.Qaswaa yousif jameel dr.qaswaa_yousif@uomosul.edu.iq
Afkar yahya ahmed

8. Course Objectives

Theoretical	Practical
–Enabling the student to understand and comprehend the science of biochemistry **–Enable the student to know the chemical composition of carbohydrates, proteins, and lipids** **– Enabling the student to be familiar with the most important sources of carbohydrates, proteins and fats** **–Empowering the student with the ability to detect different types of vital components in the organism's body** **District**	**Enabling the student to become familiar with the principles and modern methods in…** **Study of biochemical sciences as well as study Synthesis of proteins, carbohydrates, and fats and the tests performed on them**

9. Teaching and Learning Strategies

Theoretical:	Practical:
- Interactive lecture - Brainstorming - Dialogue and discussion - Assigning reports -Conducting monthly and	Interactive lecture -Discussion, dialogue, brainstorming -Conducting laboratory experiments -Assigning reports -Conducting daily and

daily examinations	monthly examinations

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2Theoretical 3Practical	Theoretical: B1: Explains to the stude the concept of chemistry Biotechnology and the st of water properties Practical: B2:Shows the student ho to apply Laboratory safety rules	THEORETICAL the study of water and its properties Practical: safety rules an specifications in Laboratories	THEORETICAL audio methods, Writing on the board Direct dialogue style PRACTICAL Assigning tasks and reports	Shortexams, assignments, discussions
2	2Theoretical 3Practical	THEORETICAL C1: Explains to the stude the most important differences in the chemic composition of carbohydrates practical: a2: Explains to the stude how to detect Carbohydrates and their types	THEORETICAL Theoretical: auditory methods, Writing on the board Dialogue style Direct Practical: Assigning tasks Short exam reports and assignments for discussi	THEORETICAL audio methods, Writing on the board Direct dialogue style PRACTICAL Assigning tasks and reports	Shortexams, assignments, discussions
3	2Theoretical 3Practical	THEORETICAL :b2 The student is familia with the factors affecting amino acids and peptide practical: : b3 The student is famili with the most important tests General carbohydrates	THEORETICAL CARBOHYDRATES Practical: Carbohydrates and their types	THEORETICAL audio methods, Writing on the board Direct dialogue style PRACTICAL Assigning tasks and reports	Shortexams, assignments, discussions
4	2Theoretical 3Practical	THEORETICAL A1: The student learns about the mechanism of action of proteins, their properties, and their structure practical: b4: The student learns	THEORETICAL auditory methods, Writing on the board Dialogue style Direct Practical: Assigning tasks And reports Short exams, assignment	THEORETICAL audio methods, Writing on the board Direct dialogue Style PRACTICAL Assigning tasks and reports	Shortexams, assignments, discussions

		about the reduction tests carbohydrates	discussions		
5	2Theoretical 3Practical	THEORETICAL C2: Explains to the stude the changes that occur in lipids, their composition and properties. practical: b5: Explains the tests to t student Description of carbohydrates	Theoretical Amino acids and peptide Practical: solubility test a Molsch test.	THEORETICAL audio methods, Writing on the board Direct dialogue style PRACTICAL Assigning tasks and reports	Shortexams, assignments, discussions
6	2Theoretical 3Practical	THEORETICAL C3: Proposes to the stude a method suitable for the natural and chemical properties of neutral fats practical: a3: Tests related to fats a suggested to the student	Theoretical: audio metho Writing on the board Dialogue style Direct Practical: Assigning tasks Short exam reports, assignments, and discussions	THEORETICAL audio methods, Writing on the board Direct dialogue style PRACTICAL Assigning tasks and reports	Shortexams, assignments, discussions
7	2Theoretical 3Practical	THEORETICAL C4: The student is familia with the most important changes that occur in phosphorylated fats (phospholipids). practical: a4: The student is familia with screening tests Clycerol	THEORETICAL Proteins practical Reductive tests for carbohydrates	THEORETICAL audio methods, Writing on the board Direct dialogue style PRACTICAL Assigning tasks and reports	Shortexams, assignments, discussions
8	2Theoretical 3Practical	THEORETICAL A2 :The student recogniz the most important chan Which occurs in enzymes and restriction Its agents practical: a5: The student learns ho to examine The pH of many solutions the organization	THEORETICAL auditory methods, Writing on the board Dialogue style Direct Practical: Assigning tasks Short exam reports, assignments, and discussions	THEORETICAL audio methods, Writing on the board Direct dialogue style PRACTICAL Assigning tasks and reports	Shortexams, assignments, discussions
9	2Theoretical 3Practical	THEORETICAL B3 :The student judges h competence	THEORETICAL Lipids	THEORETICAL audio methods, Writing on the board	Shortexams, assignments, discussions

		Nucleotides and nucleic acids **In the metabolic processe of living organisms** **Practical:** **A6: The student is given general and descriptive tests for amino acids**	**Practical: Descriptive tes For carbohydrates**	**Direct dialogue style** **PRACTICAL** **Assigning tasks and reports**	
10	**2Theoretical 3Practical**	**THEORETICAL** **A3: The student learns about the most importan chemical structures of nucleic acids (polynucleotides).** **practical:** **b6: Explains to the stude methods for detecting amino acids containing sulfur**	**Theoretical: auditory methods,** **Writing on the board** **Dialogue style** **Direct** **Practical: Assigning tasks** **Short exam reports, assignments, and discussions**	**THEORETICAL** **audio methods,** **Writing on the board** **Direct dialogue style** **PRACTICAL** **Assigning tasks and reports**	**Shortexams, assignments, discussions**
11	**2Theoretical 3Practical**	**THEORETICAL** **B4 : The student masters method and types of nucl acids** **practical:** **a1: The student takes the Millon test and the xanthoproteic test**	**THEORETICAL** **Physical and chemical properties of neutral fats** **Practical: special tests fo lipids**	**THEORETICAL** **audio methods,** **Writing on the board** **Direct dialogue style** **PRACTICAL** **Assigning tasks and reports**	**Shortexams, assignments, discussions**
12	**2Theoretical 3Practical**	**THEORETICAL** **E1: The student determin the mode of action and th importance of vitamins i the body of a living organism** **practical:** **c7: The student mentions descriptive tests for proteins**	**THEORETICAL** **.** **audio methods,** **Writing on the board** **Dialogue style** **Direct** **Practical:** **Assigning tasks** **And reports** **Short exams, assigned assignments and discussions**	**THEORETICAL** **audio methods,** **Writing on the board** **Direct dialogue style** **PRACTICAL** **Assigning tasks and reports**	**Shortexams, assignments, discussions**
13	**2Theoretical 3Practical**	**THEORETICAL** **A4: The student learns abo the types of fat-soluble vitamins and common dise resulting from their deficie in the organism's body.** **practical:** **a 8: The student learns abo**	**THEORETICAL** **Common diseases resulti from vitamin deficiency** **Practical: protein precipitation** **With heavy metal salts,**	**THEORETICAL** **audio methods,** **Writing on the board** **Direct dialogue style** **PRACTICAL** **Assigning tasks and reports**	**Shortexams, assignments, discussions**

		a test Biuret			
14	2Theoretical 3Practical	THEORETICAL B3 :The student learns about the types of fat-soluble vitamins and common diseases resulti from their deficiency in t organism's body. practical: a6: Characterizes the precipitation of proteins with salts Heavy metals	THEORETICAL Theoretical: auditory methods, Writing on the board Direct dialogue style Practical: Assigning tasks Short exam reports, assignments and discussions	THEORETICAL audio methods, Writing on the board Direct dialogue style PRACTICAL Assigning tasks and reports	Shortexams, assignments, discussions
15	2Theoretical 3Practical	THEORETICAL C5: The student is familiar with how to write reports Result of field visit to laboratories Biochemistry practical: C8: The student is familiar with how to write reports Result of field visit to laboratories Biochemistry	THEORETICAL biochemistry laboratorie audio methods, Writing on the board Direct dialogue style Practical: Assigning tasks And reports Short exams, assigned assignments and discussions	THEORETICAL audio methods, Writing on the board Direct dialogue style PRACTICAL Assigning tasks and reports	Shortexams, assignments, discussions

11.Course Evaluation

No.	Evaluation methods	Evaluation date (one week)	Grade	Relative weight %
1	Report 1	fourth week	2.5	2.5
2	Report 2	fifth week	2.5	2.5
3	(1)Quiz	sixth week	2	2
4	(2)Quiz	fourteenth week	2	2
5	(3)Quiz	fifteenth week	1	1
6	Mid 1	sixth week	7.5	7.5
7	Mid2	Eleventh week	7.5	7.5
8	theoretical exams Final	Final semester exams	40	40
9	Practical field project	The fifteenth week	5	5
10	Seminars	The third and fifth week	2	2
11	Practical (1) Quiz	The first week	1	1

12	**Practical (2) Quiz**	**fourth week**	**0.5**	**0.5**
13	**Practical (3) Quiz**	**The fourteenth week**	**6.5**	**6.5**
15	**Final practical test**	**Final semester exams**	**20**	**20**
	Total	**100**	**%100**	**%100**

11. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	Many articles and research published in Springer, Elsevier, SPRINGER NATURE
Electronic References, Websites	

Assistant Professor

Qaswaa yousif jameel

Assistant Lecturer

Afkar yahya ahmed

Chairman of the scientific committee

Dr. Abdalkader Absh Sbak

Head of Department
Professor
Dr. Khalid Anwar Khalid

جامعة الموصل
كلية الزراعة والغابات
قسم علوم التربة والموارد المائية

Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department

Academic Program and Course Description Guide

2024

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: **University of Mosul**

Faculty/Institute: **Faculty of Agriculture and forestry**

Scientific Department: **Horticulture and landscape design**

Academic or Professional Program Name: **Plant physiology**

Final Certificate Name: **Bachelor**

Academic System Classes / courses

Description Preparation Date: **2023\9\1**

File Completion Date: **2024\2\1**

Signature:

Head of Department Name:

Date:

Signature:

Scientific Associate Name:

Date:

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date:

Signature:

Approval of the Dean

1. **Program Vision**
Program vision is written here as stated in the university's catalogue and website.

2. **Program Mission**
Program mission is written here as stated in the university's catalogue and website.

3. **Program Objectives**
1- graduation of students with the ability to work in the field of Agriculture in general and the field of agricultural extension in particular 2-graduation of students with the ability to communicate and interact with the rural community 3-preparing specialized cadres in agricultural education and extension for Bachelor's and master's degrees 4 - work on the dissemination of new agricultural ideas among farmers and agricultural employees through cooperation and coordination with the agricultural departments of the ministry in Nineveh Governorate 5-studying the problems related to agricultural extension work, dissemination and adoption of agricultural ideas developed through the research of professors and graduate students 6-providing students with a broad and deep understanding of the specialization of agricultural extension

4. Program Accreditation

Does the program have program accreditation? And from which agency?

5. Other external influences

Is there a sponsor for the program?

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements				
College Requirements				
Department Requirements				
Summer Training				
Other				

* This can include notes whether the course is basic or optional.

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
2023-2024\ Third	**PLPH210**	**plant physiology**	**theoretical**	**practical**

8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes 1	Learning Outcomes Statement 1

Skills	
Learning Outcomes 2	Learning Outcomes Statement 2
Learning Outcomes 3	Learning Outcomes Statement 3
Ethics	
Learning Outcomes 4	Learning Outcomes Statement 4
Learning Outcomes 5	Learning Outcomes Statement 5

9. Teaching and Learning Strategies

Teaching and learning strategies and methods adopted in the implementation of the program in general.

10. Evaluation methods

Implemented at all stages of the program in general.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor						

Professional Development

Mentoring new faculty members

Briefly describes the process used to mentor new, visiting, full-time, and part-time faculty at the institution and department level.

Professional development of faculty members

Briefly describe the academic and professional development plan and arrangements for faculty such as teaching and learning strategies, assessment of learning outcomes, professional development, etc.

12. **Acceptance Criterion**
(Setting regulations related to enrollment in the college or institute, whether central admission or others)

13. **The most important sources of information about the program**
State briefly the sources of information about the program.

14. Program Development Plan

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
2023-2024 Second	PLPH210	Plant physiology	standerd	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

Course Description Form

1. Course Name: Plant physiology

2. Course Code: **PLPH210**

3. Semester / Year: **2024 - 2025**

4. Description Preparation Date: **1 / 9 / 2024**

5. Available Attendance Forms: in person

6. Number of Credit Hours 2 theoretical + 3 practical (5) / Number of Units (3.5)

7. Course administrator's name (mention all, if more than one name)

Name: Lecturer Doctor Ragheed Hamza Mohammed, Lecturer Doctor Ahmed Abd-AlRaheem Mohammed
Email: **ragheed_alsuitan@uomosul.edu.iq** **Ahmed79@uomosul.edu.iq**

8. Course Objectives

Enabling the student to understand and comprehend what is related to plant physiology and its relationship to other sciences

Enabling the student to know the most important scientific methods in learning about plant physiology

Enabling the student to become familiar with the concept of plant physiology

Enabling the student to be able to investigate plant cells and all phenomena related to plant physiology

- **The student can explain all aspects of plant life through plant physiology**

9. Teaching and Learning Strategies

- Interactive lecture
- Brainstorming
- Dialogue and discussion
- Field Training
- Practical exercises
- Field project
- Self-education

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 Theoretica	A1: Learn about the concept of plant physiology B1: He possesses the practical and mental knowledge and concepts that help him in studying plant physiology D3: Community members participate and work to educate them about the importance of plant physiology and its impact on controlling pollution. E1: It contributes to enhancing the values of science among community members and making them aware of the importance of plant physiology and increasing green spaces to improve the environment and serve society.	Introduction to pla physiology	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
	3 Practical	A1: Learn about the types of microscopes, writing the parts of the microscope, and how the microscope works A2: Count the parts of the microscope	Microscope installation	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
2	2 Theoretica	A2: Defines water absorption systems and their importance and environmental aspects B1: He possesses practical and mental knowledge and concepts that help him know the relationship of plants to water C5: Successfully balances the investment, use and employment of plants in accordance with their relationship with water	Plant relationship wit water	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test

	3 Practical	A1: Defines a plant cell A2: List the components of a plant cell 4A: Compare the meristematic and adult cells	Studying the plant cel and its characteristics preparing slides, and revealing the cell components through practical experiments through the microscope	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
3	2 Theoretica	A2: Determines the rising sap systems in the plant	Xylem sap	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
	3 Practical	A1: He knows every method of expressing the concentrations of solutions C4: Prepare solutions of different percentages, molarity, molarity, and standard D1: Acquiring the skills of preparing various solutions to treat plants with	Scientific experiment on methods of expressing the concentrations of solutions	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
4	2 Theoretica	A2: Determines the systems of water rising to the top of the plant C4: Recognizes the anatomical structure of the bark D3: Recognizes the elements of the cortex E1: Contributes to the recognition of phloem transport	Phloem sap	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
	3 Practical	A1: He knows every type of solution A2: List the characteristics of each type of solution C4: Identify and prepare true solutions, colloidal and emulsion C5: Distinguish between true, colloidal and emulsion solutions	Scientific experiment to prepare real and colloidal solutions, emulsions and colloid	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
5	2 Theoretica	C4: Draws up plans and programs for development in the field of plant transpiration D3: Community members participate and work to educate them about the importance of transpiration in plants and its impact on controlling irrigation. E1: Dissects the stomatal system	Transpiration in plant	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
	3 Practical	A1: Knows every phenomenon of colloids	Scientific experiment on the physiological	Interactive lecture, brainstorming, dialogu	semester test 1, final test

		A2: List the properties of colloids D1: Acquire skills in stabilizing colloids through scientific experiments	properties of the Tandall phenomenon	and discussion, self-learning,	
6	2 Theoretica	A2: Determines the types of mineral nutrition in plants C4: Draws up plans and programs for development in the field of plant nutrition D1: Acquiring the communication skills necessary to deal with confidence and certainty at the individual and group levels D3: Community members participate and work to educate them about the importance of plant nutrition and its role in regulating growth E1: Contributes to identifying vitamins necessary for growth and development	Mineral nutrition in plants	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
	3 Practical	A1: Diffusion is known A2: Enumerates the laws of diffusion C2: Conduct diffusion experiments	Scientific experiment on the phenomenon o diffusion	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
7	2 Theoretica	A3: He knows the enzyme and what it is composed of C4: splitting enzymes C5: called enzymes	Plant enzymes	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
	3 Practical	A1: Learn about the devices used in measurement, the measurement methods used and their steps	Scientific visit to laboratories	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
8	2 Theoretica	A3: Learn about photosynthesis and its effect on plant growth and development C4: Identify the factors affecting photosynthesis	Photosynthesis	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
	3 Practical	A1: Identify the types of plasma cells that occur in cells and the factors that cause them A2: Explain the reasons for this phenomenon	Plasmolysis phenomenon in plants	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
9	2 Theoretica	A4: Learn about the concept of plant respiration C3: He uses the information he needs	Respiration in plants	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test

		and what is available to him to master his work			
	3 Practical	A1: The student knows the phenomenon of imbibition and the phenomenon of osmosis and recognizes the types of cell membranes in plants. A2: Enumerates the factors affecting each phenomenon C2: Conducts scientific experiments in osmosis	Scientific experiment on osmosis and semi-permeable membrane	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
10	2 Theoretica	A2: Defines different definitions of growth C5: Successfully balances the investment, use, and employment of plants to suit growth processes	Growth in plants	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
	3 Practical	A1: The student knows the term permeability A2: Enumerate the factors affecting membrane permeability C2: identifies substances that penetrate quickly into the plant and substances that are slow to penetrate	Scientific experiment on permeability	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
11	2 Theoretica	A2: Learn about sensation and movement in plants and their importance in plant growth and development C5: Successfully balances the investment and use of movement and sensation in the plant and employs them in accordance with growth processes	Sensation and movement in plants	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
	3 Practical	A1: The student knows the stomata A2: The student explains the structure of the stoma and enumerates the factors affecting the opening and closing of the stomata C2: Explains the stomatal system	The stomatal system	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
12	2 Theoretica	A2: Learn about Verbalization and its	Verbalization	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test

		importance in crop flowering C5: Successfully balances the investment and use of plants and their employment in accordance with their Verbalization requirements to increase production			
	3 Practical	A1: The student knows the phenomenon of transpiration 2A: Enumerates and explains methods for measuring transpiration rate C2: Explains the stomatal system	Transpiration measurement	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
13	2 Theoretica	A2: It determines the type of nutrition and nutrients the plant needs for growth and development C3: He uses the information he needs and what is available to him to master his work	Mineral nutrition in plants	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
	3 Practical	A1: The student learns about the causes and times of this phenomenon and the factors causing it C2: Conducts scientific experiments on the phenomena resulting from radical pressure C4: Uses special devices to measure dissolved solids in plants	Phenomena resulting from root pressure an measurement of dissolved solids in plants	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
14	2 Theoretica	C3: He uses the information he needs and what is available to him to master his work C5: Successfully balances the investment and use of ornamental plants and uses them to adapt to drought and heat tolerance processes.	Adapt to drought and heat	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
	3 Practical	A1: The student explains the steps for estimating the leaf area of plants, as well as the steps for estimating plant pigments and the equations related to that.	Measuring plant leaf area and estimating plant pigments (chlorophyll and xanthophyll)	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test

		C4: Draw plans and programs for the estimation of plant dyes C5: Successfully balances the increase in the leaf are of the plant			
15	2 Theoretica	C4: Draws up plans and programs for development in the field of adaptation t salinity and light C5: Successfully balance the investment and use of ornamental plants and thei adaptations	Adaptation to salinity and light	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test
	3 Practical	A1: The student learns about the benefits of the respiration process in plants and how it occurs, along with an explanation of methods for measuring respiration rate. C5: Differentiate between aerobic and anaerobic respiratio	Measuring plant respiration	Interactive lecture, brainstorming, dialogu and discussion, self-learning,	semester test 1, final test

11. Course Evaluation

seq	Evaluation methods	Evaluation date (week)	Grade	Relative weight %
1	Report 1	fourth week	2.5	2.5
2	Report 2	fifth week	2.5	2.5
3	Short test (1)	sixth week	2	2
4	Quiz Short test (2)	fourteenth week	2	2
5	Quiz Short test (3)	fifteenth week	1	1
6	Semester test (1)	sixth week	7.5	7.5
7	Semester test (2)	eleventh week	7.5	7.5
8	Final theoretical test	Final semester exams	40	40
9	Practical field project	fifteenth week	5	5
10	Field evaluation	third and fifth week	2	2
11	Short test (1)	first week	1	1
12	Quiz Short test (2)	fourth week	0.5	0.5
13	Quiz Short test (3)	fourteenth week	2.5	2.5
14	Live drawings and homework	Weeks 6, 8, 9, 10, 11, 12 and 13	2.5	2.5
15	Final practical test	Final semester exams	2	2
	Total	100	100%	100%

12. Learning and Teaching Resources

Main references (sources)	- Muhammad, A. A. K. 1988. Plant physiology. part One. Dar Al-Kutub for Printing and Publishing - University of Mosul - Republic of Iraq. - Muhammad, A.A. K. 1988. Plant physiology. The second part. Dar Al-Kutub for Printing and Publishing - University of Mosul - Republic of Iraq. - Muhammad, A. A. K. 1988. Plant physiology. the third part. Dar Al-Kutub for Printing and Publishing - University of Mosul - Republic of Iraq.
Plant physiology and development	Plant physiology and development
Electronic Referenc Websites	https://exa.unne.edu.ar/biologia/fisiologia.vegetal/PlantPhysiologyTaiz2002.pdf

مدرس المادة النظري
م.د. رغيد حمزة محمد

مدرس المادة العملي
م.د. احمد عبدالرحيم محمد

رئيس اللجنة العلمية
أ.م. د. عبدالقادر عبش سباك

جامعة الموصل
كلية الزراعة والغابات
قسم علوم التربة والموارد المائية

رئيس قسم علوم التربة والموارد المائية
أ.م. د. خالد أنور خالد

principles of plant protection Description of the course on

.1 : Course Name	
Principles of plant protection	
.2 : Course Code	
PRPP117	
.3 Annual : Year / Semester	
stage is the Department of Agricultural Economics and the second is the Department of Soil and Water The second semester/the	
2024 - 2025 / Resources	
.4 Date this description was prepared	
1 / 2 / 2025	
.5 : Available forms of attendance	
My presence	
.6 :(total)/number of units (total) Number of study hours	
theoretical hours / 3 practical hours / 3.5 units 2	
.7 (Name of the course administrator (if more than one name is mentioned	
Dr. Raghad Nayef Mahidi Dr,Khaled Amiri Muhammad Ammar manaf Salah Ahmad	
.8 Course objectives	
be able to define the concept of disease and the information that must be available to know the medical history **should**	•
Choosing the appropriateness of the factors affecting the disease and determining its ability to spread	•
pathogens and know all their classifications Differentiate between types of	•
Understanding the basics of modern planning to develop a program that explains the forms and patterns of plant diseases	•
Distinguish between the ranks and sections of fungi according to the type of each	•
ut entomology and the factors that helped insects survive and spreadLearn abo	•
distinguishing between them when Identify plant diseases, symptoms and signs, and what must be taken into account	•
each disease, and determine the controls and conditions A comprehensive study of the various types of control, how to diagnose	•
that must be observed when carrying out all instructions to carry out the control in the proper manner.	
.9 Teaching and learning strategies	
Interactive lecture	-
Brainstorming	-
and discussion Dialogue	-
Field Training	-
Practical exercises	-
Field project	-
education -Self	-

.10 Course structure

Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	the week
Semester	Interactive lecture,	An overview of the	Concept of plant disease :A1	1	1

exam 1 final exam	brainstorming, dialogue -and discussion, self learning	plant concept of disease, its definition knowledge of and , the disease and the plant host	Plant disease pathogen The -1 The breadwinner -2 Environmental factors -3	theore tical	
Short practical test1	Interactive lecture, brainstorming, dialogue and discussion, field learning -training, self	Plant pathology laboratory	Identify laboratory equipment :C6 The student learned how to use a microscope, :A41 how to examine pathogens, and prepare slides	3 practic al	
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue -and discussion, self learning	Factors of the pathological triangle	Recognizes the disease pyramid, the disease A2 triangle, and the factors affecting it and medical history	1 theore tical	2
Live discussion	Interactive lecture, brainstorming, dialogue and discussion, field training, practical -exercises, and self learning	Conducting the sterilization process inside the laboratory sterilization -	The student learns about sterilization methods :C6 and how to eliminate pathogens inside the laboratory	3 practic al	
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue -discussion, self and learning	Development and detection of plant disease	Learn a brief overview of the disease history of :A3 and the each disease spreading in agricultural fields stages of development and detection of the plant .disease	1 theore tical	3
Laboratory evaluation	Interactive lecture, brainstorming, dialogue and discussion, field learning -training, self	Food environments	Identifying food media and how to prepare :A6 them	3 practic al	
Semester test 1, final , test report	Interactive lecture, brainstorming, dialogue -and discussion, self learning	Pathogens of plant hosts	diseases Identify the organisms that cause plant :A4 and understand the meaning of pathogenicity	1 theore tical	4
Practical short test 2 direct , drawing	Interactive lecture, dialogue ,brainstorming and discussion, field training, practical -exercises, and self learning	Identify several symptoms of pathogenic causes, diagnose them within the disease, and differentiate between pathogenic causes	The student learns about different plant :A10 diseases and how to diagnose them	3 practic al	
Semester test 1, final , test report	Interactive lecture, brainstorming, dialogue -and discussion, self learning	Disease symptoms and signs	It explains the difference between pathological :A1 and studies the symptoms and pathological signs anatomical symptoms and apparent and pathological signs	1 theore tical	5
Laboratory evaluation	Interactive lecture, brainstorming, dialogue and discussion, field training, practical -exercises, and self learning	Isolation of causing organisms plant diseases	Laboratory isolation of pathogens from :A10 plant parts different	3 practic al	

Short test, final test	Interactive lecture, brainstorming, dialogue -and discussion, self learning	Basics of integrated management	attack plants Shows how pathogens :B1 mechanically and chemically and discusses the ,concept of the basics of integrated management	1 theoretical	6
Field assessmen and t homework	Interactive lecture, brainstorming, dialogue and discussion, field training, practical -self exercises, and learning	Scientific visit	scientific visit to the fields Conduct a :D9 Horticulture stations, identifying the most important plant diseases and diagnosing them in the field	3 practical	
Semester exam 2, final exam	Interactive lecture, dialogue ,brainstorming -and discussion, self learning	Synthetic and chemical defences	the importance and how plants Understands :B2 defend themselves through synthetic defenses and biological chemical defenses	1 theoretical	7
writing a report	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, field project, learning-self	A scientific visit to the plastic one of houses	and inside Conduct a scientific visit to the fields :D9 and identify the most important the greenhouses plant diseases and diagnose them in the field	3 practical	
Semester exam 2, final exam	Interactive lecture, brainstorming, dialogue -and discussion, self learning	world of insects	factors that Learn about insect science and the :A3 helped insects survive and spread	1 theoretical	8
Discussion and homework	Interactive lecture, brainstorming, dialogue and discussion, field training, practical -exercises, and self learning	Insect body wall	Learn the basics about insects and their body -A1 walls	3 practical	
Semester exam 2, final exam	Interactive lecture, brainstorming, dialogue -and discussion, self learning	harms of Benefits and insects	the harms and benefits of insects Learn about :A4 and their economic importance	1 theoretical	9
Discussion and homework	Interactive lecture, brainstorming, dialogue field ,and discussion training, practical -exercises, and self learning	Identify the insect's body	recognizes insect body regionsA2	3 practical	
Semester test2	Interactive lecture, brainstorming, dialogue -and discussion, self learning	Learn about modern methods of resistance	Master the methods of pest controlB1:	1 theoretical	10
Discussion and homework	Interactive lecture, brainstorming, dialogue and discussion, field training, practical -exercises, and self learning	Study concepts	is familiar with the concept of evolution and B1 impossibility	3 practical	
Final test	Interactive lecture, brainstorming, dialogue	Learn about modern methods of	He is proficient in pest control Proficient :B2 methods	1 theore	11

	-and discussion, self learning	resistance		tical	
Discussion and homework	Interactive lecture, brainstorming, dialogue and discussion, field training, practical -exercises, and self learning	Identify insects	: identifies some insectsB2	3 practic al	
Final test	lecture, Interactive brainstorming, dialogue -and discussion, self learning	Learn about modern methods of resistance	the methods of pest control Master :B3	1 theore tical	12
And ny homework	,Interactive lecture brainstorming, dialogue and discussion, field training, practical -exercises, and self learning	Examines the mouth parts of the insect	Examines the types of mouthparts of important B3 insects and the appendages of the head region	3 practic al	
Final test	Interactive lecture, brainstorming, dialogue -and discussion, self learning	Insects that infect crops	Identify crop insects :B4	1 theore tical	13
Discussion and homework	Interactive lecture, brainstorming, dialogue and discussion, field training, practical -exercises, and self learning	Examines the insect's body parts	examines the chest and its appendagesB4	3 practic al	
,Short test final test	Interactive lecture, brainstorming, dialogue -and discussion, self learning	Orchard insects	garden insects Identify :B5	1 theore tical	14
Short practical test3	Interactive lecture, brainstorming , dialogue and discussion, field training, practical -exercises, and self learning	Examines the insect's body parts	Examines the abdomen and its appendages C1	3 practic al	
,Short test final test	Interactive lecture, brainstorming, dialogue -discussion, self and learning	General insects	Identify general insects :B6	1 theore tical	15
Field project	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, field project, learning-self	General insects	discusses general insectsB5	3 practic al	
evaluation Course .11					
Relative % weight	Class	(Calendar date (week	Calendar methods		T

2.5	2.5	fourth week	Report 1	1
2.5	2.5	The fifth week	Report 2	2
2	2	sixth week	Quiz (Short test (1	3
2	2	The fourteenth week	Quiz (Short test (2	4
1	1	fifteenth week The	Quiz (Short test (3	5
7.5	7.5	the sixth week	(Semester test (1	6
7.5	7.5	The eleventh week is difficult	(Semester test (2	7
40	40	Final semester exams	Final theoretical test	8
5	5	The fifteenth week	Practical field project	9
2	2	and fifth week The third	Field evaluation	10
1	1	The first week	Quiz (Short practical test (1	11
0.5	0.5	fourth week	Quiz (Short practical test (2	12
1	1	The fourteenth week	Quiz (Short practical test (3	13
5.5	5.5	Weeks 6, 8, 9, 10, 11, 12 and 13	Live drawings and homework	14
20	20	Final semester exams	Final practical test	15
%100	%100	100	the total	

12. Learning and teaching resources

Introduction to plant pathology insects Orchard General insects	(Required textbooks (methodology, if any
Hamid Tarabiyah -Dasmir Mikhail Daabd al -Diseases of orchards and vegetables University of Al Mosul - Zarari-Jawad al-Dr. Abd al University - Dr. Muhammad Amer Fayyad and Muhammad Hamza - Plant diseases of Basra and translated by Damahmoud Musa written by George Akrios - Plant Diseases Abba Arqoub University of -written by Abdulaziz Majeed Nakhilan - Practical plant diseases Basra	(Main references (sources
Journal of plant pathology	Recommended supporting books and (....references (scientific journals, reports
Google scholar Google chrome Google research Researchgate Journal of plant pathology	references, Internet sites Electronic

Practical subject teacher
Salah Ahmad
AMMAR MANAF

Theoretical subject teacher
Dr.Raghad Naif Mheedi
.Dr. Khaled Amiri

Head of the Agricultural Economics Department
Khalid anwar khalid

Chairman of the Scientific Committee
Dr. Abd Alkader Absh

جامعة الموصل
كلية الزراعة
قسم علوم التربة والموارد المائية

Course Description Form Principles of microbiology

1. Course Name:
Principles of microbiology
2. Course Code:
PRMB205
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
8. Course Objectives

Theoretical	Practical
- Enabling the student to understand everything related to microbiology - Enable the student to know the classification of microorganisms - Enabling the student to become familiar with the ways of living microorganisms - Enabling the student to reveal the relationship of microorganisms to ea other - The student can understand the relationship between microorganisms  Humans and soil /	-Enabling the student to understand microbiology a its life applications -Enable the student to use a microscope and examine samples -Knowing the different types and shapes of microorganisms through their dyeing - Enable the student to prepare slides for examina and measure bacterial movement -The student judges the different sterilization meth and their efficiency - Enabling the student to prepare suitable culture media for microorganisms

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 b1 The student demonstrates the concept and its origin Microbiology	theoretical Introduction to microbiology and the stages of its developme	Interactive lecture, brainstorming, dialogue and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style
	3 practical	practical b7 The student learns about science Microbiology the microscope and how to use it	practical Microscope and its use	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises field project, self-learning	practical Assigning tasks and reports
2	2 Theoretical	theoretical c1 The student becomes famili with the characteristics of living things Culture microscopy and chemical	theoretical Morphological characteristics For microbiology	Interactive lecture, brainstorming, dialogue and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style
	3 practical	practical b8 The student can prepare Slides and staining of bacteria with Gram stain	practical Gram stain	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises field project, self-learning	practical Assigning tasks and reports
3	2 Theoretical	theoretical b2 The student hits a wall cell and structures external to bacteria	theoretical External structures of bacte	Interactive lecture, brainstorming, dialogue and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style
	3 practical	practical c4 The student gets to know bacteria acid resistant, dyed and tested	practical Acid-fast bacteria	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises field project, self-learning	practical Assigning tasks and reports
4	2 Theoretical	theoretical b3,b4 The student hits a wall Cell and structures external to bacteria	theoretical External structures of bacte	Interactive lecture, brainstorming, dialogue and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style
	3 practical	practical b9 Distinguish vegetative cells fro spores	practical Painting blackboards	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises field project, self-learning	practical Assigning tasks and reports
5	2 Theoretical	theoretical c2 The student gets to know th contents Cytoplasm and bacterial movement	theoretical Internal structures of bacteria	Interactive lecture, brainstorming, dialogue and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style
	3 practical	practical d2 Enable the student to opera Microbiology laboratory equipment	practical Laboratory equipment Microbiology	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, field project, self-learning	practical Assigning tasks and reports
6	2 Theoretical	theoretical a1 The student recognizes the elements nutritional and physical factors that affect the growth of microorganisms	theoretical Microbiology developmer	Interactive lecture, brainstorming, dialogue and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style

	3 practical	practical b10 The student can see the movement of bacteria Under t microscope	practical Examination of bacterial movement by hanging dr	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises field project, self-learning	practical Assigning tasks and reports
7	2 Theoretical	theoretical a2 The student is familiar with the food environment Its composition and types	theoretical Food environments	Interactive lecture, brainstorming, dialogue and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style
	3 practical	practical b11 The student is able to use a hemocytometer slide	practical Count bacteria by Hemocytometer slide	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises field project, self-learning	practical Assigning tasks and reports
8	2 Theoretical	theoretical c3 The student judges the growth curves of microorganisms and their methods of reproduction	theoretical Microorganism growth curves	Interactive lecture, brainstorming, dialogue and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style
	3 practical	practical c5 Scientific visit	practical Scientific visit	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises field project, self-learning	practical Assigning tasks and reports
9	2 Theoretical	theoretical a3 The student learns about direc and indirect bacteria counting methods	theoretical Types of farms and counting methods bacteria	Interactive lecture, brainstorming, dialogue and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style
	3 practical	practical c6 The student will be able to cou the bacteria in milk samples	practical Testing and estimating the number of bacteria in milk	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises field project, self-learning	practical Assigning tasks and reports
10	2 Theoretical	theoretical a4 The student is familiar with fu And mold and its importance	theoretical General characteristics of fungi	Interactive lecture, brainstorming, dialogue and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style
	3 practical	practical c7 The student can Count the bacteria after cultivatio	practical Count bacteria by Molded dishes	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises field project, self-learning	practical Assigning tasks and reports
11	2 Theoretical	theoretical a5 The student is judged exterior For molds and their uses	theoretical Methods of mold reproducti Its types and uses	Interactive lecture, brainstorming, dialogue and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style
	3 practical	practical b12 The student can collect Samples from different sources	practical Count bacteria by molded dishes	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises field project, self-learning	practical Assigning tasks and reports
12	2 Theoretical	theoretical b6 The student explains the definition Yeasts and their types And uses	theoretical Yeasts	Interactive lecture, brainstorming, dialogue and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style

	3 practical	practical b13 The student learns about methods Various sterilizations and ways to use it	practical Sterilization	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises field project, self-learning	practical Assigning tasks and reports
13	2 Theoretical	theoretical d1 The student knows the definiti Fungi and their types And its uses	theoretical Fungi	Interactive lecture, brainstorming, dialogue and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style
	3 practical	practical b14 The student gets to know Examinations and tests validity of water and its microbial content	practical Water tests	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises field project, self-learning	practical Assigning tasks and reports
14	2 Theoretical	theoretical e1 Student governed definition Viruses and clarification Its types and ways of infection	theoretical Viruses	Interactive lecture, brainstorming, dialogue and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style
	3 practical	practical e3 The student can Preparing the culture media Different and necessary For the growth of microorganisms	practical Cultivation media	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises field project, self-learning	practical Assigning tasks and reports
15	2 Theoretical	theoretical e2 The student is familiar with the relationship between living things Soil microstructure	theoretical The relationship of microorganisms with soil	Interactive lecture, brainstorming, dialogue and discussion, self-learning	theoretical audio methods, Writing on the board direct dialogue style
	3 practical	practical d3 The student reviews the curriculum in detail and fast	practical review	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises field project, 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%

M. Dr.. Rand Abdel Hadi Ghazal

Theoretical subject teacher:

M.Dr. Muhammad Ayad Harbawi

M. Dr. Hesham Saadaldeen Yunis

Practical subject teacher

Dr. Ammar Younis Ahmed Kashmoula

Head of the Department of Soil Sciences and Water Resources

أ.م.د. عمار يونس احمد كشمولة

رئيس القسم

Head of department

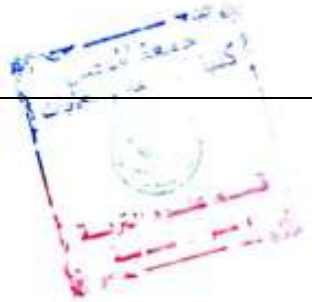
Dr. Abdul Qader Abash

Chair of the Scientific Committee

Course Description

1. Course Title:
Soil ecology and meteorology
2. Course Code
SWEN234
3. Semester / Year:
First 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 3.5 units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Taha A.T.D. AlJawwadi tars71@uomosul.edu.iq Assist. Dr. Aman A. Mawlood
8. Course Objectives
-– Identifying what ecology is and its difference from other sciences, and learning about the difference between environment and ecology through definitions that clarify this and the extent of the importance of studying ecology from an agricultural perspective. - - The student learns about the elements of climate, distinguishing it from weather, and the extent of the impact of climate differences and the effects of climate elements on plants. - - Studying the climate changes occurring due to natural change and human influence, as well as the results of pollution and negative impacts on the environment Enabling the student to become familiar with the most important devices used in measuring climate elements, such as radiation, temperature, humidity, rain, atmospheric pressure, and wind, and what is the benefit of measuring the differences for each of them, and how to employ them in predicting climate changes occurring in the near future, in order to take caution in dealings with the agricultural environment.

9. Teaching and Learning Strategies
- Interactive Lecture - BrainstormingDialogue and discussion - Practical exercises



- Assigning tasks and writing a report
- 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 and introduction to the importance of environmental science and meteorology.	A1: Introducing the student to the relationship between the environment, environmental science, and other scientific terms, as well as introducing climate terms.	2 Theoretical	1
,Practical quiz 1	Interactive lecture, brainstorming, dialogue and discussion, field training, self-learning.	Introduction and introduction to practical applications.	A14: Introducing the student to the importance of measuring climate changes and continuously archiving the results.	3 Practical	
Semester Exam 1, Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning.	Climatology	A2: Definition of ecology, its divisions, climate and weather	2 Theoretical	2
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Weather and climate.	B3: Definition of radiation measuring devices	3 Practical	
Semester Exam 1, Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	The most important divisions and subdivisions of the ecosystem	A3: Introducing the student to the ecosystem and its components	2 Theoretical	3
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, self-learning	Methods of measuring radiation	B4: Introducing students to the operation of a radiation measuring device and its calculations.	3 Practical	
Semester Exam1, Final Exam, Report	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Layers of the atmosphere, the thickness of each layer, and their characteristics	B1: The student learns about the atmosphere, the layers of the atmosphere, the thickness of each layer and its characteristics.	2 Theoretical	4
2 Practical quiz	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Types of thermometers and how to read them	B5: Introducing students to thermometers, types of thermometers and the benefit of each type.	3 Practical	
Semester Exam1, Final Exam, Report	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Energy and radiation	B2: Introducing students to the sections of the electromagnetic spectrum and identifying the visible spectrum within the wide range of the spectrum.	2 Theoretical	5
Home work	Interactive lecture, brainstorming, dialogue	Measuring atmospheric pressure	B6: Introducing students to regular and recorded atmospheric pressure devices	3 Practical	

	and discussion, field training, practical exercises, self-learning				
Quiz 1, Final Quiz	Interactive lecture, brainstorming, dialogue and discussion, self-learning	The effect of light on plants	A4: The student learns in detail about the morphological and physiological effects of light on plants and what are the types of effects. B4: Introducing the student to wind speed and direction measuring devices and recording them.	2 Theoretical	6
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Devices for measuring wind speed and direction	B4: Introducing the student to wind speed and direction measuring devices and recording them.	3 Practical	
Semester Exam 2, Final Exam, Report	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Maximum, minimum, and optimum temperatures and the effect of each on plants	A5: Forming a cognitive overview of temperature and thermal inversion and what are the minimum, maximum and ideal temperatures.	2 Theoretical	7
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, field project, self-learning	Devices for measuring atmospheric humidity	B8: Introducing the student to the use of air humidity devices and their components.	3 Practical	
Semester Exam 2, Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	The variation and differenc temperature has an effect atmospheric pressure and win	A6: Guide the student to know the variation and difference in temperatures on the globe.	2 Theoretical	8
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Simple devices for measuring evaporation	B9: Teach the student about simple devices to measure evaporation and calculations of the rate of evaporation - transpiration	3 Practical	
Semester Exam 2, Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Diurnal temperature distribution system	A7: The student masters what are temperature systems and what is the daily temperature system	2 Theoretical	9
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Devices for measuring the amount of rain and their types	B10: Introduce the student to rain measuring devices and methods of using them and calculating them	3 Practical	
Semester Exam 2	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Atmospheric pressure ranges and their distribution on the globe and their effects	A8: The student learns about atmospheric pressure and its distribution on the globe and the main ranges of its regions.	2 Theoretical	10
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Environmental problems and methods of treating them	B11: The student learns about the most important environmental problems in terms of causes and treatments.	3 Practical	

Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Types of winds and their effects on plants	A9: Forming an idea for the student about the types of winds and the extent of their negative effects on plants.	2 Theoretical	11
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Soil pollution	B12: Introducing the student to soil pollutants and methods of treating them	3 Practical	
Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Types of rain and the effects and causes of each type	A10: The student learns about water, atmospheric humidity and types of rain.	2 Theoretical	12
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Air pollution.	B13: Introducing air pollutants to the student and methods of treating them	3 Practical	
Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Teach students about seas rainfall, its distribution, and impact on rain-depen agriculture.	A11: The student learns about the impact and importance of the amount and distribution of seasonal rainfall on rain-fed agriculture	2 Theoretical	13
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Water pollution.	B14: Introducing water pollutants to the student and methods of treating them	3 Practical	
Quiz 2, Final Quiz, Report	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Meteorological terminology and types of meteorological stations.	A12: The student masters the meaning of meteorology and the types of stations specialized in it and how to obtain data	2 Theoretical	14
Practical quiz3	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Components of agricultural meteorological stations.	B15: The student learns about the components of meteorological stations and the task of the station employees and the method of archiving data	3 Practical	
Quiz 3, Final Quiz	Interactive lecture, brainstorming, dialogue and discussion, self-learning	General principles for establishing stations and monitoring areas.	A13: The student learns about the foundations on which the establishment of meteorological monitoring stations is built and how to choose them.	2 Theoretical	15
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning.	Scientific trip to the Meteorological Department.	B16: Conduct a scientific trip to meteorological stations and learn about the nature of their work	3 Practical	

11. Course Evaluation

% Relative Weight	Grade	Calendar date (week)	Evaluation methods	t

6	6	Week 8	Report 1	1
1	1	Week 3	Homework	2
1	1	Week 4	Quiz (1)	3
1	1	Week 5	Quiz (2)	4
1	1	Week 6	Quiz (3)	5
7.5	7.5	Week 7	Semester Test (1)	6
7.5	7.5	Week 11	Semester Test (2)	7
40	40	Final Exams	Final Theoretical Test	8
1	1	Week 5	Homework	9
1	1	Week 6	Homework	10
1	1	Week 11	Quiz	11
1	1	Week 12	Quiz (1)	12
10	10	Week 14	Quiz (2)	13
1	1	Week 12	Quiz (Semester Test)	14
20	20	Final Semester Exams	Final Practical Test	15
%100	% 100	100	Total	

12. Learning and Teaching Resources

Environmental Science, Hekmat Abbas Al-Ani / Raad Hashim Bakr	Required textbooks (methodology, if any)
Principles of Environmental Science and Climate, Sadiq Jaafar Al-Sarraf	Main references (sources)
Academic Scientific Journals, Reports of International Organizations on Environment and Meteorology	Recommended books and references (scientific journals, reports...)
FAO	Electronic References, Websites

Theoretical subject lecturer:
Dr. Taha A.T.D. AlJawwadi

Chairman of the Scientific Committee:
Dr. Abdul Qader Abash sbak

Head of the Department of Soil Science and Water Resources:
Dr. Khaled Anwar Khaled

Course Description Form

1. Course Name:
Statistical
2. Course Code:
STAT109
3. Semester / Year:
2024 - 2025 First semester (Autumn)
4. Description Preparation Date:
1/2/2025
5. Available Attendance Forms:
Attended
6. Number of Credit Hours (Total) / Number of Units (Total)
2 Theoretical + 3 Practical / 3.5 Unit
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Zaid Mohammed Talal Alhabbar Email: zaid.alhabbar@uomosul.edu.iq
8. Course Objectives
• Knows the science of statistics and its types, and also differentiates between descriptive statistics and inferential or inferential statistics • Explains what descriptive variables are and recognizes the difference between a sample and a population • Organize and draw a frequency distribution table and identify its parts • Organizes a table of relative frequency distribution and ascending and descending grouping • He finds the arithmetic mean - and learns about the properties of the arithmetic mean • Works on how to find the range, mean deviation, variance, and standard deviation • Distinguish the difference between permutations, combinations and a random experiment • Expresses the components of discrete probability distributions • Identify the statistical hypothesis, the null hypothesis, and the alternative hypothesis - compare the types of error • Learn about the T-test and the Z-test and the difference between them • Learn how to perform the chi-square test steps • Learn about correlation, regression, correlation coefficient, regression, and the properties of each
9. Teaching and Learning Strategies

Theoretical:	Practical
• Interactive lecture • Brainstorming • Dialogue and discussion • Assigning tasks and reporting	• Assigning group work to reveal leadership skills • Assigning tasks and a report for each lecture

• The student is assigned to prepare reports based on his own diligence and prepared for discussion with the students	

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 Theoretical + 3 Practical	a1: Knows the science of statistics and its types, and also distinguishes between descriptive statistics and inferential statistics a7: Differentiate between descriptive and inferential statistics, as the most important statisticians in the twentieth century remember	Theoretical: Statistics, its definition and types Practical: Solve mathematical exercises on the topic	Theoretical: auditory methods Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assignment of duties, discussions
2	2 Theoretical + 3 Practical	a2: Explains what descriptive variables are and recognizes the difference between a sample and population a8: Compares quantitative variables and descriptive variables It also distinguishes between the population and the sample, giving examples of each	Theoretical: The nature and types of statistical data Practical: Solve mathematical exercises on the topic	Theoretical: auditory methods Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assignment of duties, discussions
3	2 Theoretical + 3 Practical	c1: Organize and draw a frequency distribution table and identify its parts b2: Organizes a frequency distribution table and identifies its components. He also experiments with finding the ascending and descending group frequencies	Theoretical: tabular presentation and graphical representation Practical: Solve mathematical exercises on the topic	Theoretical: auditory methods Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assignment of duties, discussions
4	2 Theoretical + 3 Practical	c2: Organizes table the relative frequency distribution and ascending and descending grouping	Theoretical: Types of frequency distribution	Theoretical: auditory methods	Short exams, assignment of duties, discussions

		b3: Calculates the arithmetic mean, geometric mean, and harmonic mean. It also determines the squared mean, median, and mode.	tables and how to draw them Practical: Solve mathematical exercises on the topic	Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	
5	2 Theoretical + 3 Practical	b1: Finds the arithmetic mean - and learns about the properties of the arithmetic mean c6: The range law, mean deviation, variance of the mean deviation, and standard deviation are applied to the classified and unclassified data	Theoretical: Measures of concentration or mediation Practical: Solve mathematical exercises on the topic	Theoretical: auditory methods Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assignment of duties, discussions
6	2 Theoretical + 3 Practical	c3: Works out how to find the range, mean deviation, variance, and standard deviation c7: Explains probability theory for random experiment, sample space, and mutually exclusive events with solving examples	Theoretical: measures of dispersion or difference Practical: Solve mathematical exercises on the topic	Theoretical: auditory methods Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assignment of duties, discussions
7	2 Theoretical + 3 Practical	c4: Distinguish the difference between permutations, combinations and a random experiment b4: Explains the variables of the binomial distribution law	Theoretical: Principles of probability theory Practical: Solve mathematical exercises on the topic	Theoretical: auditory methods Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assignment of duties, discussions
8	2 Theoretical + 3 Practical	c5: Expresses the components of discrete probability distributions c8: Explains the null hypothesis and the alternative hypothesis and compares them	Theoretical: Piecewise probability distributions Practical: Solve mathematical exercises on the topic	Theoretical: auditory methods Style of writing on the blackboard Direct dialogue style	Short exams, assignment of duties, discussions

				Practical: Assigning tasks and reporting	
9	2 Theoretical + 3 Practical	a3: Recognizes the statistical hypothesis, the null hypothesis, and the alternative hypothesis - compares the types of error b5: Shows the T test "T-test" and shows the Z test "Z-test"	Theoretical: Hypothesis testing Practical: Solve mathematical exercises on the topic	Theoretical: auditory methods Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assignment of duties, discussions
10	2 Theoretical + 3 Practical	a4: Learn about the T-test and the Z-test and the difference between them b6: Enumerate the types of applications of chi-square	Theoretical: Hypothesis testing Practical: Solve mathematical exercises on the topic	Theoretical: auditory methods Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assignment of duties, discussions
11	2 Theoretical + 3 Practical	a5: Learn how to perform the chi-square testing steps b7: Explains the simple connection, and reinforces it with examples	Theoretical: Chi-square distribution Practical: Solve mathematical exercises on the topic	Theoretical: auditory methods Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assignment of duties, discussions
12	2 Theoretical + 3 Practical	a6: Learn about correlation, regression, correlation coefficient, regression, and the properties of each b8: Explains the nature of the distribution of F. It also explains the relationship between the distributions of Z, T, and F and the distinction between each of them	Theoretical: simple correlation and regression Practical: Solve mathematical exercises on the topic	Theoretical: auditory methods Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assignment of duties, discussions
13	2 Theoretical + 3 Practical	d1: Training on how to apply statistics in designing agricultural experiments	Theoretical + practical: report and discussion	Theoretical: auditory methods	Short exams, assignment of duties, discussions

		d2: Organize a report on the statistics topics studied and learn how to apply statistics in agricultural sciences		Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	
14	2 Theoretical + 3 Practical	e1: Visit to the Statistics Department with the aim of learning about the most important statistical processes and how to implement E3: The student assumes some problems in agricultural fields and laboratories and how to develop statistical solutions	Theoretical + practical: A field visit to the Department of Statistics - University of Mosul	Theoretical: auditory methods Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assignment of duties, discussions
15	2 Theoretical + 3 Practical	e2: Visit to the Mathematics Department with the aim of learning about the most important statistical operations and how to implement them e3: The student assumes some problems in agricultural fields and laboratories and how to develop statistical solutions	Theoretical + practical: A field visit to the Department of Mathematics - University of Mosul	Theoretical: auditory methods Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assignment of duties, discussions

11. Course Evaluation

	Evaluation methods	Evaluation date (week)	Degree	Percentage weight %
1	Report 1	Fourth week	2.5	2.5
2	Report 2	Fifth week	2.5	2.5
3	Short test (1) Quiz	Sixth week	2	2
4	Short test (2) Quiz	Fourteenth week	2	2
5	Short test (3) Quiz	Fifteenth week	1	1
6	Semester test (1)	Sixth week	7.5	7.5
7	Semester test (2)	Eleventh week	7.5	7.5
8	Final theoretical test	Final semester test	40	40
9	Practical field project	The fifteenth week	5	5
10	Field evaluation	Third and fifth week	2	2
11	Practical short test (1) Quiz	First week	1	1
12	Short practical test (2) Quiz	Fourth week	0.5	0.5
13	Short practical test (3) Quiz	Fourteenth week	1	1

14	Live drawings and homework	Weeks 6, 8, 9, 10, 11, 12 and 13	5.5	5.5
15	Final practical test	Final semester test	20	20
	Total	100	Degree	Percentage weight %

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Introduction to statistics
Main references (sources)	Principles of statistics
Recommended books and references (scientific journals, reports…)	Statistics book and methods of statistics
Electronic References, Websites	

Practical lecturer

Khalil Ibrahim Khalil

Theoretical lecturer

Dr. Zaid Mohammed Alhabbar

Dr. Khaled Anwar Khaled
Head of the Department of Soil Sciences and Water Resources

Dr. Abdul Qader Abash
Chair of the Scientific Committee

Course Description Vegetable production

1. Course Name: **Vegetable production**

2. Course Code: **VEPR121**

3. Semester / Year: 2024 – 2025

4. Description Preparation Date: 1/9/2024

5. Available Attendance Forms: in person

6. Number of Credit Hours 2 theoretical + 3 practical (5) / Number of Units (3.5)

7. Course administrator's name (mention all, if more than one name)

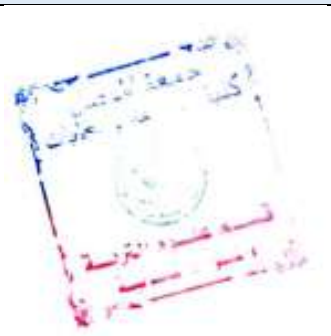
Name: Dr. Safwan Mohammed Hajem - Dr. Mohanad Aqil Ahmed
Email: Safwan.hajem@uomosul.edu.iq mohand.aq@uomosul.edu.iq

8. Course Objectives

Enabling the student to understand and comprehend the science of vegetable production and its relationship to other science
Enabling the student to know the most important scientific methods for identifying vegetable production.
Enabling the student to become familiar with the concept of vegetable production.
Enabling the student to be able to identify all types of summer vegetables and all phenomena related to summer vegetable production.
The student can explain all aspects of life related to the science of summer and winter vegetable production.
Enabling the student to become familiar with the most important laboratory and field methods related to the science of vegetable production and to conduct experiments to grow all winter vegetable crops.

9. Teaching and Learning Strategies

- Interactive lecture
- Brainstorming
- Dialogue and discussion
- Field Training
- Practical exercises
- Field project
- Self-education



10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 Theoretical	A: Identify horticulture and mention the main branches of this science. B3: Identify the most important things that must be available in order to develop the cultivation and production of vegetable crops that must be researched and studied. A1: Mention the problems of vegetable production in Iraq.	Definition and native habitats of vegetable plants	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Midterm Exam 1, Final Exam
	3 Practical	A: Among the most important factors to be tak into consideration when establishing a vegetab field.	vegetable crops	Assignment and report	Short exams and homework assignments

2	2 Theoretical	A: Identify greenhouses and list their advantages and disadvantages. B2: Explain the shape, design, and orientation of the house. A: Identify greenhouses and list their advantages and disadvantages. B: Explain the shape, design, and orientation of the house. B: Explain the shape of the wooden canopy and the cold and hot dormers.	Nursery and transplanting operations	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Midterm Exam 1, Final Exam
	3 Practical	A: Define seed and vegetative reproduction and mention their advantages and disadvantages.	Vegetable crop propagation	Assignment and report	Short exams, homework assignments, discussions
3	2 Theoretical	B: Explain the economic importance of vegetable crops. B: Explain the importance of vegetable crops in terms of nutritional value. C: Classify vegetable crops according to the botanical classification based on the structural and anatomical characteristics of the plants.	Vegetable crop classification	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Midterm Exam 1, Final Exam
	3 Practical	B: Number of ways to place seeds in the soil	Vegetable seed planting methods	Assignment and report	Short exams, homework assignments, discussions
4	Theoretical	A: Know vegetative reproduction. Mention its advantages. C: List the methods of vegetative reproduction. A: Know sexual reproduction. Mention the characteristics of good seeds. B: Explain the methods of planting seeds. A: Know transplanting and acclimatization. B: List the changes that occur to seedlings after acclimatization. C: List the methods of acclimatization.	Vegetable crop propagation	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Midterm Exam 1, Final Exam
	3 Practical	B: Classify vegetable crops according to their ability to tolerate transplanting.	Vegetable nursery	Assignment and report	Short exams, homework assignments, discussions
5	2 Theoretical	A: Knows patching A: Knows thinning A: Knows weeding B: Explains the harms of not weeding and its benefits to the plant A: Knows mulching A: Mentions the benefits of mulching A: Mentions the benefits of exporting	Agricultural operations in vegetable crops	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Midterm Exam 1, Final Exam, Report
	3 Practical	B: Number of Harding methods	Harding	Assignment and report	Short exams, homework assignments, discussions

6	2 Theoretical	A: Identify fertilizers B: Explain the importance of fertilizers for plants C: List the types of fertilizers A: Mention the benefits of animal fertilizers B: Explain how to prepare animal fertilizers A: Mention the benefits of green fertilizers B: Explain how to use green fertilizers C: Classify chemical fertilizers B: Explain how to analyze fertilizers C: Classify nitrogenous, phosphate, and potassium fertilizers according to their composition	Fertilizing vegetable crops	Interactive lecture, brainstorming, dialogue and discussion, self-learning	short test, final test
	3 Practical	B: Number of weed control methods	Agricultural operations in vegetable crops	Assignment and report	Short exams, homework assignments, discussions
7	2 Theoretical	A: Mention the most important factors affecting the absorption process by leaves. B: Explain how factors affect absorption by leaves. B: Explain methods for diagnosing the fertilizer needs of vegetable crops.	Methods of adding fertilizers	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Midterm Exam 2, Final Exam
	3 Practical	B: Design a three-year crop rotation.	Agricultural Rotation	Assignment and report	Short exams, homework assignments, discussions
8	2 Theoretical	B: Explain the effect of irrigation and irrigation intervals on plants. A: Mention the advantages and disadvantages of irrigation methods. B: Explain propagation methods in detail. C: List irrigation methods.	Irrigation in vegetable crops	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Midterm Exam 2, Final Exam
	3 Practical	B: Explain the nature of growth, root system, stem, leaves, flowers, pollination, and varieties. B: Field experiments for growing cabbage, cauliflower, radish, and turnips.	The Crusader family	Assignment and report	Short exams, homework assignments, discussions
9	2 Theoretical	B: Morphological description of Cucurbitaceae crops B: Methods of propagation, pollination, ripening, and storage	Cucurbitaceae family	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Midterm Exam 2, Final Exam
	3 Practical	B: Explain the nature of growth, root system, stem, leaves, flowers, pollination, and varieties. B: Field experiments on broad bean cultivation.	legume family	Assignment and report	Short exams, homework assignments, discussions
10	2 Theoretical	B: Morphological description of Cucurbitaceae crops B: Methods of propagation, pollination, ripening, and storage	melon	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Midterm Exam 2
	3 Practical	B: Demonstrates the nature of growth, root system, stem, leaves, flowers, pollination, and varieties. B: Field experiments for growing beets and spinach.	The Beet family Chenopodiaceae	Assignment and report	Short exams, homework assignments, discussions

11	2 Theoretical	B: Shows the morphological description of the narcissus family. B: Explains the methods of reproduction, pollination, ripening, and storage.	Alliaceae family	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Final exam
	3 Practical	B: Explain the nature of growth, root system, stem, leaves, flowers, pollination, and varieties. B: Field experiments for growing onions and garlic.	Alliaceae family	Assignment and report	Short exams, homework assignments, discussions
12	2 Theoretical	B: Shows the morphological description of the Solanaceae crops. B: Shows the methods of propagation, pollination, ripening, and storage.	Solanaceae family	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Final exam
	3 Practical	B: Demonstrates the nature of growth, root system, stem, leaves, flowers, pollination, and varieties. B4: Field experiments for growing lettuce and carrots.	The composite family, the Umbelliferae family	Assignment and report	Short exams, homework assignments, discussions
13	2 Theoretical	B: Shows the morphological description of legume crops. B: Shows the methods of reproduction, pollination, ripening, and storage.	legume family	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Final exam
	3 Practical	B: Explain the nature of growth, the root system, the stem, leaves, flowers, pollination, and varieties. B4: Field experiments for growing tomatoes, peppers, eggplant, and potatoes.	Solanaceae family	Assignment and report	Short exams, homework assignments, discussions
14	2 Theoretical	B: Shows the morphological description of cruciferous crops. B: Shows the methods of reproduction, pollination, ripening, and storage.	The Crusader family	Interactive lecture, brainstorming, dialogue and discussion, self-learning	short test, final test
	3 Practical	Examination and discussion of students' reports	midterm exam	Assignment and report	Field evaluation
15	2 Theoretical	PowerPoint presentation on plants and a scientific visit to the private horticulture station and nurseries	PowerPoint presentation on plants and a scientific visit to the private horticulture station and nurseries	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Scientific visit
	3 Practical	PowerPoint presentation on plants and a scientific visit to the private horticulture station and nurseries	Problem solving	Interactive lecture, brainstorming, dialogue and discussion, field training, field project, self-learning	Field project

11. Course Evaluation

seq	Evaluation methods	Evaluation date (week)	Grade	Relative weight %
1	Report 1	fourth week	2.5	2.5

2	Report 2	fifth week	2.5	2.5
3	Short test (1)	sixth week	2	2
4	Quiz Short test (2)	fourteenth week	2	2
5	Quiz Short test (3)	fifteenth week	1	1
6	Semester test (1)	sixth week	7.5	7.5
7	Semester test (2)	eleventh week	7.5	7.5
8	Final theoretical test	Final semester exams	40	40
9	Practical field project	fifteenth week	5	5
10	Field evaluation	third and fifth week	2	2
11	Short test (1)	first week	1	1
12	Quiz Short test (2)	fourth week	0.5	0.5
13	Quiz Short test (3)	fourteenth week	2.5	2.5
14	Writing a report	Fourteenth week	5.5	5.5
15	Final practical test	Final semester exams	20	20
	Total	100	100%	100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Vegetable Production Parts 1 and 2
Main references (sources)	- Dr. Adnan Nasser Matloub. 1985. Vegetable Production. Part One. Dar Al-Kutub for Printing and Publishing. - Matloub, Adnan Nasser (1988) Vegetable Production 2: Dar Al-Kutub for Printing and Publishing, University of Mosul, Republic of Iraq. Hassan, Ahmed Abdel Moneim (2017) Basics of Vegetable Production: Arab House for Publishing and Distribution, First Edition, Cairo, Arab Republic of Egypt.
Recommended books and references (scientific journals, reports…)	Vegetables production Plant physiology
Electronic References, Websites	Ketabpedia.com

Theoretical subject teacher
Lecturer
Dr. Safwan Mohammed Hajem

Practical subject teacher
Lecturer
Dr. Mohanad Aqil Ahmed

Chair of the Scientific Committee : Dr. Abd Al-Qader Abash Sbak

Head of the Dept. of Soil Sciences and Water Resources : Dr Khalid Anwar Khalid

Course Description Form

1. Course Name:
Alteration and Leveling of land
2. Course Code:
ALLA236
3. Semester / Year:
2nd Semester / 2023-2024
4. Description Preparation Date:
1 / 2 / 2025
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
2 Theory + 3 practical / 3.5 units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Haees Sayel Jarjes Email: haees_sayel@uomosul.edu.iq Name: Hamid Ibrahim

8. Course Objectives

Theory : -Preparing agricultural cadres capable of dealing with the problems of land settleme and modification, especially the problems resulting from meanders, undulations, rise and fall, digging and backfilling . -Preparing qualified agricultural cadres to use scientific programs that contribute to removing plant materials from their roots, because their presence negatively affects t construction work subsequent to the level process, as the presence of these materials or backfilling on top of them leads to the la of the filled surface after a period of time. - Follow up on the performance of graduat in fields and lands and the extent to which graduates' specifications match the needs projects and the extent of implementation and application of what has been studied i the field of work.	Practical : Enabling the student to practically address the problems of la settlement and modification Preparing qualified cadres to use scientific programs and following up on the performance of graduates in fields and lands and the extent to which graduat specifications match the needs of projects and the extent of implementing and applying what has been studied in the field work.

9. Teaching and Learning Strategies

Strategy	-Interactive lecture -Brainstorming -Dialogue and discussion - Assigning tasks and reporting

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	2Theory 3 Pract.	Theory: a1 Learns about concept settlement and la modification - w is the level - num - north point - ot definitions. Practical: a11 Familiar w general definitio including normalization methods for find relative relationsh between the heig of different points	Theory: The concept of settlement and adjustment - settlemer tables practical : General definitions include normalization methods for finding relative relationships between the heights o different points	Theory : In-person lectures Practical : In-person lectures wi field visits	Discussions and interaction in the lectu and a short test
2	2Theory 3 Pract	Theory: A2 is familiar with drawing natural longitudinal sectio practical : b3 Apply how to find levels using the sight line height method	Theory: Drawing natural longitudinal sections practical : Finding levels using height of sight line	Theory : In-person lectures Practical : In-person lectures w field visits	Quotes and interacti in the lecture Short test
3	2Theory 3 Pract	Theory: a 4 Learn about drawing design longitudinal sectio practical: b4 Apply how to fi levels using the ris and fall method	Theory: Drawing design longitudinal sections practical : Finding levels using method of rise and fall	Theory : In-person lectures Practical : In-person lectures wi field visits	Short test Direct drawing
4	2Theory 3 Pract	Theory: c1 Backfill is calculated from longitudinal sectio practical : c4 Draw normal longitudinal sectio	Theory: Methods of calculating excavation and backfilling from longitudinal sections practical : Drawing natural longitudinal sections	Theory : In-person lectures wi field visits Practical : In-person lectures wi field visits	Field evaluation Direct drawing

5	2Theory 3 Pract	Theory: a6,c2 Identify cros sections and calculate earthwo practical : C5 draws the desi longitudinal sectic	Theory: Cross sections and earthwork calculation practical : Drawing design longitudinal sections	Theory : In-person lectures wi field visits Practical : In-person lectures wi field visits	Short test Direct drawing
6	2Theory 3 Pract	Theory: a 6 Understands what grid settleme is practical : c6 Calculates excavation and backfilling from longitudinal sectic	Theory: Soil building practical : Estimation of calcium carbonate in the soil	Theory : In-person lectures wi field visits Practical : In-person lectures wi field visits	rt test Direct drawing
7	2Theory 3 Pract	Theory: a 7 compares the first and second cases of grid regularization practical : C7 Draws cross- sections and methods of earthwork calculations there	Theory: soil temperature practical : determination carbonates bicarbonates in the soil	Theory : In-person lectures wi field visits Practical : In-person lectures wi field visits	Short test Direct drawing
8	2Theory 3 Pract	Theory: a9 Explains grid leveling - the seco case, the triangle method and the th case practical : C8 applies the squ method in grid leveling	Theory: Grid settlement - the second case is the triangle method - the third case is excavatio and backfilling at the same time practical : The method of square grid leveling	Theory : In-person lectures wi field visits Practical : In-person lectures wi field visits	Short test Direct drawing
9	2Theory 3 Pract	Theory: a3Determines the contour lines - the contour interval - factors on which t choice of the cont interval depends - the specifications the contour lines practical : a11 Learn about g	Theory: Contour lines - the contour interval - the factors on which the choice of the contour interval depends - specifications of the contour lines Grid leveling - the seco practical : case, the method	Theory : In-person lectures wi field visits Practical : In-person lectures wi field visits	Short test Direct drawing

		leveling - the seco case, the triangle method - contour lines	triangles - contour line		
10	2Theory 3 Pract	Theory: b1 will work and draw the contour lines in the direct way practical : a12 Familiarizes with the specifications of contour lines	Theory: Preparing contour ma first the direct method practical : Specifications of cont lines	Theory : In-person lectures wi field visits Practical : In-person lectures wi field visits	Short test Direct drawing
11	2Theory 3 Pract	Theory: b2 is used and dra contour lines indirectly practical : d1 means prepar contour lines - direct method	Theory: Preparing contour ma second, the indirect method practical : Preparing contour lin the direct method	Theory : In-person lectures wi field visits Practical : In-person lectures wi field visits	Short test Direct drawing
12	2Theory 3 Pract	Theory: a8 It is suggested t pad contour lines practical : d2 is used to prep contour lines - indirect method	Theory: Filling contour lines practical : Preparation of cont lines - indirect method	Theory : In-person lectures wi field visits Practical : In-person lectures wi field visits	Short test Direct drawing
13	2Theory 3 Pract	Theory: e1 justifies paddin of contour lines practical : b5 Applies the Contour Lines - Fi Contour Lines sett	Theory: Uses and benefits of contour lines practical : Setting up contour lin filling contour lines	Theory : In-person lectures wi field visits Practical : In-person lectures w field visits	Short test Direct drawing
14	2Theory 3 Pract	Theory: c3 Draw contour maps practical : d3,b6 uses and applies contour lir	Theory: Contour mapping with homogeneous gradien Calculating normalization from contour lines Practical:: Applications and uses contour lines practical	Theory : In-person lectures wi field visits Practical : In-person lectures wi field visits	Short test Direct drawing
15	2Theory 3 Pract	Theory: A10 Learn how to evacuate lands for	Theory: Evacuating lands for th purposes of leveling ar	Theory : In-person lectures wi field visits	Semester exam 2, f exam

		the purposes of settlement work practical : a13 Learn about leveling and adjustment equipment - bulldozers - scrap - graders - graders	leveling - leveling and leveling equipment - bulldozers - scrapers - graders - graders Practical: Leveling and adjustme equipment - bulldozer scrapers - graders - graders practical :	Practical : In-person lectures wi field visits	

11.	Course Evaluation			
	Evaluation Methods	Evaluation Date	Degree	Relative weight %
	Final report theory + pract. Report	Theory 15 weeks Pract. 1-15 week	7 Theory + 6 pract.	% 13
	Short exam (1)	Week (3)	4 Theory + 2 pract.	% 6
	Half exam (theory + pract.)	Week (9)	10 Theory + 5 pract.	% 15
	Short exam (2)	Week (12)	4 Theory + 2 pract.	% 6
	Final exam (practical)	Exam pract.	20	% 20
	Final exam (theory)	Exam theory	40	% 40
			100	% 100

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any	
Main references (sources)	Principles of plane space and topographic Surveying by Riyadh Saleh Al-Khafaf Muhji Book - Dar Al-Kutub for Printing and Publishing - University of Mosul 2000
Recommended books and references (scientific journals, reports...)	The book Principles of Plane Surveying and Topograp written by Dr. Mahmoud Hosni Dr.. Muhammad Rashad Al-Din - Knowledge Establishment
Electronic References, Websites	https://www.geographyknowledge.com/2017/09/Principl -surveying.html

جامعة الموصل
كلية
قسم علوم التربة والموارد المائية

مدرس المادة النظري : Dr. Haees Sayel Jarjes

Head of department : khaled Anwer khaled

رئيس اللجنة العلمية : د. Abdalqader Abash Sbak

Course Description Form Computer applications3

1. Course Name:
Computer applications3
2. Course Code:
COMA301
3. Semester / Year:
Second semester/ 2024-2025
4. Description Preparation Date:
1/2/2025
5. Available Attendance Forms:
In presence
6. Number of Credit Hours (Total) / Number of Units (Total):
3 practical hours/1.5 units
7. Course administrator's name (mention all, if more than one name)
Name: Mohammed Moath Albakri Email: albakri2@uomosul.edu.iq
8. Course Objectives

Course Objectives	• Enabling the student to become familiar with the statistical program SPSS and its applications in agricultural experiments. • Enabling the student to know and understand programs in the SPSS language and apply the steps and procedures followed to use the SPSS statistical program in analyzes of agricultural experiments. • Enabling the student to write programs in the SPSS language for various agricultural and scientific experiments. • Providing the student with the skills of dealing with data types when writing programs in SPSS. • Enabling the student to correct grammatical and linguistic errors that appear when implementing programs written in SPSS. • Enabling the student to read, understand and interpret the results and outputs of implementing programs written in SPSS..

9. Teaching and Learning Strategies	
Strategy	- Interactive lecture - Brainstorming - Dialogue and discussion - Field Training - Practical exercises - Field project - Self-education

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3 practical	a1: The student remembers the concepts of statistics	What is Statistics Science? Descriptive statistics: Statistics Inferential: Community Population: Census: Statistical metrics First: Measures of Central Tendency Second: Measures of absolute dispersion	Interactive lecture, brainstorming, dialogue and discussion, practical exercises, and self-learning.	Final test.
2	3 practical	a2: The student learns about the SPSS windows, the purpose of each window, and how to deal with them.	Run and familiarize yourself with the SPSS program Program windows Getting to know the program windows.	Interactive lecture, brainstorming, dialogue and discussion, practical exercises, and self-learning.	Report, Final test.
3	3 practical	c1: The student enumerates the types of files that SPSS deals with, the basic steps and rules in analyzing data, and the basic commands in SPSS.	Retrieve data and files: save the file: Add, modify and control variables Add a variable or view: Cancel a variable, view, or state Search for a case search for value.	Interactive lecture, brainstorming, dialogue and discussion, practical exercises, and self-learning.	Homework1, Final test.
4	3 practical	d1: The student sorts and arranges the observations and finds their sequential ranks in SPSS.	Sort observations command sort cases Ranking of observations according to a specific variable: Using the IF function with Compute	Interactive lecture, brainstorming, dialogue and discussion, practical exercises, and self-learning.	Quiz1, Final test.
5	3 practical	d2: The student executes the Compute command and uses it to create a new variable using an	Compute. command Create a new variable using an arithmetic expression or an equation Create a new variable using a	Interactive lecture, brainstorming, dialogue and discussion, practical exercises, and	Homework2, Final test.

		arithmetic expression, equation, or function, and uses the IF function with Compute.	function	self-learning.	
6	3 practical	b1: The student works on finding a frequency distribution table and drawing a histogram.	Descriptive statistics and histograms of data (1) Histogram and Frequencies + Scientific visit	Interactive lecture, brainstorming, dialogue and discussion, practical exercises, and self-learning.	scientific visit, Final test.
7	3 practical	b2: The student finds measures of descriptive statistics.	(2) Descriptive Statistics + Semester exam 1	Interactive lecture, brainstorming, dialogue and discussion, practical exercises, and self-learning.	semester test1, Final test.
8	3 practical	C2: The student uses the graph and its types in statistical analysis	Chart Learn about several types of chart Graph	Interactive lecture, brainstorming, dialogue and discussion, practical exercises, and self-learning.	practical test1, Final test.
9	3 practical	a3: The student remembers hypothesis testing, the terminology used in it, and the steps for hypothesis testing	Test of hypotheses 1- Statistical hypothesis 2- The level of significance or the level of probability 3- Statistical test function 4- Probability value (Sig. or P-value): -Steps for testing hypotheses	Interactive lecture, brainstorming, dialogue and discussion, practical exercises, and self-learning.	Homework3, Final test.
10	3 practical	b3: The T-test is performed when testing hypotheses related to a single mean.	First: T-test in the case of testing hypotheses related to one mean.	Interactive lecture, brainstorming, dialogue and discussion, practical exercises, and self-learning.	Quiz2, Final test.
11	3 practical	b4: The student applies the difference test between two independent combined means	Second: Tests of differences between two independent combined averages.	Interactive lecture, brainstorming, dialogue and discussion, practical exercises, and self-learning.	Homework, Final test.
12	3 practical	b5: The student tests the differences between the means of two populations from related samples	Third: Tests of differences between the averages of two groups of related samples. + Semester exam 2	Interactive lecture, brainstorming, dialogue and discussion, practical exercises, and self-learning.	practical test2, Final test.
13	3 practical	b6: The student concludes the one-way analysis of variance	Analysis of Variance (ANOVA) One-Way ANOVA	Interactive lecture, brainstorming, dialogue and discussion, practical exercises, and self-learning.	semester test2, Final test.
14	3 practical	b7: The student determines the simple	Simple Linear Correlation Correlation Coefficient.	Interactive lecture, brainstorming, dialogue	Homework, Final test.

		linear correlation and the correlation coefficient		and discussion, practical exercises, and self-learning.	
15	3 practical	b8: The student discovers a simple linear regression equation	Simple Linear Regression	Interactive lecture, brainstorming, dialogue and discussion, practical exercises, and self-learning.	practical test3, Final test.

11. Course Evaluation

t	Evaluation methods	Evaluation date (one week)	Grade	Relative weight %
1	Report 1	second week	2	2%
2	Homework1	the third week	1	1%
3	Short test Quiz1	fourth week	2	2%
4	Homework2	The fifth week	1	1%
5	Scientific visit	the sixth week	1.5	1.5%
6	Semester test1	Seventh week	10	10%
7	Practical test1	The eighth week	2.5	2.5%
8	Homework3	Week nine	1	1%
9	Short test Quiz2	The tenth week	2	2%
10	Homework4	Week eleven	1	1%
11	Practical test2	The twelfth week	2.5	2.5%
12	Semester test2	The thirteenth week	10	10%
13	Homework5	The fourteenth week	1	1%
14	Practical test3	The fifteenth week	2.5	2.5%
15	Final practical test	Final semester exams	60	60%
	The total		100	100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	A curriculum was prepared by computer professors at the college based on the SPSS software guide.
Main references (sources)	- A Handbook of Statistical Analyses using SPSS by Sabine Landau and Brian S. Everitt 2004 - IBM SPSS Statistics 22 Core System User's Guide by IBM – 2013. - Data analysis using the statistical program SPSS, written by Dr. Firas Rashad Al-Samarrai.
Recommended books and references (scientific journals, reports...)	- Your guide to the statistical program SPSS Prepared by Saad Zaghloul Bashir.

Electronic References, Websites	https://www.SPSS.com/en_sg/training/offers/free-training.html https://video.SPSS.com/detail/videos/how-to-tutorials https://www.udemy.com/course/SPSS-programming-for-beginners https://SPSScrunch.com/courses/SPSS-base-programming-for-absolute-beginners-free-version/

subject teacher: Mohammed Moath Albakri

Chairman of the Scientific Committee:

Head of the Department:

أ.م.د. خالد انور خالد
Khaled Anwer Khaled
Head of department

جامعة الموصل
كلية التربية للعلوم الصرفة
قسم علوم التربية

Course Description Form

1. Course Name :
Irrigation
2. Course Code:
IRIG349
3. Semester / Year:
First semester 2024/2025
4. Description Preparation Date:
1/9/2024
5. Available Attendance Forms:
In presence + electronic
6. Number of Credit Hours (Total) / Number of Units (Total) :
2 Theoretical +3 Practical / 3.5 Unit
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Faris Akram Salih Al-Wazzan Nour Jamal Hussein Email: dr.farisakram@uomosul.edu.iq
8. Course Objectives

Course Objectives	**1- Preparing students who have the ability to use modern irrigation methods and desc these methods accurately with the possibility of using them within Iraqi soils, wh represent calcareous soils... and integrating these methods with drainage networks disposal of excess water.....** **2- Entering the agricultural sector with distinguished efficiency through participation irrigation projects, modern irrigation techniques, and the use of the best methods in or to reduce water use within agricultural lands and reduce the risk of salt and desert..** **3- Directing students towards a desire to obtain better experiences when applying postgraduate studies..**

1. Teaching and Learning Strategies

Theoretical: -Interactive lecture **-**Brainstorming **-**Dialogue and discussion **-**Assigning tasks and reporting **-**Presentations of models of irrigation and drainage networks	**Practical:** - Assigning group work to reveal leadership skills - Assigning tasks and reporting for each experiment - He is assigned to prepare a report entitled from his own diligence and prepare it for discussion with Students

2. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2 Theoretical 3Practical**	**Theoretical:** Explains the concept to the student Irrigation and relationships mathematical **practical :** Empowering the student to solve Equations	**Theoretical:** The concept of irrigation and the introduction to irrigation with mathematical relationships between the size and mass of soil components **practical :** Mathematical relationships for soil components and the equivalent depth of soil water	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions
2	**2 Theoretical 3Practical**	**theoretical**: Explains depth to the student The equivalent and its importance **practical** : Explains to the student Fundamentals of humidity measurement	**theoretical**: Equivalent depth derivations with solving mathematical problems **practical** : Methods for measuring soil moisture	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions
3	**2 Theoretical 3Practical** **2 Theoretical 3Practical**	**Theoretical:** Explains the concepts of movement to the student **practical :** Shows the student the measurement Field capacity And the wilting point	**theoretical**: Physical concepts of motion and its laws **practical** : Measuring field capacity and permanent wil point	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions

4	**2 Theoretical 3Practical**	**Theoretical**: Explains to the student Types of pumps agricultura **practical** : Explains measurement methods using multiple methods	**Theoretical:** Choosing the type of pump with examples practical : Methods for measuring irrigation water discharge	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions
5	**2 Theoretical 3Practical**	**Theoretical:** Enabling the student to Irrigation water evaluation **practical :** Shows mathematical applications weirs	**Theoretical:** Evaluation of irrigation water quality **practical** : Irrigation canal design	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions
6	**2 Theoretical 3Practical**	**Theoretical:** Shows the student importance Irrigation efficiencies **practical :** Empowering understanding competencies Irrigation	**Theoretical**: Irrigation efficiencies with example **practical :** Types of irrigation efficiencies with solutions and examples	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions
7	**2 Theoretical 3Practical**	**Theoretical:** Enabling the student Understanding evaporation transpiration **practical :** Explains methods measuring Water consumption	**Theoretical:** evaporation and transpiration **practical** : Water requirements measurements	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions

8	**2 Theoretical 3Practical**	**Theoretical:** Explains to student importance irrigation scheduling **practical :** Explains the basics of irrigation scheduling	**Theoretical:** Irrigation scheduling **practical :** Methods of scheduling irrigation with solutions and examples	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions
9	**2 Theoretical 3Practical**	**Theoretical:** Shows the student importance Water requirement of crop **practical :** Empower student to Calculate the plant's water requirement water	**Theoretical**: Water requirement of the crop **practical** : Calculate water requirements and solve examples	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions
10	**2 Theoretical 3Practical**	**Theoretical:** The student can Knowledge of irrigation cycle **practical :** Explains to student calculation of period between ritual and anothe	**Theoretical:** Irrigation frequency Irrigation cycle **practical** : Calculating irrigation quantities and irrigation cycle	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions
11	**2 Theoretical 3Practical** **2 Theoretical 3Practical**	**Theoretical:** The student shows how Water entry into the soil **practical :** Shows the student methods Instantaneous Infiltration measurement	**Theoretical:** Water Infiltration **practical :** Infiltration measurement	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions

12	**2 Theoretical 3Practical**	**Theoretical**: Explains importance irrigation Surfact **practical :** Shows irrigation methods	**Theoretical**: Surface irrigation methods **practical** : Surface and subsurface irrigation	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions
13	**2 Theoretical 3Practical**	**Theoretical:** Shows sprinkler irrigation systems **practical :** Explains strip irrigation systems	**Theoretical**: Strip irrigation **practical :** Arrangement of strip irrigation and its types	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions
14	**2 Theoretical 3Practical**	**Theoretical:** Shows Sprinkler Irrigation **practical :** Explains sprinkler irrigation system	**theoretical**: Basin irrigation and sprinkler irrigation **practical :** Arrangement and types of sprinklers	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions
15	**2 Theoretical 3Practical**	**theoretical:** Explains drip irrigation systems **practical:** Shows drip irrigation systems	**Theoretical:** Drip irrigation **practical** : Arrangement of drippers and their mechanism of operatio	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions

3. Course evaluation

Relative weight %	Degree	**Calendar appointment (weekly)**	Calendar methods	ت
13%	7 Theoretical + 6 practical	Theoretically week (15) Practically week 1-15	Theoretical final report + practical experience reports	1
6 %	4+ Theoretical 2 practical	week (3)	Quiz(1)	2
15%	10 Theoretical+ 5 practical	week (9)	Exam Midterm (Theoretical and practical	3
6%	4 + Theoretical 2 practical	week (12)	Quiz(2)	4
20%	20	Practical exam week	Final practical test	5
40%	40	Theory exam week	Final theoretical test	6
100%	100		Total	

4. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Irrigation… Dr. Issam Khudair Al-Hadithi
Main references (sources)	Irrigation and drainage book by Dr. Laith K
Recommended books and references (scientific journals, reports...)	SSSJ , WATER J .
Electronic References, Websites	https://doi.org/10.2136/sssabookser5.1.2ed

Dr. Faris akram salih Al-Wazzan

Theoretical teacher

Nour Jamal Hussein

Practical teacher

Abdul Qadir Abash Al-Hadidi

Head of the scientific committee

Khalid Anwar Khalid

Head of the Department of Soil Sciences and Water Resources

Course description form

1. Course Name:
Natural resource economics
2. Course Code:
REEC490
3. Semester/Year: Annual
First semester/fifth stageRabaa/ 2024-2025
4. Date this description was prepared
2024/9/1
5. Available attendance forms:
In person
6. Number of study hours (total)/number of units (total):
2 theoretical hours / 3 practical hours (5 hours) / 3.5 units
7. Name of the course administrator (if more than one name is mentioned)
Dr: Muna Abdel Qader Eman Faisal Mohammad
8. Course objectives
• Enabling the student to learn about natural resources, their types and their importance • Empowering the studentHow to exploitNatural ResourcesIn an optimal way and explain uses • Enable the student to recognizeOn land, human and water resources • Empowering the studentTo learn about waysPreserving these resources and the demand supply for them
9. Teaching and learning strategies
- Interactive lecture - Brainstorming - Dialogue and discussion - Field Training - Practical exercises - Field project - Self-education
10. Course structure

Evaluation method	Teaching method	Name of the unit/topic	Required learning outcomes	hours	the week
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Research methods in economic resources	A1: Learn about the methods and methods used to study and explore economic resources	2Theoretical	1
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	The importance of the reasons for studying it Geological depletion Economic depletion	A2:Learn about the concept of natural resources	3Practical	
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Characteristics of economicsEconomic Resources - Classification of economic resources	B1: Explains the characteristics of economic resources C1: Enumerates resource classifications	2Theoretical	2
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Basic functionsFor Earth	A3: Enumerates the functions of the earth	practical	
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Economics of land resources - concepts and characteristics of land - uses of land - use capacity - best use of land	A4:Learn how to use the landC2Determine the best methods to use	2	3
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Light cutting and advantages of light farming Dense reduction and the advantages of dense agriculture The difference between a dense border and a light border	C3:Compare between the dense border and the light border	practical	

Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Land use density - factorsInfluentialIn the density of land use -	A5:Understands how population density is distributed A6He knows how to plan to distribute resources fairly	theoretical	4
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Economic supply response For land due to changing demand	B2:Explains the economic offer	Practical	
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Display of land resources - concept of land - natural supply - economic supply - . Means of increasing the economic supply of land	B3:YimmigBetween the natural and economic supply of the land C4Compares the different options available for land use	theoretical	5
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	A graph of supply and demand from society's point of view and how equilibrium is achieved	B4:Explains the theory of supply and demand in selling from society's point of view	practical	
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Land rent - characteristics of rent - types of agricultural land rent - Theories of rent - the economic and social importance of rent	B5:He knows the definition of rent C5It shows the types of rent	theoretical	6
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	A graph of supply and demand from an individual's point of view and how equilibrium is achieved	B6:Explains the theory of supply and demand in selling from the individual's point of view	practical	
Semester exam	Semester exam	Semester exam	Semester exam	2	7
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and	Traditional resources, their types and features, and unconventional resources, their types and features	C6: Compares traditional and non-traditional German resources	practical	

	discussion, self-learning				
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Evaluation of agricultural land resources - evaluation requirements - factors affecting the value of land - Earth straightening methods	B7: It is clear Factors affecting agricultural land values C7Methods of evaluating land, how to use it, and determining the best ways to use the land	theoretical	8
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Diagram of the water balance and means of maintaining the quantity and quality of water resources	B8:It shows the balance between supply and demand for water	practical	
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Tenure of agricultural land resources - the concept of agricultural tenure - types of tenure -.	The concept of tenure explains the factors influencing the use of land C8:And evaluate the effectiveness of agricultural policies	theoretical	9
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Strong and weak condition for sustainable development	C9:Compares the strong and weak condition for sustainable development	practical	
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Characteristics of land tenure – Importance of land tenure resources- Lands of the Arab world countries-Arable lands For agricultureThe floorArab agricultural -	C10Determines the needs of the farmer And he plans toMake plans fortoDevelopment of the agricultural sector	theoretical	10
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Natural capital stock stability chart	B9:It shows the stability of the natural capital stock	practical	

Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Agricultural land resources in Iraq - divisions of Iraqi lands - per capita share of arable land	A7::Knows terrestrial resources Its types and importance And understanding the challenges facing agriculture in Iraq	theoretical	11
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	The optimal point and future justifications for achieving it	B10:It shows the optimum point for the size of the capital stock	Practical	
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Economics of human resources - population size - population size and economic activity - population density -	A8::Understands the importance of human resources, analyzing decisions and developing management skills	theoretical	12
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Supplier of capital and its sources	B11:Explains capital resources	practical	
Semester exam	Semester exam	Semester exam	Semester exam	Semester exam	13
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Characteristics of human resources management	B12:Explains human resources management	practical	
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Agricultural workforce - human resources in Iraq.	A9:Recognize definitionsbasics related to itIt helps develop workforce skills	theoretical	14
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Characteristics of capital resources	B13:Shows intellectual capital	practical	

Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Economics of water resources - the importance of water resources - sources of water resources in Iraq - fish wealth	B14Knows water resources, their importance, and their distribution sources	theoretical	15
Semester exam 1, final exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Examples of capital resources	B15:Gives examples of capital resources	Practical	

Course evaluation .11

Relative weight%	Class	Calendar date (week)	Calendar methods
52.	52.	the third week	Short test(1 Quiz)
20	20	the sixth week	Theoretical semester test
2.5	2.5	The ninth week	Short test(Quiz2))
40	40	Final semester exam	Final theoretical test
2.5	2.5	The first week	A short practical test(1) Quiz
5.2	2.5	fourth week	A short practical test(2) Quiz
10	10	the sixth week	Practical semester test
20	20	Final semester exams	Final practical test
100%	100%		the total

Learning and teaching resources .12

Land economics and reformagricultural,Dr. Ab Khaleq Muhamm	**Required textbooks (methodology, if any)**
The Economics of Agrarian Reform, Dr. Ab Wahab Matar Al-Dahri	**Main references (sources)**
Economics of Natural and Environmental Resourc Dr. Hamad bin Muhammad Al-Sheikh	**Recommended supporting books and references (scientific journals, reports....)**
nothing	**Electronic references, Internet sites**

Theoretical subject teacher
muna Abdel Qader Ahmed

Dr. Khaled Anwar Khaled
Head of the Department of Soil Sciences and Water Resources

Dr. Abdul Qader Abash
Chair of the Scientific Committee

Course Description Form

1. Course Name:
Organic Matter in the soil
2. Course Code:
AGSW24_F3024
3. Semester / Year:
First fall semester / 2024-2025
4. Description Preparation Date:
1\ 9 \ 2024
5. Available Attendance Forms:
My 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. Ran Abdalhade Gazal & M.Dr. Mohamad Ayad Harbawee M.Dr. Hesham Saadaldeen Younis

8. Course Objectives	
theoretical 1- Enabling the student to know the organic matter in the soil 2- Identify the phenotypic characteristics of organisms in the soil 3- Identify how organic matter is transformed into humus in soil 4- Introducing the student to the characteristics of organic matter in the soil 5- Trying to enhance the student's skills in diagnosing and calculating each other Chemical equations	Practical Enabling the student to have the ability to analyze Organic matter and enzyme determination And conduct practical experiments to detect some sugars

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 3 practical	Theoretical The student demonstrates a conce Organic matter From the soil Practical The student gets to know the material organic matter and its decomposition in soil	Theoretical Organic matter in soil, its definition and sources Practical Decomposition of organic matter in soil	theoretical audio methods, Writing on the board Direct dialogue style practical Assigning tasks and reports	Short exams, assignments, discussions
2	2 Theoretical 3 practical	Theoretical The student explains the most important Components of plant waste Practical The student reveals the origin and method you analyze it	Theoretical Components of plant waste Practical Hydrolysis of starch	theoretical audio methods, Writing on the board direct dialogue style practical Assigning tasks and reports	Short exams, assignments, discussions
3	2 Theoretical 3 practical	Theoretical Identify organic compounds Practical The student can detect Liquefy the gelatin	Theoretical Simple organic compounds resulting from the decomposition of organic matter Practical Detection of gelatin liquefaction	theoretical audio methods, Writing on the board direct dialogue s practical Assigning tasks and reports	Short exams, assignments, discussions
4	2 Theoretical 3 practical	Theoretical The student learns about the carbon cycle and enzymatic activity in the soil Practical The student detects the breakdow of fats	Theoretical Organic matter: carbon cycle, enzymatic activity in soil Practical Lipolysis	theoretical audio methods, Writing on the board direct dialogue style practical Assigning tasks and reports	Short exams, assignments, discussions
5	2 Theoretical 3 practical	Theoretical Recognize transformations Nitrogen bioavailability and microorganisms that decompose i Urea Practical The student will be able to decompose organic acids	Theoretical Biological transformations of nitrogen: nitrogen cycle, urea hydrolysis, nitration process Practical Hydrolysis of amino acids	theoretical audio methods, Writing on the board direct dialogue style practical Assigning tasks reports	Short exams, assignments, discussions
6	2 Theoretical 3 practical	Theoretical The student explains how it is done Mineralization and nitrogen assimilation Practical The student learns how Determination of cellulase enzyme in soil	Theoretical Biological nitrogen fixation Practical Cellulose hydrolyzes aerobically and anaerobically	theoretical audio methods, Writing on the board direct dialogue s practical Assigning tasks reports	Short exams, assignments, discussions
7	2 Theoretical 3 practical	Theoretical The student is aware of the importance of nitrogen-fixing microorganisms	Theoretical Biotransformations of phosphorus: its cycle and the role of microorganisms in its transformations	theoretical audio methods, Writing on the board direct dialogue style	Short exams, assignments, discussions

		Practical The student detects the decomposition of cellulose	Practical Determination of phosphatase enzyme in soil	practical Assigning tasks reports	
8	2 Theoretical 3 practical	Theoretical The student judges the role Microorganisms that convert phosphorus Practical The student is able to estimate the enzyme phosphatase in soil	Theoretical Biotransformations of sulfur: a role Sulfur, its mineralization, representation Microbial, oxidative stress Practical Quantification of fungal growth	theoretical audio methods, Writing on the board direct dialogue style practical Assigning tasks reports	Short exams, assignments, discussions
9	2 Theoretical 3 practical	Theoretical The student learns about the role Microorganisms that transform sulfur Practical The student can measure the amount of fungal growth	Theoretical Reduction of inorganic sulfur compounds Practical Sulfur transformations Biology	theoretical audio methods, Writing on the board direct dialogue style practical Assigning tasks reports	Short exams, assignments, discussions
10	2 Theoretical 3 practical	Theoretical Determine which student you are doing By reducing sulfur compounds Inorganicity Practical The student will be able to estimate sulfur biologically	Theoretical Biotransformations of iron: oxidation and reduction, decomposition of iron compounds Membership Practical Estimation of urease enzyme	theoretical audio methods, Writing on the board direct dialogue style practical Assigning tasks reports	Short exams, assignments, discussions
11	2 Theoretical 3 practical	Theoretical The student learns about the role Microorganisms that transform iron Practical The student will be able to estimate the urease enzyme in the soil	Theoretical Decomposition of pesticides in soil Practical Estimation of catalase enzyme	theoretical audio methods, Writing on the board direct dialogue style practical Assigning tasks reports	Short exams, assignments, discussions
12	2 Theoretical 3 practical	Theoretical The student is familiar with the role of microorganisms in the decomposition of pesticides Practical The student is able to estimate the catalase enzyme in soil	Theoretical The student is familiar with the role of microorganisms in the decomposition of pesticides Practical The student is able to estimate the catalase enzyme in soil	theoretical audio methods, Writing on the board Direct dialogue style practical Assigning tasks reports	Short exams, assignments, discussions
13	2 Theoretical 3 practical	Theoretical The student explains the relationship between microorganisms Practical The student reveals the total reducing sugars	Theoretical The student explains the relationship between microorganisms Practical The student reveals the total reducing sugars	theoretical audio methods, Writing on the board Direct dialogue style practical Assigning tasks reports	Short exams, assignments, discussions
14	2 Theoretical 3 practical	Theoretical The student learns about an Activity Microbiology in the area near the roots Which is known as the rhizosphere Practical The student reveals an ability	Theoretical The student learns about an activity microbiology in The area near the roots Which is known as the rhizosphere Practical	theoretical audio methods, Writing on the board Direct dialogue style practical Assigning tasks and reports	Short exams, assignments, discussions

		Bacteria to perform transformations Nitrogenism	The student reveals an ability Bacteria to perform transformations Nitrogenism		
15	2 Theoretical 3 practical	Theoretical The student learns about the most important... Factors affecting growth Microbiology Practical The student reveals the ability of bacteria to carry out phosphate transformations	Theoretical The student learns about the most important... factors affecting growth microbiology Practical The student reveals the ability of bacteria to carry phosphate transformations	theoretical audio methods, Writing on the board Direct dialogue style practical Assigning tasks and reports	Short exams, assignments, discussions

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)	
Recommended supporting books and reference (scientific journals, reports….)	
Electronic references, Internet sites	

M. Dr.. Rand Abdel Hadi Ghazal
Theoretical subject teacher:

M.Dr. Mohammad Ayad Harbawi
M.Dr. Hesham Saadaldeen Yunis
Practical subject teacher

Dr. Khaled Anwar Khaled
Head of the Department of Soil Sciences and Water Resources

Dr. Abdul Qader Abash
Chair of the Scientific Committee

Remote Sensing Course Description

1. : Course name
remote sensing
2. : Course code
RESE352
3. : Chapter / Year
the chapter 2025 - 2024 / Third phase / Second spring
4. : Date this description was prepared
2025/2/1
5. Available attendance forms:
In-person/online
6. :Number of study hours (total) / Number of units (total)
theoretical + 3 practical / 3.5 units 2
7. : Name of the course administrator (if more than one name is mentioned)
Aman Adel Mouloud aman_adel@uomosul.edu.iq Ghada Ahmed Mohamed ghadaalhasme@uomosul.edu.iq
8. Course objectives
- Empowerment The student from to understand And comprehension what Related By remote sensing And its relationship Soil and Water Resources Sciences -Empowerment The student from knowledge Most important features remote sensing -Empowerment The student from Familiarity Most important Applications of remote sensing in other sciences - Empowerment The student With ability Detection on Space data -can The student that Interprets, processes, and outputs .remote sensing maps Empowerment - The student from Recognition on Most important Roads Laboratory in Monitoring changes in vegetation cover and detection on Reflectivity of every phenomenon on the Earth's surface
9. Teaching and learning strategies
- Interactive lecture - brainstorming - Dialogue and discussion - Field training - Practical exercises - Field project - Self- learning
10. Course structure

week	watches	Required learning outcomes	Name of unit or topic	Learning method	Evaluation method
1	2 theoretical	A1 The student should be able to demonstrate : sound knowledge and understanding of remote .sensing B1 He has the practical and mental knowledge and : . concepts that help him in remote sensing	Introduction to Remote Sensing	,Interactive lecture brainstorming, dialogue and discussion, self-learning	Midterm ,Exam 1 Final Exam
	3 practical	A1 The student should be able to demonstrate : sound knowledge and understanding of remote .sensing C6 Discover : The student Any means of distinguishing between remote sensing items and able to use laboratory tools within the specialty	Concepts and foundations of remote sensing	,Interactive lecture brainstorming, dialogue and discussion, field training, self- learning	Short practical test 1
2	2 theoretical	A2 Explains : The student The most important remote sensing operations B1 He has the practical and mental knowledge and : concepts that help him in the stages of remote . sensing	Stages and processes of remote sensing	,Interactive lecture brainstorming, dialogue and discussion, self-learning	Midterm ,Exam 1 Final Exam
	3 practical	C6 Discover : The student Any means of distinguishing between remote sensing items and able to use laboratory instruments within the .specialty	Aerial survey sources and information	,Interactive lecture brainstorming, dialogue and discussion, field training, practical exercises, self-learning	a report
3	2 theoretical	A2 Explains : The student The most important remote sensing operations	Properties of electromagnetic radiation	,Interactive lecture brainstorming, dialogue and discussion, self-learning	Midterm ,Exam 1 Final Exam
	3 practical	C6 Discover : The student Any means of distinguishing between remote sensing items and able to use laboratory tools within the specialty B9 The student should be able to suggest methods : for analyzing aerial photographs and data and .interpreting agricultural phenomena	Types of aerial photographs and the difference between them	,Interactive lecture brainstorming, dialogue and discussion, field training, self- learning	Field evaluation
4	2 theoretical	A2 Explains : The student The most important remote sensing operations C6 Discover : The student Any means of distinguishing between remote sensing items and able to use laboratory tools within the specialty D1 : The student will use computer programs to analyze and display data and information in the field . of remote sensing	Remote sensing and electromagnetic spectrum applications	,Interactive lecture brainstorming, dialogue and discussion, self-learning	Midterm ,Exam 1 Final Exam Report ,
	3 practical	C6 Discover : The student Any means of distinguishing between remote sensing items and able to use laboratory instruments within theC9 specialty : The student should be able to conduct applied research and use statistical programs in .experimental design and data analysis	Coordinate system on aerial photographs and distance between points	,Interactive lecture brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Short Practical Test 2

5	2 theoretical	C6 Discover : The student Any means of distinguishing between remote sensing items and able to use laboratory tools within the specialty D1 : The student will use computer programs to analyze and display data and information in the field . of remote sensing	Characteristics of aerial photographs	,Interactive lecture brainstorming, dialogue and discussion, self-learning	Midterm ,Exam 1 Final Exam Report ,
	3 practical	C6 Discover : The student Any means of distinguishing between remote sensing items and able to use laboratory tools within the specialty D12 Depends : The student any A special equation for reflectivity, uses information technology to obtain data and information easily and conveniently .	Finding ground coordinates	,Interactive lecture brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Field evaluation
6	2 theoretical	A2 Explains : The student The most important remote sensing operations C6 Discover : The student Any means of distinguishing between remote sensing items and able to use laboratory tools within the specialty D1 : The student will use computer programs to analyze and display data and information in the field . of remote sensing	Spectral reflectance ,properties of soil plants, and water	,Interactive lecture brainstorming, dialogue and discussion, self-learning	,short test final test
	3 practical	C9 The student should be able to analyze data : related to satellites and use calculators and .programs D12 Depends : The student any A special equation for reflectivity, uses information technology to obtain . data and information easily and conveniently	Spectral bands and their ranges in satellites and reflectivity reading	,Interactive lecture brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Live drawing and homework
7	2 theoretical	A1 The student should be able to demonstrate : sound knowledge and understanding of remote . sensing C9 The student should be able to analyze data : related to satellites and use calculators and .programs	Study of space visuals	,Interactive lecture brainstorming, dialogue and discussion, self-learning	Midterm ,Exam 2 Final Exam
	3 practical	C9 The student should be able to analyze data : related to satellites and use calculators and .programs D1 : The student will use computer programs to analyze and display data and information in the field . of remote sensing E3 The student will work efficiently and effectively : in the field of work and practice the characteristics .and features of satellites	Black and white film and color film	,Interactive lecture brainstorming, dialogue and discussion, field training, practical ,exercises, field project self-learning	Field project
8	2 theoretical	C6 Discover : The student Any means of distinguishing between remote sensing items and able to use laboratory tools within the specialty C9 The student should be able to analyze data : related to satellites and use calculators and .programs	,Spectral radiometric and temporal resolution	,Interactive lecture brainstorming, dialogue and discussion, self-learning	Midterm ,Exam 2 Final Exam

	3 practical	B18 The student should be able to analyze data and : information in the land, water and environment .sector to find the most appropriate solutions C6 Discover : The student Any means of distinguishing between remote sensing items and able to use laboratory tools within the specialty	Engineering analysis of systems	,Interactive lecture brainstorming, dialogue and discussion, field training, practical exercises, self-learning	, drawing homework
9	2 theoretical	A1 The student should be able to demonstrate : sound knowledge and understanding of remote . sensing C9 The student should be able to analyze data : related to satellites and use calculators and .programs	Elements of aerial photo interpretation	,Interactive lecture brainstorming, dialogue and discussion, self-learning	Midterm ,Exam 2 Final Exam
	3 practical	B18 The student should be able to analyze data and : information in the land, water and environment . sector to find the most appropriate solutions D12 Depends : The student any A special equation for reflectivity, uses information technology to obtain . data and information easily and conveniently	Thermal aerial photography	,Interactive lecture brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Live drawing and homework
10	2 theoretical	A2 Explains : The student The most important remote sensing operations C9 The student should be able to analyze data : related to satellites and use calculators and .programs	Interpretation of phenomena in images and visuals	,Interactive lecture brainstorming, dialogue and discussion, self-learning	Term 2 Exam
	3 practical	C6 Discover : The student Any means of distinguishing between remote sensing items and able to use laboratory tools within the specialty D12 Depends : The student any A special equation for reflectivity, uses information technology to obtain . data and information easily and conveniently	Thermal energy detectors in observing the Earth's surface features	,Interactive lecture brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Live drawing and homework
11	2 theoretical	A2 Explains : The student The most important remote sensing operations C6 Discover : The student Any means of distinguishing between remote sensing items and able to use laboratory tools within the specialty	Spectral and temporal resolution of satellites	,Interactive lecture brainstorming, dialogue and discussion, self-learning	Final exam
	3 practical	B18 The student should be able to analyze data and : information in the land, water and environment . sector to find the most appropriate solutions C9 The student should be able to analyze data : related to satellites and use calculators and .programs C24 The student should be proficient in using : , modern technologies, managing machines .equipment , and geographic information systems	Study of the ,objective enhanced and processed mapper for satellites	,Interactive lecture brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Live drawing and homework
12	2 theoretical	A2 Explains : The student The most important remote sensing operations B20 The student should be able to analyze the : factors that have a mutual influence between water .scarcity, desertification, and climate change	Definition of spatial resolution of satellite imagery and the	,Interactive lecture brainstorming, dialogue and discussion, self-learning	Final exam

		C6 Discover : The student Any means of distinguishing between remote sensing items and able to use laboratory tools within the specialty	capabilities of . different sensors		
	3 practical	B18 The student should be able to analyze data and : information in the land, water and environment . sector to find the most appropriate solutions B48 The student should be able to identify and : .measure land areas and conduct spatial analysis C9 The student should be able to analyze data : related to satellites and use calculators and .programs	Multispectral combing	,Interactive lecture brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Live drawing and homework
13	2 theoretical	A2 Explains : The student The most important remote sensing operations C9 The student should be able to analyze data : related to satellites and use calculators and .programs	Types of satellite images according to spatial resolution and their classification according to the .most accurate	,Interactive lecture brainstorming, dialogue and discussion, self-learning	Final exam
	3 practical	B20 The student should be able to analyze the : factors that have a mutual influence between water .scarcity, desertification, and climate change B48 The student should be able to identify and : .measure land areas and conduct spatial analysis C9 The student should be able to analyze data : related to satellites and use calculators and .programs	Use of calculator to differentiate and interpret .spatial data	,Interactive lecture brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Live drawing and homework
14	2 theoretical	C6 Discover : The student Any means of distinguishing between remote sensing vocabulary and able to use laboratory tools within the specialty C9 The student should be able to analyze data : related to satellites and use computers and .programs	Radiation accuracy of sensors and .their factors	,Interactive lecture brainstorming, dialogue and discussion, self-learning	,short test final test
	3 practical	C9 The student should be able to analyze data : related to satellites and use calculators and .programs C34 The student should monitor changes in natural : ,phenomena such as soil degradation desertification, and water pollution, which lead to .the death of beneficial organisms D12 Depends : The student any A special equation for reflectivity, uses information technology to obtain . data and information easily and conveniently	remote sensing software in the study of space .data	,Interactive lecture brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Short practical test 3
15	2 theoretical	C6 Discover : The student Any means of distinguishing between remote sensing vocabulary and able to use laboratory tools within the specialty C9 The student should be able to analyze data : related to satellites and use computers and .programs E3 The student will work efficiently and effectively : in the field of work and practice the characteristics .and features of satellites	Elements of aerial photographs and comparison .between images	,Interactive lecture brainstorming, dialogue and discussion, self-learning	,short test final test

	3 practical	C9 The student should be able to analyze data : related to satellites and use calculators and .programs C34 The student should monitor changes in natural : ,phenomena such as soil degradation desertification, and water pollution, which lead to .the death of beneficial organisms D1 : The student will use computer programs to analyze and display data and information in the field . of remote sensing	UsingERDAS software and ArcMap	,Interactive lecture brainstorming, dialogue and discussion, field training, practical ,exercises, field project self-learning	Field project

11. Course Evaluation

T	Evaluation methods	Calendar appointment (week)	degree	Relative % weight
1	Report 1	Fourth week	2.5	2.5
2	Report 2	Fifth week	2.5	2.5
3	Short Test (1)Quiz	Week 6	2	2
4	Short Test (2)Quiz	Fourteenth week	2	2
5	Short Test (3)Quiz	The fifteenth week	1	1
6	Midterm Exam (1)	Week 6	7.5	7.5
7	Midterm Exam (2)	The eleventh week	7.5	7.5
8	Final theoretical exam	Final semester exams	40	40
9	Practical field project	The fifteenth week	5	5
10	Field evaluation	The third and fifth week	2	2
11	Practical Short Test (1)Quiz	First week	1	1
12	Practical Short Test (2)Quiz	Fourth week	0.5	0.5
13	Practical Short Test (3)Quiz	Fourteenth week	1	1
14	Live drawings and homework	Weeks 6, 8, 9, 10, 11, 12, and 13	5.5	5.5
15	Final practical exam	Final semester exams	20	20
	the total	100	%100	%100

12. Learning and teaching resources

Required textbooks (methodology if any) Introduction to Remote Sensing	**Dagestani, Hikmat**
Main references (sources) Remote sensing	Lilisand
Recommended supporting books and ,references (scientific journals (…reports	Internet
Electronic references, websites	nothing

Theoretical subject teacher

Aman Adel Mawloud

Practical subject teacher

Ghada Ahmed Mohamed

Chairman Head of the Scientific Committee /Head of the Department of Soil Scince and water

Dr. Khaled Anwar Khaled

Dr. Abdul Qader Abash Sbak

Course Description Form

1. Course Name :
Drainage
2. Course Code:
DRAI 355
3. Semester / Year:
Second Semester 2024/2025
4. Description Preparation Date:
1/2/2025
5. Available Attendance Forms:
In presence + electronic
6. Number of Credit Hours (Total) / Number of Units (Total) :
2 Theoretical +3 Practical / 3.5 Unit
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Faris Akram Salih Al-Wazzan Nour Jamal Hussein Email: dr.farisakram@uomosul.edu.iq
8. Course Objectives

Course Objectives	• **1- Preparing students who have the ability to use modern drainage methods and describe these methods accurately with the possibility of using them within Iraqi soils, which represent calcareous soils... and integrating these methods with irrigation networks and getting rid of excess water.....** • **2- Entering the agricultural sector with distinguished efficiency through participation. In puncture projects, modern irrigation techniques, and the use of the best methods in order to reduce water use within agricultural lands and reduce the risk of salt and desertification...** **3- Directing students towards a desire to obtain better experiences when applying for postgraduate studies**

.Teaching and Learning Strategies

Theoretical: -Interactive lecture **-**Brainstorming **-**Dialogue and discussion **-**Assigning tasks and reporting **-**Presentations of models of irrigation and drainage netwo	**Practical:** - Assigning group work to reveal leadership skills - Assigning tasks and reporting for each experiment - He is assigned to prepare a report entitled from his own diligence and prepare it for discussion with Students

2. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2 Theoretical 3Practical**	**Theoretical:** Explains the concept to the student water drainage **practical :** Enabling the student to understand the topic of water drainage	**Theoretical:** The concept of drainage and the introductio water drainage **practical :** Introduction to water drainage	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions
2	**2 Theoretical 3Practical**	**theoretical**: Shows students signs Water drainage problems appear **practical** : Enable the student to know the benefits of draining water	**theoretical**: Signs of water drainage problems **practical** : Water drainage purposes	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions
3	**2 Theoretical 3Practical**	**Theoretical:** Explains to the student the concepts of water movement **practical :** Shows the student investigative methods	**theoretical**: Movement of water in the soil and missing equations Her own **practical** : Exploratory investigations	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions

4	**2 Theoretical 3Practical**	**Theoretical**: Explains to the student Solve movement problems Ground water **practical** : Explains methods of investigation and detection of drainage	**Theoretical:** Solutions to groundwater movement problems practical : Design investigations	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions
5	**2 Theoretical 3Practical**	**Theoretical:** Enabling student to Solve the relaxation equation **practical :** Shows the student the use of drawing scale	**Theoretical:** Derivation of the relaxation equation with examples **practical** : Drawing scale	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions
6	**2 Theoretical 3Practical**	**Theoretical:** Shows the stude the import Flow network **practical :** Empower understand conductivity	**Theoretical**: Flow network **practical :** Methods for measuring the conductivity of saturated water. Laboratory methods	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions
7	**2 Theoretical 3Practical**	**Theoretical:** Enabling student to Understanding Hoggart equation **practical :** Explains method measuring conductivity in the field	**Theoretical:** Hockhart's equation to calculate the distance between trocars **practical** : Methods for measuring saturated water conductivity: field methods above the groundwater level	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions

8	**2 Theoretical 3Practical**	**Theoretical:** Explains to the importance of equation for unstable state water **practical :** Explains foundations measurement under groundwa	**Theoretical:** Clover Dam equation for unsteady state water drainage **practical :** Methods for measuring saturated water conductivity: field methods below the groundwater level	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions
9	**2 Theoretical 3Practical**	**Theoretical:** Shows the student the importance Forchheimer equation **practical :** Enable the student understand the types of water drainage	**Theoretical**: Forchheimer equation with examples and derivation **practical** : Types of water drainage	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions
10	**2 Theoretical 3Practical**	**Theoretical:** student can Knowing calculation of the diameter trocar tubes **practical :** Explains to student importance covered trocars	**Theoretical:** Calculating the diameter of water drainage pipes **practical** : Covered trocars	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions
11	**2 Theoretical 3Practical**	**Theoretical:** student shows h Calculate additional wate wash away the salts **practical :** Shows student methods Add water to wash away the salts	**Theoretical:** Laundry requirements with examples **practical :** Calculating the amounts of water added for Laundry requirements	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions

12	**2 Theoretical 3Practical**	**Theoretical**: Shows Add water to wash away the salts **practical :** Explains the effect of salinity water drainage	**Theoretical**: Water drainage and its relationship to salinity **practical** : The effect of salts on soil and water	**theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions
13	**2 Theoretical 3Practical**	**Theoretical:** Shows the student methods of maintaining trocars **practical :** Explains maintenance methods	**Theoretical**: Methods of maintaining trocar networks **practical :** Maintenance concepts for trocars	**theoretical:** Audio methods style Writing on the board Direct dialogue style	Conduct daily examinations. Assignment discussions
14	**2 Theoretical 3Practical**	**Theoretical:** Shows methods designing trocars **practical :** Demonstrates practical design	**theoretical**: Methods and design of modern trocars **practical :** Use programming to design trocars	**practical :** Adapt tasks and reports **theoretical:** Audio methods style Writing on the board Direct dialogue style	Conduct daily examinations. Assignment discussions
15	**2 Theoretical 3Practical**	**theoretical:** Demonstrates the design of trocars **practical:** Shows the student a complete comparison of the types of trocars	**Theoretical:** Design of open and covered trocars **practical** : Comprehensive comparison of open and covered trocars	**practical :** Adapt tasks and reports **theoretical:** Audio methods style Writing on the board Direct dialogue style **practical :** Adapt tasks and reports	Conduct daily examinations. Assignment discussions

3. Course evaluation

Relative weight %	Degree	**Calendar appointment (weekly)**	Calendar methods	ت
13%	7 Theoretical + 6 practical	Theoretically week (15) Practically week 1-15	Theoretical final report + practical experience reports	1
6 %	4+ Theoretical 2 practical	week (3)	Quiz(1)	2
15%	10 Theoretical+ 5 practical	week (9)	Exam Midterm (Theoretical and practical	3
6%	4 + Theoretical 2 practical	week (12)	Quiz(2)	4
20%	20	Practical exam week	Final practical test	5
40%	40	Theory exam week	Final theoretical test	6
100%	100		Total	

4. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Drainage…D. Mohsen Al-Alamy
Main references (sources)	Irrigation and drainage book by Dr. Laith K
Recommended books and references (scientific journals, reports...)	SSSJ , WATER J .
Electronic References, Websites	https://doi.org/10.2136/sssabookser5.1.2ed

Dr. Faris akram salih Al-Wazzan
Theoretical teacher

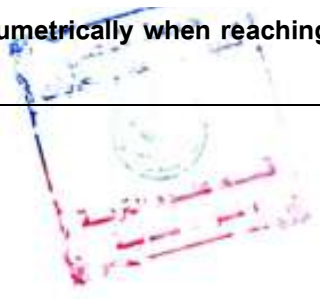
Nour Jamal Hussein
Practical teacher

Abdul Qadir Abash Al-Hadidi
Head of the scientific committee

Khalid Anwar Khalid
Head of the Department of Soil Sciences and Water Resources

Course Description Form

1. Course Name:
Soil chemistry
2. Course Code:
SOCH350
3. Semester / Year:
First Autumn semester/2024-2023
4. Description Preparation Date:
2024/9/1
5. Available Attendance Forms:
My presence + electronic
6. Number of Credit Hours (Total) / Number of Units (Total)
2 theoretical +3 piratical /3.5 units
7. Course administrator's name (mention all, if more than one name)
Name: . Abdalkader Absh Sbak Email: dr.abdalkaderabshsbak@uomosul.edu.iq Name:Ahmed Sameer Ghanim Email: ahmedaltaay1986@uomosul.edu.iq
8. Course Objectives
• The learner should be able to understand and comprehend what is related to the chemical propert of soil. **• Choosing the appropriateness of the factors affecting the knowledge and study of the most import chemical reactions that occur in the soil solution.** **• Differentiating between the natural systems of interactions that occur between the different solid a liquid phases of the soil.** **• Understand the basics of detecting the type of metals that control dissolution and precipitation.** **• Enabling the student to become familiar with the most important laboratory methods for estimating chemical elements in the soil and their condition, the materials and work methods for estimating ea element, and the devices by which the estimation is carried out.** **• Familiarity with the information the student needs and what is available to him to master his work** **• The student's awareness of the factors affecting chemical reactions** **• Determine the appropriate type of methods suitable for chemical analysis and what must be taken i account when conducting it.** **• Enable the student to measure chemical elements quantitatively and volumetrically when reaching end of the clear reaction point.**



9. Teaching and Learning Strategies

Strategy	
Theortical: - Interactive lectu - Brainstorming - Dialogue and discussion - Assigning tasks and reportir - Presentations of models of soil samples with different chemical properties - He is assigned to prepa report entitled from his own diligence prepare it for discussion with the students	practical: - Assigning group work to reveal skills Leadership - Assigning tasks and reporting for each experiment

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2Theoretical	A1: The student learns ab the internal types of composition of the Earth' crust. B1: The student encounte the types of igneous rocks (igneous, volcanic, and metamorphic).	About the chemical composition of the Eart crust	Interactive lectur brainstorming, dialogue and discussion, self-learning	Midterm Exam 1, Final Exam
	3Practical	C10: The student collects various soil samples. C11: Grinds and sieves so samples. C12: Prepares soil sample for analysis.	The student plans to collect a comprehensive sample of the entire fiel for the purpose of preparing it for chemica analysis.	Interactive lectur brainstorming, dialogue and discussion, field training, self-learning	Short practical tes
2	2Theoretical	A2: The student identifies the close relationship between the three soil phases.	The student understanc the relationship of soil chemistry with other sciences.	Interactive lectur brainstorming, dialogue and discussion, self-learning	Midterm Exam 1, Final Exam

		A3: The student describes the volumetric relationsh between soil components			
	3Practical	A13: Recognizes basic uni C13: Convert units to othe units according to international and basic ur A14: Demonstrates conversion of old units to new units.	Basic and universal unit	Interactive lectur brainstorming, dialogue and discussion, field training, practica exercises, self-learning	direct drawing
3	2Theoretical	A4: The student identifies the most important eleme that make up the compou in the Earth's crust. B2: The student links the minerals formed to the ty of weathering.	Metal part chemistry	Interactive lectur brainstorming, dialogue and discussion, self-learning	Midterm Exam 1, Final Exam
	3Practical	C14: Measures soil pH. C15: Measures total dissolved salts in the soil.	Methods for estimating soil pH and total dissolv salts in the soil	Interactive lectur brainstorming, dialogue and discussion, field training, practica exercises, self-learning	Field evaluation
4	2Theoretical	A5: The student identifies the most important sourc of organic matter. C2: The student discovers the general composition c organic matter. B3: The student evaluates stages of organic ma decomposition.	1- Sources of organic matter 2- General composition organic matter	Interactive lectur brainstorming, dialogue and discussion, self-learning	Midterm Exam 1, Final Exam, Repor
	3Practical	B11: Extract cation excha capacity by saturating wit sodium acetate. C16: Measure cation exchange capacity using a flame photometer.	Cation exchange capaci	Interactive lectur brainstorming, dialogue and discussion, field training, practica exercises, self-learning	Short Practice Tes Direct Drawing
5	2Theoretical	A5: The student identifies the physical and chemical properties of humus thro soil color. B4: The student evaluates relationship between hu compounds and th solubility in acidic and b media.	1- Physical and chemica properties of humus 2- Basic groups of humi compounds	Interactive lectur brainstorming, dialogue and discussion, self-learning	Midterm Exam 1, Final Exam, Repor
	3Practical	C17: Ammonium oxalate i used to determine activat calcium carbonate. C18: Analyze the remaini oxalate by titration with potassium permanganate	Active calcium carbonat	Interactive lectur brainstorming, dialogue and discussion, field training, practica exercises, self-learning	Field evaluation
6	2Theoretical	A6: The student identifies the nature of the chemica composition of the soil	1- The chemical composition of the soil solution	Interactive lectur brainstorming, dialogue and	short test, final tes

		solution from the ionic species. C3: The student understa the nature of the chemica equilibrium of the soil solution.	2- The nature of the chemical equilibrium of the soil solution	discussion, self-learning	
	3Practical	C19: Estimates gypsum in soil using acetone. C20: Draws the relationsh between the electrical conductivity of the soil extract and the gypsum concentration.	Gypsum in soil	Interactive lectur brainstorming, dialogue and discussion, field training, practica exercises, self-learning	Live drawing and homework
7	2Theoretical	C4: The student explains t process of gaining or losi proton. C5: The student explains process of gaining or los an electron.	1- Acid-base neutralizat reactions 2- Oxidation-reduction reactions	Interactive lectur brainstorming, dialogue and discussion, self-learning	Midterm Exam 2, Final Exam
	3Practical	C21: Calculate the regulat capacity in soil from pH readings. A15: Draw the relationshi between the electrical conductivity of a soil extra and the gypsum concentration.	Regulatory capacity in s	Interactive lectur brainstorming, dialogue and discussion, field training, practica exercises, field project, self-learn	Field project
8	2Theoretical	A7: The student explains t phenomena that occur between the liquid and so phases of soil. B5: The student applies some equations to explain the interaction on clay surfac	1- The double electrical layer 2- The equations describing the double electrical layer	Interactive lectur brainstorming, dialogue and discussion, self-learning	Midterm Exam 2, Final Exam
	3Practical	C22: Calculates soil pH fro pH readings. A16: Draws the relationsh between soil pH and the concentration of added ac or base.	Soil Buffer	Interactive lectur brainstorming, dialogue and discussion, field training, practica exercises, self-learning	Live drawing and homework
9	2Theoretical	A8: The student describes the ion exchange process using the mass action law B6: The student evaluates ion exchange process ba on the type of charge and size of the ion.	1- Properties of ion exchange 2- Factors affecting exchange reactions	Interactive lectur brainstorming, dialogue and discussion, self-learning	Midterm Exam Final Exam
	3Practical	C23: The student makes a soil extract. C24: The student measure the dissolved sodium element in the extract usi a flame photometer. A17: Draws the relationsh between the reading obtained from the device and the element	Calculation of exchangeable ions in so	Interactive lectur brainstorming, dialogue and discussion, field training, practica exercises, self-learning	Live drawing homework

		concentration from the standard solution.			
10	2Theoretical	B7: The student applies th Freundlich-Langmuir equation to describe the adsorption and release processes. B8: The student applies Kerr-Wanslow-Capon equations to desc exchange processes betw positive ions of the same different valences.	1- Physicochemical equations (Freundlich, Langmuir) 2- Chemical equations (Kerr, Fanslow, Capon)	Interactive lectur brainstorming, dialogue and discussion, self-learning	Term 2 Exam
	3Practical	C25: The student makes a soil extract. C26: The student measure the dissolved potassium i the extract using a flame photometer. A18: Draws the relationsh between the reading obtained from the device and the element concentration from the standard solution.	Calculation of exchangeable ions in so	Interactive lectur brainstorming, dialogue and discussion, field training, practica exercises, self-learning	Live drawing homework
11	2Theoretical	A9: The student describes the process of dissolving CO2 gas in water. B9: The student evaluates the role carbonic acid in the solubility of metals.	1- CO2-H2O system 2- CaCO3-CO2-H2O syst	Interactive lectur brainstorming, dialogue and discussion, self-learning	Final exam
	3Practical	C27: Measures calcium in soil extract by titration w EDTA C28: Measures calcium ar magnesium in soil extract titration with EDTA using the EBT indicator	Calculation of exchangeable ions in so	Interactive lectur brainstorming, dialogue and discussion, field training, practica exercises, self-learning	Live drawing homework
12	2Theoretical	C6: The student explains t nature of phosphoric acid ionization. A10: The student uses chemical equations to describe the reactions of phosphorus in soil.	1- The nature of phosphoric acid ionizat 2- Phosphorus reaction soil	Interactive lectur brainstorming, dialogue and discussion, self-learning	Final exam
	3Practical	C29: Measures the dissolv chloride in the soil extrac titration with silver nitrat	Calculation of exchangeable ions in so	Interactive lectur brainstorming, dialogue and discussion, field training, practica exercises, self-learning	Live drawing homework
13	2Theoretical	A11: The student draws solubility diagrams to identify the mineral controlling solubility. C7: The student draws solubility diagrams to	1- Solubility diagrams f carbonate minerals 2- Solubility diagrams phosphorus minerals	Interactive lectur brainstorming, dialogue and discussion, self-learning	Final exam

		identify the mineral controlling solubility.			
	3Practical	C30: Extract humic compounds in soil by neutralizing them with a sodium bicarbonate solut C31: Extract humic compounds in soil by neutralizing them with a sodium hydroxide solutio C32: Calculate the percentage of organic car in soil using wet oxidatior	Humic compounds in sc	Interactive lectur brainstorming, dialogue and discussion, field training, practica exercises, self-learning	Live drawing and homework
14	2Theoretical	C8: The student explains t importance of soil pH. A12: The student identi the most important sou of acidity in soil.	1- The importance of studying soil pH 2- Sources of acidity in s	Interactive lectur brainstorming, dialogue and discussion, self-learning	Short.exams, assignments, discussions
	3Practical	C33: Calculate the ionic strength of monovalent compounds C34: Calculate the ionic strength of divalent compounds C35: Calculate the ionic strength of trivalent compounds	Ionic strength in soil	Interactive lectur brainstorming, dialogue and discussion, field training, practica exercises, self-learning	Short practical tes
15	2Theoretical	C9: The student identifies the type and sources of salinity. B10: The student evalu the salt composition of soil based on knowledg the dominant ions.	1- Sources of salinity in soil 2- The salt composition saline soils	Interactive lectur brainstorming, dialogue and discussion, self-learning	short test, final tes
	3Practical	C36: Calculate the activity coefficient for monovalen compounds C37: Calculate the activity coefficient for divalent compounds C38: Calculate the activity coefficient for trivalent compounds	Soil activity and effectiveness coefficient	Interactive lectur brainstorming, dialogue and discussion, field training, practica exercises, field project, self-learn	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	7theoretical + 6 practical	13 %

2	Short test (1) Quiz	week (3)	4 theoretical + 2 practical	6%
3	Midterm Exam (theoretical and practical)	week (9)	10theoretical + 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)	Book: Soil Chemistry, written by Kazem Mashhout, 1986
Main references (sources)	
Recommended books and references (scientific journals, reports…)	Spsito,G.(2008).The Chemistry of soil. Oxford University Press.
Electronic References, Websites	

dr.Abd Alkader Absh Sbak
Theoretical subject teacher

Ahmed Samir Ghanem
Practical subject teacher

dr.Abd Alkader Absh Sbak
Chairman of Scientific Committee

dr.Khalid Anwar Khalid
Head of the Department

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.

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

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	

	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	

	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

Theoretical subject lecturer:
Dr. Ammar Younis Kashmoula

Practical subject lecturer:
Assist. Lecturer Reem Walid Al-Saffar

Chairman of the Scientific Committee:
Dr. Abdulqader Abash Sbak

Head of the Department of Soil Science and Water Resources:
Dr. Khalid Anwar Khalid

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 theortical +3 prtical /3.5 units
7. Course administrator's name (mention all, if more than one name)
Name: Abdalkader Absh Sbak Email: dr.abdalkaderabshsbak@uomosul.edu.iq Name: Ahmed Sameer Ghanim Email: ahmedaltaay1986@uomosul.edu.iq
8. Course Objectives

Course Objectives Theoretical : 1- Enabling the student to understand And comprehend the relationship Between the crystal and its systems And axes 2- Enabling the student to know the structural composition of silicate minerals 3- Enabling the student to understand and know the most important structural properties of minerals - Clay 4- Identify the transformations that occur in clay minerals	**practical :** **- Enabling the student to recognize the most important methods of detection** **Identification of clay minerals and procedures for diagnosing minerals** **the soil** **Enable the student to identify the crystalline structure of minerals** 

9. Teaching and Learning Strategies

Strategy Theoretical: - The lecture is interactive	practical : - Assigning group work to reveal

- Brainstorming - Dialogue and discussion - Assigning tasks and reporting - Presentations of models of clay samples mounted or slides The student is assigned to prepare a report entitled from his own diligence and prepare it for discussion With the students	skills Leadership - Assigning tasks and reporting for each experiment

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2Theoretical	A1: The student identifies t most important rocks that make up the Earth's crust. B1: The student distinguish between types of rocks (igneous, sedimentary, metamorphic). B2: The student distinguish between chemical and physical weathering.	Mineral compositi of the Earth's cru	Interactive lectu brainstorming, dialogue discussion, s learning	Midterm Exam 1, Final Exam
	3practical	C7: The student collects various soil samples. C8: Grinds and sieves soil samples. C9: Prepares soil samples fo mineral analysis.	Preparing soil samples for miner analysis	Interactive lectu brainstorming, dialogue and discussion, field training, self-learning	Short practical t 1
2	2Theoretical	A2: The student identifies t main parts of a crystal. C1: The student describes crystal axes with a diagram.	Crystal structure of minerals	Interactive lectu brainstorming, dialogue discussion, s learning	Midterm Exam 1, Final Exam
	3practical	C10: The student uses the siphon method to separate t clay from the other separato	Clay separation	Interactive lectu brainstorming, dialogue and discussion, field training, self-learning	direct drawing
3	2Theoretical	A3: The student differentiat between crystal systems by the number of faces, axis length, and interfacial angle A4: The learner differentia between cubic, hexagonal, trigonal crystal systems, well as monoclinic and tricli crystal systems.	Crystal systems	Interactive lectu brainstorming, dialogue discussion, s learning	Midterm Exam 1, Final Exam

	3practical	C11: The learner uses distil water to wash the soil from salts.	Removal of dissolv salts	Interactive lectu brainstorming, dialogue and discussion, field training, self-learning	Field evaluation
4	2Theoretical	B3: The student uses relationship between arrangement of atoms t make up a mineral crystal. A Determine the type of bond a the strength and hardness of mineral.	Structural composition of minerals	Interactive lectu brainstorming, dialogue a discussion, s learning	Midterm Exam Final Exam, Report
	3practical	C12: The student removes carbonate minerals using H A12: The student uses a hydrogen peroxide solution remove organic matter.	Removal of calciur carbonate and orga matter	Interactive lectu brainstorming, dialogue and discussion, field training, self-learning	Short Practice T 2, Direct Drawi
5	2Theoretical	A5: The student is familiar with the most important rul governing the distribution o ions in the minerals of the Earth's crust. B4: The student distinguis silicate minerals based on type of structural unit.	Structural composition of silicate minerals	Interactive lectu brainstorming, dialogue a discussion, s learning	Midterm Exam Final Exam, Report
	3practical	C13: The student uses DCB remove iron oxides from th clay separator.	Removal of iron oxides	Interactive lectu 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 distinguis primary minerals fr secondary minerals by th resistance to weathering.	soil minerals	Interactive lectu brainstorming, dialogue a discussion, s learning	short test, final t
	3practical	B11: The student examines clay slices with an X-ray machine.	Preparing clay slice for examination	Interactive lectu brainstorming, dialogue and discussion, field training, practica exercises, self-learning	Live drawing a homework
7	2Theoretical	A6: The student differentia between silicate minerals	Silicate Minerals	Interactive lectu brainstorming, dialogue a	Midterm Exam 2, Final Exam

		the number of tetrahedral a octahedral units.		discussion, s learning	
	3practical		Mineralogical analysis of clay	Interactive lectu brainstorming, dialogue and discussion, field training, practica exercises, field project, self-learning (scienti visit to the Colle of Earth Science	Field Project (Scientific Visit the College of Earth Sciences)
8	2Theoretical	B7: The student distinguish silicate minerals from non-silicate minerals through silicon dioxide.	non-silicate minera	Interactive lectu brainstorming, dialogue a discussion, s learning	Short exams, assignments, discussions
	3practical	A14: Classify clay minerals during a magnesium saturat and air-drying treatment. A15: Classify clay minerals during a magnesium saturat and ethylene glycol treatme A16: Classify clay minerals during a potassium saturatio and air-drying treatment. A17: Classify clay minerals during a potassium saturatio and heating at 350°C. A18: Classify clay minerals during a potassium saturatio and heating at 550°C. A19: The student identifies the types and proportions of clay minerals in a soil samp	Practical applicatio for diagnosing and calculating clay mineral ratios	Interactive lectu brainstorming, dialogue and discussion, field training, practica exercises, self-learning	Live drawing an homework
9	2Theoretical	A7: The student understand the importance of clay minerals. C2: The student judges structural composition by th number of tetrahedral and octahedral units.	clay minerals	Interactive lectu brainstorming, dialogue a discussion, s learning	Midterm Exam 1 Final Exam
	3practical	A20: The student uses the washing and sedimentation method to separate sand. A21: The learner uses a ligh microscope to observe cryst of different colors and sizes	sand separation	Interactive lectu brainstorming, dialogue and discussion, field training, practica exercises, self-learning	Live drawing an homework

10	2Theoretical	A8: The student classifies c minerals into crystalline and amorphous. B8: The student identifies expanded clay minerals wit crystal dimension of 18 Angstroms.	Clay mineral classification	Interactive lectu brainstorming, dialogue discussion, s learning	Term 2 Exam
	3practical	A16: The student uses bromoform to separate coar sand from fine sand.	Separating light sar minerals from heav ones	Interactive lectu brainstorming, dialogue and discussion, field training, practica exercises, self-learning	Live drawing an 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 lectu brainstorming, dialogue discussion, s learning	Final exam
	3practical	C14: The student uses cannabalsam to stabilize sar grains.	Preparing sand slid for analysis	Interactive lectu brainstorming, dialogue and discussion, field training, practica exercises, self-learning	Live drawing an homework
12	2Theoretical	A10: The student classifies smectite minerals as expans minerals. C4: The student identifies smectite minerals by their 1 Angstrom reflection.	Clay minerals 1:2 (expanded)	Interactive lectu brainstorming, dialogue discussion, s learning	Final exam
	3practical	A22: The student identifies the type of charges through correction curves.	Estimation of permanent soil charges	Interactive lectu brainstorming, dialogue and discussion, field training, practica exercises, self-learning	Live drawing an homework
13	2Theoretical	C5: Mica appears hexagona under an electron microscop C6: The student identifies mica minerals by their lamellar structure.	Clay minerals 1:2 (non-expanding)	Interactive lectu brainstorming, dialogue discussion, s learning	Final exam
	3practical	A23: The student distinguishes between varia charges and permanent charges by the degree of interaction of the medium.		Interactive lectu brainstorming, dialogue and discussion, field training, practica	Live drawing an 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 lectu brainstorming, dialogue a discussion, s learning	short test, final t
	3practical	B13: The student examines iron oxides extracted using chelating materials.	Estimation of total iron oxides in soil	Interactive lectu brainstorming, dialogue and discussion, field training, practica 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 lectu brainstorming, dialogue a discussion, s learning	short test, final t
	3practical	A24: The student uses an X device to examine crystallin iron oxides.	Estimation of crystalline iron oxi in soil	Interactive lectu brainstorming, dialogue and discussion, field training, practica 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) writt by Prof. Dr. Salman is behind Iss
Electronic References, Websites	

dr.Abd Alkader Absh Sbak
Theoretical subject teacher

Ahmed Samir Ghanem
Osama Hosam Fadl
Practical subject teacher

dr.Abd Alkader Absh Sbak
Chair of Scientific Committee

dr. dr.Khalid Anwar Khalid
Head of the Department

Course Description Form

1. Course Name:
Soil morphology
2. Course Code:
SMOR354
3. Semester / Year:
Spring second semester/ 2024-2025
4. Description Preparation Date:
1/2/2025
5. Available Attendance Forms:
Compulsory
6. Number of Credit Hours (Total) / Number of Units (Total)
Theory 2 – practical 3 /3.5 units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Omar Nabhan Abdulqader Email: umarn79@uomosul.edu.iq Dr. Aman Adel Mawlood
8. Course Objectives
Enable the student to understand and comprehend what is related to soil morphology and its relationship to soil science and water resources - Enable the student to know the most important features of the soil profile - Enable the student to become familiar with the most important factors affecting the development of horizons - Empowering the student with the ability to detect diagnostic horizons - The student can explain the development of horizons and address the differences in results for the future over time practical: - Enabling the student to become familiar with the most important laboratory methods in studying macro- a micro-morphological characteristics and the important chemical and physical analyzes in distinguishing a studying soil horizons.
9. Teaching and Learning Strategies

Strategy Reactive lecture Critical thinking Discussion Require to do Several Homework's and Write scientific report for	Practical: group work and cooperation among students. -learn various academic skills. -Do Homework, discussion in the lab and exercise related to hydrology and water resources

different task during the semester	

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theory	A1: The stud explains the conc of soil morphology	The concept of soil morphology and its relationship to other sciences	Listening, Data show Using white board for Writing and drawing, discussion with students	Quiz , Participation during lecture and Monthly exams
	3 practical	B1: Practical and mental knowledge and To help student's i Soil morphology	Definition morphology, its typ and methods studying the pedon	Describe Different Samples, Doing various Lab works exercises	
2	2 theory	A1: The student explains the most important soil formation B1: Practical and mental knowledge and To help student's i Soil morphology	Terminology used in soil morphology	Listening Data show Using white board for Writing and drawing discussion with students	
	3 practical	C6: The student discovers any mear of distinguishing horizons	distinguishing betw soil pedon, soil profile, soil, and pedon	Describe Different Samples, Doing various Lab works exercises	
3	2 theory	A2: The student becomes familiar with the most important factors affecting the formation and development of the pedon	The main horizons in soil ped	Listening Data show Using white board for Writing and drawing, discussion with students	Quiz, Participation during lecture and Monthly exams
	3 practical	D3: The student discovers the	Physiography of region and pedons	Describe Different Samples, Doing various Lab works exercises	

		difference in horizo within one pedon			
4	2theory	A2: The stud becomes familiar w the most import factors affecting formation development of pedon E3: student should Able to d efficiently in the fi of work to trans knowledge and ski To farmers .	Secondary horizons and their diagnosis	Listening Data show Using white board for Writing and drawing, discuss with students	
	3 practical	C6: The stud discovers difference in horizons within one pedon. Able to use Lab equipment	Describing the characteristics of the appearance of the Earth's surface	Describe Different Samples, Doing various Lab works exercise	
5	2theory	E3: student should Able to d efficiently in the fi of work to trans knowledge and ski To farmers	In one area poly pedon	Listening, Data show Using white board for Writing and drawing, discussion with students	Quiz , Participation during lecture and Monthly exams
	3 practical	C6: the student Examine the tools Used to examine Soil pedon. D3: The student Should be able to Communicate his Information with th Community .	spatial and environmental description of the ar surrounding the soil pedon	Describe Different Samples, Doing various Lab works exercises	
6	2 theory	D1: acquiring the Communication Skills to deal with Confidence certainty at the Individual and group Level. D3: The student Should be able to Communicate his Information with th	Diagnostic characteristics of genetic horizons in soil pedon	Listening, Data show Using white board for Writing and drawing, discussion with students	

		Community			
	3 practical	C6: The stud practices measur some of the physi and chemi characteristics of pedon in the field	large and sn morphological characteristics	Describe Different Samples, Doing various Lab works exercises	
7	2theory	A3: The student learns about the most important diagnostic horizons D1: acquiring the Communication Skills to deal with Confidence a certainty at the Individual and Group level	Distinctive exter diagnostic horizons, their types a characteristics	Listening, Data show Using white board for Writing and drawing, discuss with students	
	3 practical	C6: The stud practices measur some of the physical and chemi characteristics of pedon in the field	Special formations the soil pedon	Describe Different Samples, Doing various Lab works exercises	
8	2theory	A2: The stud becomes familiar w the most import factors affecting formation a development of pedon B1: Practical and mental knowledge and To help student's i Soil morphology	Distinctive inter diagnostic horizo their types a characteristics	Listening, Data show Using white board for Writing and drawing, discussion with students	Quiz, Participation during lecture and Monthly exams
	3 practical	C3: the student Should be prepare Scientific resea and studies in his Field specialization .	Epipedon diagno horizons	Describe Different Samples, Doing various Lab works exercises	
	2theory	B9: the student is Familiar with the Most important	The relationship of the distinctive	Listening, Data show Using	

9		Features that appea On surface a subsurface horizon C3: the student Should be prepare Scientific resea and studies in his Field specialization .	diagnostic horizons to the main and secondary horizons in soil beds and the conditions of their formation	white board for Writing and drawing, discussion with students	
	3 practical	C6: student discov Any distinguishing Horizons , and able use lab and field Equipment .	micro morphologi characteristics	Describe Different Samples, Doing various Lab works exercises	
10	2theory	A1: The stud explains the conc of soil morphology B1: Practical and mental knowledge and To help student's i Soil morphology	Geological Weather and Pedogenic	Listening, Data show Using white board for Writing and drawing, discussion with students	Quiz , Participation during lecture and Monthly exams
	3 practical	C6: student discov Any distinguishing Horizons , and able use lab and field Equipment . E3: student should Able to c efficiently in the fi of work to trans knowledge and ski To farmers	Preparing thin sect of soil Samples	Describe Different Samples, Doing various Lab works exercises	
11	2theory	A21: The student Should be able to Describe weatherir stages in the field	Products weathering a formation of clay minerals under different conditions	Listening, Data show Using white board for Writing and drawing, discussion with students	
	3 practical	C25: test soil kinds In the lab under Varies slope level.	Study of pedons on slopes	Describe Different Samples, Doing various Lab works exercises	

12	2theory	A2: The stud becomes familiar w the most import factors affecting formation development of pedon A22: student shoul Be able to interpret The second symbol Which show in natural soil horizon	Different clima conditions in formation morphological characteristics wit pedons	Listening, Data show Using white board for Writing and drawi discussion with students	Quiz, Participation during lecture and Monthly exams
	3 practical	C6: student discov Any distinguishing Horizons , and able use lab and field Equipment .	field survey with the choice pedons	Describe Different Samples, Doing various Lab works exercises	
13	2theory	C3: the student Should be prepare Scientific resea and studies in his Field specialization	Micromorphology, its concepts and components	Listening, Data show Using white board for Writing and drawing, discuss with students	
	3 practical	C6: student discov Any distinguishing Horizons , and able use lab and field Equipment	Different soil tests at different horizons and climatic conditions	Describe Different Samples, Doing various Lab works exercises	
14	2theory	B1: Practical and mental knowledge and To help student's i Soil morphology C6: student discov Any distinguishing Horizons , and able use lab and field Equipment	Types of fine morphological characters, such as cutaneous ones, and their classes according to location, components, and internal composition(s), Fabric, and their dividing boundaries.	Listening, Data show using white board for Writing and drawing, discussion with students	Quiz , Participation during lecture and Monthly exams
	3 practical	C3: the student Should be prepare	Field visits to differ soils and distinguish them from each othe	Describe Different Samples, Doing various	

		Scientific resea and studies in his Field specialization		Lab works exercises	
15	2theory	C6: student discov Any distinguishing Horizons , and able use lab and field Equipment C3: the student Should be prepare Scientific resea and studies in his Field specialization	Presentation of slides on large and small morphologi characters	Listening, Data show Using white board for Writing and drawing, discussion with students	
	3 practica	D3: The student Should be able to Communicate his Information with th Community	A scientific trip for purpose of collect soil samples fr different sites	Describe Different Samples, Doing various Lab works exercises	

11. Course Evaluation

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

Evaluation method	Deadline	Grade	Relative weight
Final report	At the end of semester	Theory 3 Practical 3	6%
Quiz	Week 4	Theory 2 Practical 2	4%
First exam	Week 6	Theory 10 Practical 5	15%
Second exam	Week 14	Theory 10 Practical 5	15%
Final exam (practical)		20	20%
Final exam (theory)		40	40%
Total		100	100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Soil management and conservation
Main references (sources)	USDA
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Dr. Omar Nabhan Abdel Qader
Theoretical subject teacher

Dr. Aman Adel
Ms. Shaimaa Ghanem
Practical subject teacher

Dr. Khaled Anwar Khaled
Head of the Department of Soil Sciences and Water Resources

Dr. Abdul Qader Abash
Chair of the Scientific Committee

Course Description Form

1. Course Name:
Soil Pollution and Water
2. Course Code:
SOPW351
3. Semester / Year:
First Semester / 2024-2025
4. Description Preparation Date:
1 / 9 / 2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
2 Theory + 3 Practical / 3.5 units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Qahtan Darwish Essa Email: qahtan_darwish@uomosul.edu.iq
8. Course Objectives

Theory:	**Practical :**
-Enabling the student to understand the concepts of soil and water pollution -Enabling the student to understand the resources of soil and water pollution - Introducing the student to methods for treating contaminated soil -Enable the student to calculate the level and degree of soil and water pollution	- Enabling the student to recognize th most important methods for calculat the degree of pollution, assessing level of pollution, and measuring so characteristics that are conside standards for soil and water quality

9. Teaching and Learning Strategies	
Strategy	- Interactive lecture, Brainstorming, - Dialogue and discussion, - Assigning tasks and reporting - Assigning group work to reveal leadership skills

10. Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	Theory	Theory: a1: The student identifies pollution to the ecosystem And pollutants	Theory Entrance to pollution For the ecosystem	Theory : -Auditory methods,	Exams, Homework, Reports.
	3 Pract.	b2: The student Learns about pollution And pollutants	Definition of pollution and pollutants	Assigning tasks and reports	Exams, Homework, Reports.

2	Theory .	a2: Entrance to pollution For the ecosyste	The concept of pollution and its sources Its types and negative effect	-Auditory methods, - Style of writing on the blackboa - Direct dialogue style	Exams, Homework, Reports
	3 Pract.	a13:Definition of pollution and pollutants	The effect of pollution on Human, animal Plant,	Assigning tasks and reports	Exams, Homework, Reports
3	2theory	Theory: c1: The student learns about the types Soil contamination	Theory: Types of soil pollution	- Style of writing on the blackboa - Direct dialogue	Exams, Homework, Reports
	3 pract.	b3: The student is familiar with toxic gases	dust, toxic gase Oxides Sulfur oxides Nitrogen, sulfid Hydrogen	Assigning tasks and reports	Exams, Homework, Reports
4	2theory	a3: The student recognizes a gas Nitrogen and its degradation in the environment	Nitrogen gas and its cycle In the environment	-Auditory methods, - Style of writing on the blackboa - Direct dialogue style	Exams, Homework, Reports
	3pract.	b4: The student is familiar with a pollution	Air pollution, it sources, Hydrocarbons	Assigning tasks and reports	Exams, Homework, Reports
5	2theory	a4: The student learns about each cycle of oxygen and carbon and sulfur in nature	Oxygen and carbon cycle and sulfur in nature	- Style of writing on the blackboa - Direct dialogue style	Exams, Homework, Reports
	3 pract.	b5:The student ge to know Water filtration project	Visit a water filtration proje in Al-Rashedia	Assigning tasks and reports	Exams, Homework, Reports
6	2theory	a5: The student gets to know Chemical contamination of soil agricultural samples	Chemical contamination soil agricultural	-Auditory methods, - Style of writing on the blackboa - Direct dialogue style	Exams, Homework, Reports
	3pract.	b6:The student examines water samples	Measurement o temporary hardship and permanent	Assigning tasks and reports	Exams, Homework, Reports

7	2theory	b1: The student identifies the risks of pollution on plant growth and human healt	Chemical pollution and it impact on plant growth and human health	-Auditory methods, - Style of writing on the blackboa - Direct dialogue style	Exams, Homework, Reports
	3pract.	b7: The student measures salinity Soil acidity	Calculate the salinity of wate and acidity calculation and basal	Assigning tasks and reports	Exams, Homework, Reports
8	2theory	a6:The student masters processing Chemical pollutio	Treating Chemical pollution	- Style of writing on the blackboa - Direct dialogue style	Exams, Homework, Reports
	3pract.	b8:The student measures calcium and magnesium	Measure calcium and magnesium with water	Assigning tasks and reports	Exams, Homework, Reports
9	2theory	a7: The student learns about pathogenic microbes in the soil	Pathogenic microbes For humans and animals in the soil	-Auditory methods,	Exams, Homework, Reports
	3pract.	b9:The student Identifies methods of measuring pollution	Methods of Measuring pollution of water and soil	Assigning tasks and reports	Exams, Homework, Reports
10	2theory	a8: The student is familiar with soil pollution with heavy meta	Soil contamination with heavy met	-Auditory methods, - Style of writing on the blackboa - Direct dialogue style	Exams, Homework, Reports
	3pract.	c3:The student learns about pollution With powders, fertilizers and waste	Pollution with washing powders, fertilizers animal wastes	Assigning tasks and reports	Exams, Homework, Reports
11	2theory	a9:The student masters processi minated lands	Treatment of contaminated lands	-Auditory methods, - Style of writing on the blackboa - Direct dialogue style	Exams, Homework, Reports

	3pract.	a14:The student gets to know Spectrometer	Visible light Spectrometer and the elements it measures	Assigning tasks and reports	Exams, Homework, Reports
12	2theory	a10: The student learns about pollution Water	Water Pollution	-Auditory methods,	Exams, Homework, Reports
	3pract.	b10:The student measures the vital requirement and The chemistry in water	Measurement of COD and BOD	Assigning tasks and reports	Exams, Homework, Reports
13	2theory	a11: The student judges soil pollution	Modern standards for evaluation Soil pollution level	-Auditory methods, - Style of writing on the blackboa - Direct dialogue style	Exams, Homework, Reports
	3pract.	c4:The student gets to know Atomic Absorption device	Absorption device Atomic matter and its components	Assigning tasks and reports	Exams, Homework, Reports
14	2theory	a12: The student learns methods Pesticide transmission	Methods of transmission of pesticides In the soil	-Auditory methods, - Style of writing on the blackboa - Direct dialogue style	Exams, Homework, Reports
	3pract.	b11:The student learns about pollution With pesticides	Pesticide contamination	Assigning tasks and reports	Exams, Homework, Reports
15	2theory	c2: The student is familiar with the effect of pesticides on organisms	The effect of pesticides on Activity of microorganisms in soil	-Auditory methods, - Style of writing on the blackboa - Direct dialogue style	Exams, Homework, Reports
	3pract.	b12:The student explains the risks Radioactive isotope contamination	Risks of isotope contamination Radioactive	Assigning tasks and reports	Exams, Homework, Reports
11. Course Evaluation					

	Evaluation Methods	Evaluation Date	Degree	Relative weight %
	Final report theory + pract. Report	Theory 15 weeks Pract. 1-15 week	7 Theory + 6 pract.	% 13
	Short exam (1)	Week (3)	4 Theory + 2 pract.	% 6
	Half exam (theory + pract.)	Week (9)	10 Theory + 5 pract.	% 15
	Short exam (2)	Week (12)	4 Theory + 2 pract.	% 6
	Final exam (practical)	Exam pract.	20	% 20
	Final exam (theory)	Exam theory	40	% 40
			100	% 100

12. Learning and Teaching Resources	
Required textbooks (curricular books any)	Book (Soil pollution and water) Dr. Mahmood Al-Jumaili and Sal Hadi (2018)
Main references (sources)	Book (Soil pollution and water) Dr. Shikhani, Dr. Mohammad Sam Dr Aiad Foad (2015)
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Teacher of Theory : Dr. Qahtan Darwish Essa

Teacher of Practical : Mr. Ahmed Sameer Ghanim

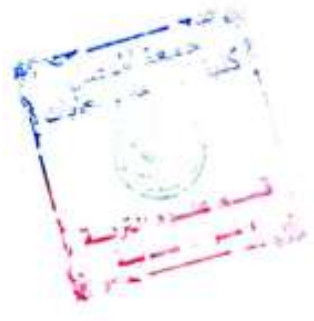
Chair of the Scientific Committee : Dr. Abd Al-Qader Abash Sbak

Head of the Dept. of Soil Sciences and Water Resources : Dr Khalid Anwar Khalid

Course Description

1. Course Title:
Desertification
2. Course Code
DESE455
3. Semester / Year:
Second Semester –2024-2025
4. Description Preparation Date:
1/2/2025
5. Available Attendance Forms:
In presence
6. Number of Credit Hours / Number of Units /
2 Theoretical 2 units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Taha A.T.D. AlJawwadi Email: tars71@uomosul.edu.iq
8. Course Objectives
1 - Identify desertification and what is its difference from the desert, through some definitions and scientific terms that explain this. 2 - Introducing the student to the meaning of desertification indicators, what they mean and their difference from other expressions. 3- Explaining the causes of desertification in some detail and teaching the student that mismanagement, in addition to climatic factors, are among the most important causes. 4- Introducing the student to the criteria for desertification and its degrees according to international standards 5- Introducing sand dunes as one of the most important manifestations of desertification. 6- Directing the student to methods of combating desertification in some countries according to the financial capabilities of each country.

9. Teaching and Learning Strategies
- Interactive Lecture - Brainstorming - Dialogue and discussion - Practical exercises - Assigning tasks and writing a reportSelf-learning



1. Course Structure

The week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 Theoretical	A1. Teach students about the definitions of desertification, its difference from degradation, and what each word means	Concepts and definitions of desertification, land degradation and desert.	Auditory methods Writing style on the blackboard Slideshow style Interactive dialogue style.	Homework Assignment of duty discussions
2	2 Theoretical	A2: Introducing the student that desertification is a global problem and guiding him to the most important areas affected by it	Desertification is a global problem in arid and semi-arid regions.	Auditory methods Writing style on the blackboard Slideshow style Interactive dialogue style.	Short exams Assignment of duty discussions
3	2 Theoretical	A3: Introducing the student to the causes of desertification and degradation .	Causes of desertification and land degradation.	Auditory methods Writing style on the blackboard Slideshow style Interactive dialogue style.	Short exams Assignment of duty discussions Homework
4	2 Theoretical	B1: The student learns about the processes that cause desertification and degradation	Desertification and land degradation processes.	Auditory methods Writing style on the blackboard Slideshow style Interactive dialogue style.	Homework Assignment of duty discussions short test (1)
5	2 Theoretical	B2Introducing students to the degrees of desertification and the difference between each degree and another	Degrees and manifestations of desertification	Auditory methods Writing style on the blackboard Slideshow style Interactive dialogue style.	Homework Assignment of duty discussions Short test (2) Homework
6	2 Theoretical	A4: The student gets to know the approved standards By international organizations in assessing desertification	Standards approved by the FAO in assessing desertification	Auditory methods Writing style on the blackboard Slideshow style Interactive dialogue style.	Homework Assignment of duty discussions Short test (3)
7	2 Theoretical	A5: Creating a knowledge overview of land degradation and	Degradation of pasture lands,	Auditory methods Writing style on the blackboard	Short exams Assignment of duty discussions

		the impact of overgrazing and premature grazing	overgrazing and early grazing	Slideshow style Interactive dialogue style.	Semester test (1)
8	2 Theoretical	A5: Identifying sand dunes and distinguishing them from dust storms	Sand dunes and d storms	Auditory methods Writing style on the blackboard Slideshow style Interactive dialogue style.	Short exams Assignment of duty discussions Report 1
9	2 Theoretical	A7: Introducing the student to the types of sand dunes and how they are created	Types of sand dunes, their formation, and their division according to the speed of movement.	Auditory methods Writing style on the blackboard Slideshow style Interactive dialogue style.	Homework Assignment of duty discussions
10	2 Theoretical	A8: The student learns the methods and methods of combating desertification	Ways and methods to combat desertification and reduce its risks	Auditory methods Writing style on the blackboard Slideshow style Interactive dialogue style.	Short exams Assignment of duty discussions
11	2 Theoretical	A9: Forming the idea of mechanical methods in combating desertification.	Mechanical methods in combating desertification	Auditory methods Writing style on the blackboard Slideshow style Interactive dialogue style.	Short exams Assignment of duty discussions Semester test (2)
12	2 Theoretical	A10: The student learns about chemical methods in combating desertification.	Chemical methods in combating desertification.	Auditory methods Writing style on the blackboard Slideshow style Interactive dialogue style.	Short exams Assignment of duty Discussions Write a simplified report with quick testing
13	2 Theoretical	A11 The student learns about the biological methods in combating desertification and what are the benefits of afforestation.	Biomethods and afforestation Windbreaks in combati desertification	Auditory methods Writing style on the blackboard Slideshow style Interactive dialogue style.	Short exams Assignment of duty discussions
14	2 Theoretical	A12: The student learns about the distribution of degrees of desertification and degradation in Iraq and places representative of these degrees	Distribution of degrees processes of desertification and land degradation in Iraq.	Auditory methods Writing style on the blackboard Slideshow style Interactive dialogue style.	Short exams Assignment of duty discussions

15	2 Theoretical	A13: The student learns about modern techniques in monitoring desertification, the most important of which is remote sensing.	Using remote sensing techniques to monitor and monitor the phenomenon of desertification.	Auditory methods Writing style on the blackboard Slideshow style Interactive dialogue style.	test Assignment of duty discussions

1. Course Evaluation

t	Evaluation methods	Calendar date (week)	Grade	% Relative Weight
1	Report 1	The eighth week	5	5
2	Homework	the third week	1	1
3	Short test (1) Quiz	fourth week	1	1
4	Short test (2) Quiz	The fifth week	1	1
5	Short test (3) Quiz	the sixth week	1	1
6	Semester test (1)	The seventh week	7.5	7.5
7	Semester test (2)	The eleventh week is difficult	7.5	7.5
8	Final theoretical test	Final semester exams	60	60
9	Homework	The fifth week	1	1
10	Homework	the sixth week	1	1
11	Homework	The first week	1	1
12	Homework	fourth week	1	1
13	test	The fourteenth week	10	10
14	Homework	The ninth week	1	1
15	test	Final semester exams	1	1
	Total	100	% 100	%100

2. Learning and Teaching Resources

Desertification, Majid Khudair Abbas / Abdul Amir Thajil Saleh - University of Baghdad 2012	Required textbooks (methodology, if any)
	Main references (sources)
Academic scientific journals, reports of international environmental and weather organizations	Recommended books and references (scientific journals, reports...)
FAO	Electronic References, Websites

Theoretical subject lecturer:
Dr. Taha A.T.D. AlJawwadi

Chairman of the Scientific Committee:
Dr. Abdul Qader Abash sbak

Head of the Department of Soil Science and Water Resources:
Dr. Khaled Anwar Khaled

Course Description Form

1. Course Name:
Irrigation systems technologies
2. Course Code:
AGSW24_F4061
3. Semester / Year:
First semester / 2024 −2025
4. Description Preparation Date:
1 \ 2 \ 2025
5. Available Attendance Forms:
presence
6. Number of Credit Hours (Total) / Number of Units (Total)
2 Theoretical 3 practical/ 3.5 unite
7. Course administrator's name (mention all, if more than one name)
Name: mooatasim daood S.Agha Email: mooatasim@uomosul.edu.iq
8. Course Objectives

− The student will be able to identify the factors involved in selecting an irrigation method. **− The student will be able to identify the factors associated w irrigation water.** **− The student will be able to understand surface irrigation methods.** **− The student will be able to calculate the amount of irriga water added.**	**− The student will be able to identify the type irrigation methods** **− The student is able to identify the components traceability of the irrigation network** **− The student can follow and see the irrigation fac** **− The student will be able to identify the form surface irrigation.** **− The student is able to understand and observe method of sprinkler irrigation** **− The student is able to understand and follow the irrigation method.**

9. Teaching and Learning Strategies

- Interactive lectures - Brainstorming - Dialogue and discussion - Assigning tasks and reporting	practical: - Assigning group work to reveal leadership skills - Assigning tasks and reports

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 Theoretical 3 practical	Theoretical Factors for choos the appropri irrigation method Practical: a1 student understa different irrigation metho traditional methods modern methods	Theoretical 1 The student understar how to choose the appropriate irrigation method. Practical Different ways of ad water	theory: Blackboard with fie observations practical : Using the blackbo and field observatio	Short exams, assignments, discussions
2	2 Theoretical 3 practical	a2 The student understa the irrigation w factors related t the choice of irrigation metho practical : a2The student understa what the unit consists of crops, the farm, and the f	theory: Irrigation method factors related to irrigation wate practical : Irrigation unit	theory: Blackboard and observations practical : Using the blackbo and field observati	Short exa assignments, discussions
3	2 Theoretical 3 practical	Theory: a3 The student understar the forms and methods o surface irrigation. Practical: a3The student is fam with the forms of sur irrigation, and what is b irrigation	theory: Surface irrigatio practical : basin irrigation	theory: Watching videos explanations on board practical : Using the blackbo and field observati	Shortexams, assignments, discussions
4	2 Theoretical 3 practical	Theory:	theory Flood irrigation	theory: Using the whiteboard while watching YouTube	

		b1 The student understar the forms and advantages flood irrigation. practical : b1 It enables the studer understand and estimate depth and volume of w added to the basin	practical : Irrigation terraces, free flooding, and the studen estimation of the depth irrigation water using th basin method	Practical: Use the blackboard and assign reports	
5	2 Theoretical 3 practical	Theory: a4 The student understar what basin irrigation is, i advantages and limitatio Practical: a4 The student understar strip irrigation	Theoretical: Basin irrigation and its advantages Practical: Strip irrigation	Theoretical: Watch posters practical : Use the whiteboard and watch posters	
6	2 Theoretical 3 practical	Theoretical: B2 The student will be ab to understand the feature contour basins. practical : b2 The student is able to learn about the advantag and devices of sprinkler irrigation	Theoretical Contour basins practical : Sprinkler irrigation	Theoretical: View a poster using board. practical : Field views and pos	
7	2 Theoretical 3 practical	Theoretical: d1 The student understar the estimation of water concentration within the d1 practical : The student is able estimate the drair required for a sprin irrigation system	Theoretical: Estimating the rate of so infiltration of water practical : Sprinkler irrigation sys capacity	Theoretical: Performing s calculations reports Practical: Examples blackboard assignn and report	First examination
8	2 Theoretical 3 practical	theory: d2 The student understa what free irrigation is what its advantages are. Practical: d2 The student is able know the sprinkler disch and irrigation time	theory: Flood irrigation practical : Single spray capacity	Theoretical: Scenes of some post Practical: Examples blackboard assignn and report	
9	2 Theoretical 3 practical	Theoretical: d3 Enable the student to apply certain ratios to determine irrigation time and the volume of water added.	Theoretical Estimating the basin irrigation period practical : Capacity of one sprinkle a rectangular field	Theory: Using the board practical :	Short exams, homework assignments, discussions

		practical : d3 The student will be ab estimate sprinkler drain and irrigation systems		Use the blackboard assign a report	
10	2 Theoretical 3 practical	Theoretical: Theory: d4 The student understands what strip irrigation is and its advantages. practical : d4 The student is able to estimate the uniformity o water distribution in the field	Theoretical: : Strip irrigation practical : Correlation coefficient	Theoretical: Using the whiteboa with the poster practical : Example solutions field observations	exams, homeworl assignments, discussions
11	2 Theoretical 3 practical	Theoretical: d5 The student distingui the stages of strip irrigati practical: d5 The student will be ab estimate the depth of w applied by sprin irrigation	Theoretical: Stages of strip irrigation practical : Applications in correlati coefficient	Theoretical: Illumination using t board practical : Assigning tasks reporting	exams, homework assignments, discussions
12	2 Theoretical 3 practical	Theory: d6 The student be able to design a s irrigation system. Practical: d6 The student is able to calculate the depth of irrigation water and the discharge of the sprinkle nozzle	Theoretical: Designing a strip irriga system Practical: Estimating the percen of losses for sprin irrigation	Theoretical: Using the board practical : Using the whitebo while assigning report	Short exams homework assignments, discussions
13	2 Theoretical 3 practical	Theoretical: b3 The student learns abo the nature of the furrow its features. practical : b3 The student understa the characteristics of irrigation and estimates correlation coefficient	Theoretical: Furrow irrigation practical : Drip irrigation	Theoretical: Using the board practical : Use the whiteboard with field views and assignments	Short exams homework assignments, discussions
14	2 Theoretical 3 practical	Theoretical: b4 The student understar the construction of a drip irrigation system and its advantages. practical:	Theoretical: Drip irregation practical : Theoretical definition o drips	Theoretical: blackboard plannin practical : Assigning tasks reporting	Second examition

		b 4The student is able to understand the shape of t water distribution below dripper. Estimating the drainage of the dripper			
15	2 Theoretical 3 practical	Theoretical: . b5 The student understar the advantages of sprinkl irrigation, and what the capacity of the system is. practical : b5 The student is able to understand the problem blockages and bottleneck occurring in the drip irrigation network	Theoretical: Spring irrigation practical : Types of blockages and bottlenecks in the drip irrigation network	Theoretical: Illustration of a diagram on the boa practical : Preparing some chemical solutions i the laboratory	Short exams homework assignments, discussions

11. Course Evaluation

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)	irrigation and drainage (Prof. Dr. Laith Khalil Ismail)
Main references (sources)	Irrigation, its basics and applications (Dr. Nabil Ibrahim Latif)
Recommended books and references (scientific journals, reports…)	Rafidain Journal of Agricultur
Electronic References, Websites	https://www.iasj.net

Theoretical subject teacher: Mooatasim Daood S . Agha.

practical subject teacher: Mooatasim Daood . Sulayman

Department Head: Khalid Anwar khalid

Chairman of the Scientific Committee: Abdel Qader Abash Sabak

Course Description Form

1. Course Name:

Fertilizer technologies

2. Course Code: :

AGSW24-F4111

3. Semester / Year: Aumtumn

second fall semester / 2024-2025

4. Description Preparation Date:

1-2-2025

5. Available Attendance Forms: Mandatory

The presence + online

6. Number of Credit Hours (Total) / Number of Units (Total):

2 Theoretical+ 3 practical

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Rana Saadallah Aziz
Name :A.T reem waleed abdalgabbar
Name :A.T Marwan Mahmod Yassen

8. Course Objectives

Course Objectives

Theoretical part:
1. Student education how to take soil models or plant from the field.
2. Detailed knowledge of the most important food and micro nutrients and how to use fertilizers to provide plant to th elements.
3. Identify chemical fertilizer types.
4. Student education means used in the assessment of forefront and knowledge of the amount of fertilizer and scientific.
5.Kneads and places manufacturing chemical fertilizer.
6.Students towards desire to have better experiences when submitting graduate studies.
7.How to add chemical fertilizers and accounts.

practical part
- Detection of types of chemical fertilizers And practical experiments to determine the type of these fertilizers.

9. Teaching and Learning Strategies

Theoretical:	Practical:

- Interactive lecture. - Dialogue and discussion. - Assigning tasks and reporting. - Brainstorming . - Special offers on chemical fertilizer manufacturing models.	- Assigning group work to reveal skills Student leadership. - Assigning tasks and a report for each lecture

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 Theoretical 3 Practical	Theoretical: shows For the student an introduction to Fertilizer technologies Definitions of types of fertilizers and their purpose them and then classify them Practical: a general idea about each Types of fertilizers, purpose of fertilization, classification of fertilizers.	Theoretical: Introduction to fertilizer technology, objective, Sources, general definitions, general idea For all types of fertilizers, their purpose Fertilization, classification of fertilizers. Practical: Shows the student how to classify fertilizers and the purpose of fertilization	Theoretical: Methods audio Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assigned assignments and discussions.
2	2 Theoretical 3 Practical	Theoretical: Explains to the student the salt index for fertilizers How to calculate it,with an explanation of the most important points To store fertilizers Practical How to find and calculate the salt index for fertilizers :	Salt lndex for fertilizers and how to calculate it, Fertilizer movement, fertilization methods, Points to consider when storing Fertilisers. Practical: It explains to the student what the salt index is, why it is important, what the salt index is, as well as the importance of fertilizers and how to store them.	Theoretical: Methods audio Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assigned assignments and discussions.
3	2 Theoretical 3 Practical	Theoretical: definition Student through methods	Manufacture of phosphate fertilizers, phosphoric acid, and	Theoretical: Methods audio	Short exams, assigned assignments

		Fertilizer manufacturing Phosphate including Phosphoric acid, superphosphate fertilizer Regular, triple, concentrated and fertilizer Ammonium phosphate and urea phosphate. Practical: Phosphate fertilizers, standard specifications for phosphate fertilizers, detection of fertilizers	superphosphate fertilizer Regular, triple superphosphate fertilizer, concentrated superphosphate fertilizer, fertiliser Ammonium phosphate, urea phosphate. Practical: Introducing the student to how to detect phosphate fertilizers, and knowing the percentage of phosphorus in these fertilizers	Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	and discussions.
4	2 Theoretical 3 Practical	Theoretical: recognize Student at the fertilizer complex in Al-Qaim And each unit of Complex units Explaining the steps of its production. Practical: Manufacturing different types of nitrogen and phosphate fertilizers	Fertilizer complex in Al-Qaim, with a mention, explanation and detail of each unit of the complex, and production steps for each type Fertilisers. Practical: Introducing the student to methods of manufacturing different types of fertilizers	Theoretical: Methods audio Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assigned assignments and discussions.
5	2 Theoretical 3 Practical	Theoretical: recognize The student is more important Nitrogen solutions with slow clarification nitrogen fertilizers Liberation and recognition On the forms of packaging Practical: Nitrogen fertilizers Standard specifications for nitrogen fertilizers and slow-release fertilizers	Nitrogen solutions, slow-release nitrogen fertilizers, slow-release compounds in water, forms of packaging, environmental problems For nitrogen fertilizers. Practical: The student learns about the types of slow-release fertilizers, and the purpose of packaging fertilizers	Theoretical: Methods audio Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assigned assignments and discussions.

6	2 Theoretical 3 Practical	Theoretical: recognize The student is on the road Fertilizer evaluation And methods of mixing them And examples of it. Practical: Fertilizer evaluation Fertilizer mixing guide	Fertilizer evaluation and mixing, descriptive and quantitative evaluation of fertilizers, fertilizer mixing guide, Examples of mixing fertilizers. Practical: The student learns about the foundations of evaluating fertilizers and how to mix fertilizers using mathematical methods	Theoretical: Methods audio Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assigned assignments and discussions.
7	2 Theoretical 3 Practical	Theoretical: recognize Student on fertilizers, especially those containing... On potassium, its forms, factors affecting readiness, and its sources and types. Practical: Potassium fertilizers, factors affecting the readiness of these fertilizers, calculating the percentage of potassium in these fertilizers.	Fertilizers containing potassium, forms of potassium in the soil, factors affecting the readiness of potassium, its sources, types of potassium fertilizers, potassium chloride, potassium sulphate, potassium nitrate. Practical: The student learns On how to detect potassium fertilizers, and methods of manufacturing these Fertilisers	Theoretical: Methods audio Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assigned assignments and discussions.
8	2 Theoretical 3 Practical	Theoretical: The student becomes familiar with the financial advice and its objectives Its methods and components, while introducing the student to the critical limits of major and minor elements. Practical: Definition of fertilizer recommendation Its goals, methods and components	The Samadhi recommendation is defined as its objectives Its methods, components, plant analysis, Critical limits for macro and micro nutrients. Practical: Introducing the student to the importance of the fertilizer recommendation and its purpose	Theoretical: Methods audio Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assigned assignments and discussions.

9	2 Theoretical 3 Practical	heoretical: It explains the most important organic fertilizers, their importance, the differences between them and mineral fertilizers, their sources, and the factors affecting their decomposition, while giving examples of organic fertilizers. Practical: Estimating the percentage of organic carbon in fertilizer, estimation The percentage of total nitrogen in Fertilizer	Organic fertilizers, their importance, division Organic fertilizers, differences between organic and chemical fertilizers, notes that This must be taken into account when choosing fertilizers Organic matter, its sources, types, methods of adding it, factors affecting decomposition Organic fertilizer, examples of calculating the amount of organic fertilizer. Practical: Conduct laboratory experiments to calculate the percentage of organic carbon and the percentage of total nitrogen in organic fertilizers	Theoretical: Methods audio Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Conducting weekly oral or written tests.
10	2 Theoretical 3 Practical	Theoretical: recognize The student receives fertilizers containing calcium and magnesium Knowing its critical limits and clarifying its problems in Iraqi soil. Practical: The importance of fertilizers containing calcium and magnesium, standard specifications for these fertilizers	Fertilizers containing calcium and magnesium and their critical limits and problems in Iraqi soils Practical: Explains to the student how to detect these fertilizers and methods of manufacturing them	Theoretical: Methods audio Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assigned assignments and discussions.
11	2 Theoretical 3 Practical	Theoretical: Explains. Fertilizers for the student Major elements	Micronutrient fertilizers (iron, zinc, manganese, boron, copper, molybdenum.	Theoretical: Methods audio Style of writing on the blackboard	Short exams, assigned assignments

		Practical: The importance of micronutrient fertilizers, standard specifications, and determinants of using these fertilizers	Practical: Explains to the student how to detect these fertilizers and methods of manufacturing them	Direct dialogue style Practical: Assigning tasks and reporting	and discussions.
12	2 Theoretical 3 Practical	Theoretical: The student learns about the element sulfur, its limits, and its problems in Iraqi soil. Practical: sulfur fertilizers, types of sulfur fertilizers, standard specifications	Sulfur and its presence Sulfur as a critical boundary conditioner has its benefits and problems in the soil. Practical: Instructing students on how to find the percentage of sulfur in these fertilizers, conducting laboratory experiments to detect these fertilizers.	Theoretical: Methods audio Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assigned assignments and discussions.
13	2 Theoretical 3 Practical	Theoretical: Explains to the student the methods of manufacturing fertilizers and their problems Practical: Fertilizer manufacturing methods	Fertilizer industry, raw materials used in manufacturing, its problems Practical: Introducing the student to the materials used in the manufacture of fertilizers	Theoretical: Methods audio Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assigned assignments and discussions.
14	2 Theoretical 3 Practical	Theoretical: Explains to the student the types of nitrogen fertilizers and their use as fertilizer. Practical: Standard specifications for nitrogen fertilizers, methods of using these fertilizers	Nitrogen fertilizer, anhydrous ammonia, ammonium nitrate, urea, hydrolyzate Urea in the soil and used as fertilizer. Practical: Introducing the student to how to detect nitrogen fertilizers, and methods of manufacturing these fertilizers	Theoretical: Methods audio Style of writing on the blackboard Direct dialogue style Practical: Assigning tasks and reporting	Short exams, assigned assignments and discussions.
15	2 Theoretical 3 Practical	Theoretical: The student will become familiar with the most important electronic instructions and problems and the	Guidance and associated environmental problems Using fertilizers, optimal use	Theoretical: Methods audio Style of writing on the blackboard Direct dialogue style	Short exams, assigned assignments and discussions.

		optimal use of brand name techniques. Practical: Methods of dealing with fertilizers, and how to add these fertilizers to the soil	Chemical fertilizer technologies in Iraqi agriculture. Practical: Introducing the student to the most important guidelines used in using fertilizers and how to use them	Practical: Assigning tasks and reporting	

11. Course Evaluation

T	Calendar methods	Calendar date (week)	Class	Relative weight %
1	Theoretical final report + practical experience reports	My theory is week 15 My work week is 1-15.	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 Quiz(2)	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%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Fertilizer technologies book.
Main references (sources)	1. Lectures prepared from the Internet. 2. Fertilizer technologies by Dr. Nour El-Din Shawky Ali 2007.
Recommended books and references (scientific journals, reports…)	1. Fertilizers and soil fertility. Written by Dr. Saadallah Najm Abdullah Al-Naimi 1999. College of Agriculture / University of Mosul. 2. Fertilization and soil fertility. Written by Dr. Kazem Mashhout Awad 1987. College of Agriculture / University of Basra.
Electronic References, Websites	FAO

Theoretical subject teacher:
Dr. Rana Saadallah Aziz

practical subject teacher:
A.T. Reem Waleed abdalgabbar
Marwan Mahmod Yassen

Chairman of the Scientific Committee:
Dr. Abdul Qader Abash Sabak

Head of the Department of Soil Sciences:
Dr. Khaled Anwer Khaled

Course Description Form

1. Course Name:	
Hydrology and water resources	
2. Course Code:	
HYWR452	
3. Semester / Year:	
First semester – Autumn/ fourth stage / −2024−2025	
4. Description Preparation Date:	
1/9/2024	
5. Available Attendance Forms:	
Compulsory	
6. Number of Credit Hours (Total) / Number of Units (Total)	
Theory 2 – practical 3 /3.5 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Omar Nabhan Abdulqader Email: umarn79@uomosul.edu.iq Mrs. Noor Jamil	
8. Course Objectives	
Course Objectives Improve the student's ability in water sciences and hydrology and management of water resources. -increase the student's skills in term of water sciences -improve the student's ability to dealing with different hydrological data and its application in agricultural and soil sciences	Practical Study the hydrological cycle, rainfall, evaporation, infiltration, initial loss, surface run off , ground water , hydrograph , flooding and rain water harvesting
9. Teaching and Learning Strategies	
Strategy Reactive lecture Critical thinking Discussion Require to do Several Homework's and Write scientific report for different task during the	Practical: group work and cooperation among students. -learn various academic skills. -Do Homework, discussion in the lab and exercise related to hydrology and water resources

semester	

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2 theory	A1: identify The elements of hydrological Cycle A2: explain impact Of climate Change and Human activity On water cycle	Water cycle	Listening, Data show Using white board for Writing and drawing, discussion with students	Quiz , Participation during lecture and Monthly exams
	3 practical	A14: study of Water Properties C13: distribution Of hydrological; Cycle in 3 different climate Zones.	Water Properties and Flow path of Hydrological Cycle	Describe Different Samples, Doing various Lab works exercises	
2	2 theory	A3: Mechanism of rainfall formation. A4: Type of precipitation and Rainfall intensity	Rainfall Formation	Listening Data show Using white board for Writing and drawing, discussion with students	
	3 practical	B6: Calculate average rainfall using Thiessen polygon method B7: Calculate average rainfall using isohyetal lines method	Calculate average rainfall over specific area	Describe Different Samples, Doing various Lab works exercises	
3	2 theory	C1: Draw the Relation Between rainfall Depth and area under	Area-depth – Duration of Rainfall	Listening Data show Using white board for	Quiz, Participation during lecture and

		different Intensity. B1: Design and probability Of maximum Rainfall		Writing and drawing, discussion with students	Monthly exams
	3 practical	A:15 solve Mathematical Problem isohyetal lines method A16: solve Mathematical Problem Thiessen polygon method	Exercise of Calculated Average Rainfall	Describe Different Samples, Doing various Lab works exercises	
4	2theory	A5: explain and Determine Of effective Rainfall C2: Analysis the Factors effect on Effective Rainfall	Effective rainfall And factors effect On it	Listening Data show Using white board for Writing and drawing, discussion wi students	
	3 practical	B8: Analysis Of rainfall Probability B9: apply to determine return Period for rainfall.	Probability And return period	Describe Different Samples, Doing various Lab works exercises	
5	2theory	A6: Normal and acid rainfall quality C3: interception and depression storage	Rainfall water Quality, interception Quality Of rainfall And initial Loss from Precipitation	Listening, Data show Using white board for Writing and drawing, discussion with students	Quiz , Participation during lecture and Monthly exams
	3 practical	A17: calculate Frequency of Of rainfall A18:determine rain intensity	Draw and Calculate Rainfall Intensity	Describe Different Samples, Doing various Lab works exercises	
	2 theory	A7: Evaporation From surface Water body and Soil	Evaporation and factors Effect on it	Listening, Data show Using white	

6		A8 : listed the Factors effect On evaporation Rate .		board for Writing and drawing, discussion with students	
	3 practical	A9: Calculate Miss rainfall Data B10: Analysis Double mass Cure method	Calculate Miss rainfall Data	Describe Different Samples, Doing various Lab works exercises	
7	2theory	C4: the relation Between Infiltration And surface Runoff B2: Evaluation The factors Effect of infiltration Into the soil	Infiltration of Water into the Soil	Listening, Data show Using white board for Writing and drawing, discussion wi students	
	3 practical	B11: using Different Evaporation equations C14: Mathematical Exercise about Evaporation	practical different method to calculate evaporation	Describe Different Samples, Doing various Lab works exercises	
8	2theory	C5: Watershed Properties Such as drainage Pattern, stream Length and Stream order C6: draw and Determine the Boundary of Watershed	Properties Of watershed	Listening, Data show Using white board for Writing and drawing, discussion with students	Quiz, Participation during lecture and Monthly exams
	3 practical	B12: using Infiltration index Equation C15: Mathematical Exercise about Determine Infiltration Index	Determine Infiltration Index	Describe Different Samples, Doing various Lab works exercises	

9	2theory	A9 : describe Surface runoff And it types C7: Analysis the Factors effects On surface runoff	Surface runoff	Listening, Data show Using white board for Writing and drawing, discussion with students	
	3 practical	C16 determine of properties Waters on and calculate Stream order C17: Determine The water Divide and Drainage density And drainage Pattern	Morphometric Analysis For Watershed	Describe Different Samples, Doing various Lab works exercises	
10	2theory	B6: Study and Evaluation Of hydrograph and It parts. C8: Separate and Analysis hydrograph Parts	Hydrograph	Listening, Data show Using white board for Writing and drawing, discussion with students	Quiz, Participation during lecture and Monthly exams
	3 practical	C18: Analysis hydrograph Data C19: determine Amount of Discharge and recharge between river and ground water.	Dealing with hydrograph Data	Describe Different Samples, Doing various Lab works exercises	
11	2theory	A10: explain Porosity and permeability Of rocks and it Related to ground Water A11: Methods Of drilling wells and pumping Test analysis	Ground water And wells	Listening, Data show Using white board for Writing and drawing, discussion with students	
	3 practical	B13: plot The locations Of wells and Springs, drawing	Determine Ground water Level in wells	Describe Different Samples, Doing various Lab works exercises	

		Water level maps B14: Determine The rate of ground Water flow and estimate The amount of aquifer storage			
12	2theory	C9: reason of flood and factor effect on it. B4: Analysis Of flood data	Flooding and Analysis Of flow Duration Curve	Listening, Data show Using white board for Writing and drawi discussion with students	Quiz, Participation during lecture and Monthly exams
	3 practical	C20: Exercise About flow Duration curve C21: Analysis Discharge data During flood and Drought period	Analysis Of flood data	Describe Different Samples, Doing various Lab works exercises	
13	2theory	A12: properties and types of Water harvesting A13: advantage and disadvantage Of water Harvesting	water Harvesting	Listening, Data show Using white board for Writing and drawing, discussion wi students	
	3 practical	B15: Mathematical Exercise about Rainfall water harvesting B16: Mathematical Exercise about Runoff water harvesting	Exercise about Harvesting	Describe Different Samples, Doing various Lab works exercises	
	2theory	C10 : different Type of water Footprint C11 : using Footprint in Agricultural	Water Footprint	Listening, Data show using white board for Writing and drawing, discussion with students	Quiz , Participation during lecture and Monthly exams

14	3 practical	A21: define Virgin flow A22: Mathematical Exercise about virgin flow	Virgin flow	Describe Different Samples, Doing various Lab works exercises	
15	2theory	C12: Interaction Between Surface water and ground Water B5 conserve and good Management Water Resources	Integration Of surface And ground Water Management	Listening, Data show Using white board for Writing and drawing, discussion with students	
	3 practica	A23: Field trip to Mosul Dam and Some sites of irrigation Project.	Field trip to Mosul dam	Describe Different Samples, Doing various Lab works exercises	

11. Course Evaluation

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

Evaluation method	Deadline	Grade	Relative weight
Final report	At the end of semester	Theory 3 Practical 3	6%
Quiz	Week 4	Theory 2 Practical 2	4%
First exam	Week 6	Theory 10 Practical 5	15%
Second exam	Week 14	Theory 10 Practical 5	15%
Final exam (practical)		20	20%
Final exam (theory)		40	40%
Total		100	100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Engineering hydrology author: Basal Alrawi
Main references (sources)	Hydrology in practices (2011) Author Shaw E.M , Beven K.J, Chappell N.A

Recommended books and references (scientific journals, reports…)	Hydrology journal
Electronic References, Websites	USGS website

Dr. Omar Nabhan Abdel Qader
Theoretical subject teacher

M.M. Noor Jamal
Practical subject teacher

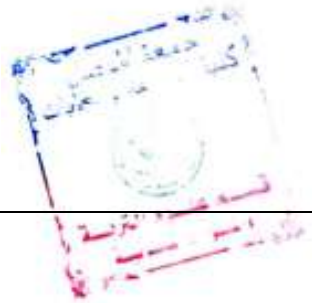
Dr. Khaled Anwar Khaled
Head of the Department of Soil Sciences and Water Resources

Dr. Abdul Qader Abash
Chair of the Scientific Committee

Course Description

1. Course Title:
Plant nutrition
2. Course Code
PLNU214
3. Semester / Year:
Second semester –2024-2025
4. Description Preparation Date:
1/2/2025
5. Available Attendance Forms:
In presence
6. Number of Credit Hours / Number of Units /
2 Theoretical + 3 Practical 3.5 units
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 Assist. Lecturer : Marwan Mahmod Yassen
8. Course Objectives
-Preparing students with the ability to work in the field of plant nutrition and the use of fertilizers according to the modern scientific method to keep pace with the development in this field and entry into the agricultural sector efficiently by participating in agricultural projects. - Enable the student to diagnose the symptoms of nutrient deficiency on the plant and processed. - Enable the student to identify the methods of plant sampling, digestion and preparation for chemical analysis. - Introducing the student to the most important methods of measuring the plant content of elements. - Introducing the student to the most important methods of preparing nutrient solutions.

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 plant nutrition, the origin and development of science	A1: The student is aware of information about origin and stages of development of plant nutrition	2 Theoretical	1
,Practical quiz 1	Interactive lecture, brainstorming, dialogue and discussion, field training, self-learning.	Laboratory work guidelines, identification Laboratory equipment .	A14: The student gets to know types of laboratory equipment and how it works and how to express the concentration of elements in the plant	3 Practical	
Semester Exam 1, Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning.	Essential components of the plant	A2: The student gets to know mineral composition of the plant and the factors affecting it	2 Theoretical	2
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Plant sampling and preparation for chemical analysis	B3: The student gets to know Conditions for taking the sample from field, drying and grinding and preparing it for chemical analysis	3 Practical	
Semester Exam 1, Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Plant Growth culture	A3: The student knows the types of nutrient cultures and its importance and advantages and the disadvantages of each type	2 Theoretical	3
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, self-learning	Digestion of plant samples	B4: The student learns how to digest a plant sample, ways of digestion and the advantages of and the disadvantages of each method	3 Practical	
Semester Exam1, Final Exam, Report	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Nutrient absorption	B1: The student gets to know absorbing forms Nutrients and the factors affecting it	2 Theoretical	4
2 Practical quiz	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Preparation acidic extract of plant sample	B5: The student can Preparation of extract acidity of plant samples	3 Practical	
Semester Exam1, Final Exam, Report	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Root, water, absorption and nutrients	B2: The student learns about the structure of the root and how to absorb water and the factors affecting it	2 Theoretical	5
Home work	Interactive lecture, brainstorming, dialogue and discussion, field	Estimating the Cationic Exchange capacity of roots	B6: The student knows the methods of estimating Root exchange capacity	3 Practical	

	training, practical exercises, self-learning				
Quiz 1, Final Quiz	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Nutrient absorption theories – theories of negative and active absorption	A4: The student gets to know absorption theories Negative and active	2 Theoretical	6
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Preparation of nutrient solutions	B7: The student can prepare Nutrient solutions of three or four salts	3 Practical	
Semester Exam 2, Final Exam, Report	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Nitrogen in plant	A5: The student gets to know the importance of nitrogen, the way it is absorbed and its transformations within the plant, the symptoms of its deficiency and methods addressed	2 Theoretical	7
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, field project, self-learning	Determination of Total Nitrogen in Plant Samples	B8: The student can Determination nitrogen- by Kjeldahl method- and how to calculate Concentration in different units	3 Practical	
Semester Exam 2, Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	phosphorus in plant	A6: The student gets to know the importance of phosphorus, the way it is absorbed, its transformations within the plant and the symptoms of its deficiency	2 Theoretical	8
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Determination of phosphorus in plant samples	B9: The student can estimate Phosphorus in the chromatic way and how to calculate the concentration in different units	3 Practical	
Semester Exam 2, Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Potassium in plant	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	Determination of potassium in plant samples	B10: The student can estimate Potassium using a flame device and how to calculate the concentration In different units	3 Practical	
Semester Exam 2	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Calcium in plant	A8: The student can recognize on the importance of calcium, the way it is absorbed, its transformations within the plant and the symptoms of its deficiency and methods addressed	2 Theoretical	10
Home work	Interactive lecture, brainstorming, dialogue and discussion, field	Determination of calcium in plant samples	B11: The student can estimate calcium using chelating substances and how to calculate the concentration In different units	3 Practical	

	training, practical exercises, self-learning				
Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Magnesium in plant	A9: The student can recognize on the importance of magnesium, the way it is absorbed, its transformations within the plant, the symptoms of its deficiency	2 Theoretical	11
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Determination of magnesium in plants	B12: The student can estimate magnesium using recombination with chelating substances	3 Practical	
Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Sulfur in plant	A10: The student gets to know the importance of sulfur, the way it is absorbed, its transformations within the plant and the symptoms of its deficiency	2 Theoretical	12
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Determination of sulfur in plant samples	B13: The student can estimate Sulfur using turbidity method	3 Practical	
Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	iron and zinc in plant	A11: The student can recognize on the importance of both Iron and zinc, method absorption, transformation within plant and symptoms of deficiency	2 Theoretical	13
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Determination of iron in plant by the chromatography method	B14: The student can estimate iron by the color method	3 Practical	
Quiz 2, Final Quiz, Report	Interactive lecture, brainstorming, dialogue and discussion, self-learning	manganese and copper in plant	A12: The student can recognize on the importance of both manganese, copper, method Absorption and transformation within plant and symptoms of deficiency	2 Theoretical	14
Practical quiz3	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Determination of iron, zinc, manganese and copper in Plant using atomic absorber	B15: The student can estimate micro element cations	3 Practical	
Quiz 3, Final Quiz	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Boron and molybdenum in plant	A13: The student gets to know the importance of boron molybdenum, absorption transformation within the plant, Symptoms of deficiency.	2 Theoretical	15
Home work	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning.	Determination of boron and molybdenum in plants	B16: The student can estimate Boron and molybdenum	3 Practical	

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

12. Learning and Teaching Resources	
Plant Nutrition - Mengele and Kirkby - translated by Dr. Saad Allah Al-Nuaimi	Required textbooks (methodology, if any)
rtilizers and soil fertility Dr. Saad Allah Al-Nuaimi	Main references (sources)
Soil fertility and fertilization-Dr.Kazem Mashhoot awad Plant physiology. Dr. Abdul azim Kazem	Recommended books and references (scientific journals, reports...)
	Electronic References, Websites

Theoretical subject lecturer:
Dr. Ammar Younis Kashmoula

Practical subject lecturer:
Assist. Lecturer: Reem Walid Al-Saffar

Marwan Mahmod Yassen

Chairman of the Scientific Committee:
Dr. Abdul Qader Abash sbak

Head of the Department of Soil Science and Water Resources:
Dr. Khalid Anwar Khalid

Course Description Form/ Soil and Water conservation

1. Course Name:
Soil and water conservation
2. Course Code:
WASC449
3. Semester / Year:
First semester/2024-2025
4. Description Preparation Date:
1/9/2024
5. Available Attendance Forms:
Life in person + Virtual
6. Number of Credit Hours (Total) / Number of Units (Total)
2 + 3= 75 Hr / 3.5
7. Course administrator's name (mention all, if more than one name)
Name: Dr. khaled Anwer khaled Assi.Lectu. Reem Waleed Alsafar
8. Course Objectives
Course Objectives - Enable the student to understand and comprehend what is related to soil and water conservation and its relationship to soil science and water resources - Enable the student to know the most important methods of soil maintenance and water harvesting - Enable the student to become familiar with the most important water sources - Empowering the student with the ability to detect types of water and wind erosion -The student can control erosion and preserve the soil from erosion - Enabling the student to become familiar with the most important laboratory methods for estimati erosion and erosion and detecting soil loss rates and their factors.
9. Teaching and Learning Strategies
- Interactive lecture - Brainstorming - Dialogue and discussion - Assigning tasks and reporting - Presentations of examples of sites degraded by erosion

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	2 virtual	A1: Learn about the concept of soil and water conservation, its benefits, and an introduction and definition of land degradation by water and wind.	Introduction to conservation	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Semester exam 1, exam
	3 Laboratory	C1: The student will examine the tools for measuring rain amounts and be able to design scientific experiments by applying modern technologies.	Analysis of rainfall data	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Semester exam 1, final exam
2	2 virtual	C25: The student should be able to implement water harvesting projects and good agricultural practices to maximize productivity to obtain safe food.	The topic of Precipitation	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Semester exam 1, final exam
	3 Laboratory	C1: The student will examine the tools for measuring rain amounts and be able to design scientific experiments by applying modern technologies. D19: The student discovers any soil degradation caused by water and is able to deal with water sources, soil and other agricultural natural resources.	Rainfall rate		Direct drawing
3	2 virtual	A2: The student is familiar with the most important factors affecting water erosion	Run off		Semester exam 1, final exam
	3 Laboratory	C1: The student will examine the tools for measuring rain amounts and be able to design scientific experiments by applying modern technologies.	Depth of rainfall		Field evaluation
4	2 virtual	A2: The student is familiar with the most important factors affecting water erosion B20: The student will be able to analyze the factors that have a mutual influence	Rainfall data analysis		Semester exam 1, final exam

		between water scarcity, desertification and climate change.			
	3 Laboratory	D24: The student interprets quantitative information from formulas, graphs, tables, plans, simulations, and visualizations, draws conclusions from that information, and represents it symbolically, visually, and numerically.	Examples of soil and water conservation	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Practical quiz 2, direct drawing
5	2 virtual	D1: That the student practices various thinking skills in a systematic and positive manner in diagnosing the problems and issues he faces while working and proposing appropriate solutions to them. E1: The student proposes ways to preserve the environment and natural resources and preserve the soil from grazing	Surface runoff in soil	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Semester exam 1, final exam
	3 Laboratory	C25: The student should be able to implement water harvesting projects and good agricultural practices to maximize productivity to obtain safe food. D24: The student interprets quantitative information from formulas, graphs, tables, plans, simulations, and visualizations, draws conclusions from that information, and represents it symbolically, visually, and numerically.	The rational method for calculating the loss	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Semester exam 1, final exam
6	2 virtual	A24: The student exercises the factors affecting erosion in the field and explains the principles of planning and implementing agricultural operations and appropriate scientific methods in soil and water treatment. D1: The student practices various thinking skills in a	Forms of water erosion	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Semester exam 1, final exam

		systematic and positive manner in diagnosing the problems and issues he faces while working and proposing appropriate solutions to them.			
	3 Laboratory	C25: The student should be able to implement water harvesting projects and good agricultural practices to maximize productivity to obtain safe food. B20: The student will be able to analyze the factors that have a mutual influence between water scarcity, desertification, and climate change.	The CN method in calculating the flow	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Direct drawing and homework
7	2 virtual	A1: Learn about the concept of soil and water conservation, its benefits, and an introduction and definition of land degradation by water and wind B20: The student will be able to analyze the factors that have a mutual influence between water scarcity, desertification and climate change.	The most important methods of surface and subsurface runoff	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Semester exam 2, final exam
	3 Laboratory	C1: The student examines the tools for measuring rainfall amounts and is able to design scientific experiments by applying modern technologies. C25: The student should be able to implement water harvesting projects and good agricultural practices to maximize productivity to obtain safe food.	Kinetic energy KE	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Field project
8	2 virtual	A2: The student is familiar with the most important factors affecting water erosion B9: The student explains the most important methods of movement of plankton and sediments as a result of	Mechanics of water erosion	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Semester exam 2, final exam

		water erosion, and suggests ways to analyze data and information and interpret agricultural phenomena using applied programs to solve the problem of erosion.			
	3 Laboratory	C2: The student should be able to prepare scientific research and studies in his field of specialization. C25: The student should be able to implement water harvesting projects and good agricultural practices to maximize productivity to obtain safe food.	General equation for soil loss	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Direct drawing and homework
9	2 virtual	A1: Learn about the concept of soil and water conservation, its benefits, and an introduction and definition of land degradation by water and wind C2: The student should be able to prepare scientific research and studies in his field of specialization.	Erosion and soil productivity		Semester exam 2, final exam
	3 Laboratory	C25: The student should be able to implement water harvesting projects and good agricultural practices to maximize productivity to obtain safe food.	Calculating the erosion susceptibility factor of rain	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Direct drawing and homework
10	2 virtual	B9: The student explains the most important methods of movement of plankton and sediments as a result of water erosion, and suggests ways to analyze data and information and interpret agricultural phenomena using applied programs to solve the erosion problem. C25: The student should be able to implement water harvesting projects and good agricultural practices to maximize productivity to obtain safe food.	Controlling water erosion	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Semester test2

	3 Laboratory	C2: The student should be able to prepare scientific research and studies in his field of specialization. D19: The student discovers any soil degradation caused by water and is able to deal with water sources, soil and other agricultural natural resources.	Soil erosion susceptibility factor using the nomograph method	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Direct drawing and homework
11	2 virtual	B9: The student explains the most important methods of movement of plankton and sediments as a result of water erosion, and suggests ways to analyze data and information and interpret agricultural phenomena using applied programs to solve the erosion problem. C25: The student should be able to implement water harvesting projects and good agricultural practices to maximize productivity to obtain safe food.	USLE Calculation Methods	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Final test
	3 Laboratory	C25: The student should be able to implement water harvesting projects and good agricultural practices to maximize productivity to obtain safe food. D19: The student discovers any soil degradation caused by water and is able to deal with water sources, soil and other agricultural natural resources.	Topographic factor calculations in LS erosion	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Direct drawing and homework
12	2 virtual	A1: Learn about the concept of soil and water conservation, its benefits, and an introduction and definition of land degradation by water and wind. A2: The student is familiar with the most important factors affecting water erosion	The concept of wind erosion and its risks	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Final Test
	3 Laboratory	B20: The student will be able to analyze the factors	Calculate the weighted rate of dry	Interactive lecture,	Direct drawing and homework

		that have a mutual influence between water scarcity, desertification, and climate change. C25: The student should be able to implement water harvesting projects and good agricultural practices to maximize productivity to obtain safe food.	soil loss, MWD	brainstorming, dialogue and discussion, self-learning	
13	2 virtual	A2: The student is familiar with the most important factors affecting water erosion B9: The student explains the most important methods of movement of plankton and sediments as a result of water erosion, and suggests ways to analyze data and information and interpret agricultural phenomena using applied programs to solve the erosion problem.	Mechanics of wind erosion	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Final Exam
	3 Laboratory	C6: The student examines the tools used to examine soil C25: The student should be able to implement water harvesting projects and good agricultural practices to maximize productivity to obtain safe food.	Calculate the weighted rate of loss of wet soil (MWD).	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Direct drawing and homework
14	2 virtual	B9: The student explains the most important methods of movement of plankton and sediments as a result of water erosion, and suggests ways to analyze data and information and interpret agricultural phenomena using applied programs to solve the erosion problem.	Controlling wind erosion	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Short test, final test
	3 Laboratory	B20: The student will be able to analyze the factors that have a mutual influence between water scarcity, desertification, and climate change. C2: The student should be able to prepare scientific	Crop management factor calculations	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Short practical test3

		research and studies in his field of specialization. C25: The student should be able to implement water harvesting projects and good agricultural practices to maximize productivity to obtain safe food.			
15	2 virtual	C2: The student should be able to prepare scientific research and studies in his field of specialization B9: The student explains the most important methods of movement of plankton and sediments as a result of water erosion, and suggests ways to analyze data and information and interpret agricultural phenomena using applied programs to solve the erosion problem.	Maintenance applications necessary to maintain productivity	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Short test, final test
	3 Laboratory	B20: The student will be able to analyze the factors that have a mutual influence between water scarcity, desertification, and climate change. D24: The student interprets quantitative information from formulas, graphs, tables, plans, simulations, and visualizations, draws conclusions from that information, and represents it symbolically, visually, and numerically.	Calculating the agricultural uses factor.	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Field project

Course Evaluation				
No	Evaluation methods	Evaluation date	Grade	Relative weight
1	Report 1	fourth week	2.5	2.5
2	Report 2	The fifth week	2.5	2.5
3	Short test (1) Quiz	the sixth week	2	2
4	Short test (2) Quiz	The fourteenth week	2	2
5	Short test (3) Quiz	The fifteenth week	1	1
6	Semester test (1)	the sixth week	7.5	7.5
7	Semester test (2)	The eleventh week is difficult	7.5	7.5
8	Final theoretical test	Final semester exams	40	40
9	Practical field project	The fifteenth week	5	5
10	Field evaluation	The third and fifth week	2	2
11	Practical short test (1) Quiz	The first week	1	1

12	Short practical test (2) Quiz	fourth week	0.5	0.5
13	Short practical test (3) Quiz	The fourteenth week	1	1
14	Live drawings and homework	Weeks 6, 8, 9, 10, 11, 12 and 13	5.5	5.5
15	Final practical test	Final semester exams	20	20
	Total	100	100%	%100

Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Soil management and conservation
Main references (sources)	USDA
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Assi. Prof. Dr. Khaled Anwer khaled

Assit. Prof. Dr. Abdul kader Abash sbak

Head of Scientific Member

Assi.Lectu. Reem Waleed Alsafar.

Assi. Prof. Dr. Khaled Anwer khaled

Head of Department

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 proce	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 and nitrate	Practical Study of nitrogen transformations and detection of urea, nitrite and nitrate from soil	Interactive lecture, brainstorming, dialog and discussion, field training, practical exercises, field projec self-learning	practical Assigning tasks and reports
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	Practical Estimation of microorganisms	Interactive lecture, brainstorming, dialo	practical

		c9 The student examines the neighborhoods that... It quenches soil aggregates	in the composition of soil aggregates	and discussion, field training, practical exercises, field proje self-learning	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 compounds membership	Interactive lecture, brainstorming, dialo and discussion, self-learning	theoretical audio methods, Writing on the board direct 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. Muda 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	

M. Dr.. Rand Abdel Hadi Ghazal

Theoretical subject teacher:

M.Dr. Muhammad Ayad Harbawi

M. Dr. Hesham Saadaldeen Yunis

Practical subject teacher

Dr. Ammar Younis Ahmed Kashmoula

Head of the Department of Soil Sciences and Water Resources

أ.م.د.م خالد انور خالد

رئيس القسم

Head of department

Dr. Abdul Qader Abash

Chair of the Scientific Committee

Course Description Form

1. Course name:
Soil survey and classification
2. Course code:
SOSC448
3. Semester/Year: Annual
Second semester (Autumnal) 2024-2025
4. Date of preparation of this description
1/9 /2024
5. Available forms of attendance:
presence
6. Number of study hours (total) / Number of units (total):
2 theoretical + 3 practical / 3.5 units
7. Name of the course supervisor (if more than one name is mentioned)
Assist. Prof. Yousif Hasan Yousif alnaseryousif10@uomosul.edu.iq Practical teacher: Ms. Aman Adel Aman_adel@uomosul.edu.iq
8. Course objectives
The learner will be able to identify the important physical, chemical, biological, and environmental properties of soil that influence soil management. Distinguish between soil evaluations systems in terms of agricultural suitability and soil productivity. Understand sound methods for agricultural soil management. Understand the impact of good physical, chemical, and fertility properties on soils to prevent soil degradation. Understand the basics of assessing the suitability and productivity of agricultural lands according to the type of agricultural crops.
9. Teaching and learning strategies
- Interactive lectures -brainstorming -Dialogue and discussion -field training -Practical exercises -field projects -Interactive lectures -brainstorming -Self-learning

10. Course structure

Evaluation method	Learning method	Name of unit or topic	Required learning outcomes	Hours	Week
Quiz, Homework,	Auditory methods, interactive dialogue	Soil formation and general terms	a1- Understand the concept of soil surveying, classification	2 theoretical	first

Discussion Assignment	Report writing assignment	The importance of studying soil survey from	b7- Master the importance of soil surveying from	3 practical	
Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue	Soil formation factors and types of surveys	Soil formation factors and types of surveys	2 theoretical	second
	Report writing assignment	Personal characteristics of the specialist conducting survey	b8- The student masters the duties and characteristics of the surveyor.	3 practical	
Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue, and slide presentation	Soil classification	a3- Familiarize yourself with the objectives and classification systems.	2 theoretical	Third
	Report writing assignment	Objectives, purposes, and grades surveys	b9- The student masters aims and purposes surveys.	3 practical	
Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue, writing on the board	Soil classification systems in the world: Systems classifying Russian soil	a4- The student learns about international classification systems	2 theoretical	Fourth
	Report writing assignment	Tools and equipment used in the soil survey process	b10- The student masters the tools used in the field and their uses.	3 practical	
Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue	Canadian Soil Classification + United Nations Soil Classification International Soil Classification	a5- The student learns about the characteristics and levels of soil classification.	2 theoretical	Fifth
	Report writing assignment	Preparation and interpretation of soil maps	b11-The student judges how numbers are calculated	3 practical	
Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue,	American soil classification systems	b1- He judges the old and modern American system	2 theoretical	Sixth
	Report writing assignment	Stages of soil survey implementation	b12- The student masters soil surveys in stages.	3 practical	

Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue, writing on the board	Diagnosis and naming of taxonomic units	b2- The student masters the naming of taxonomic units	2 theoretical	eventh
	Report writing assignment	Arrange the soils in Soil Taxonomy and name them.	b3- The student masters the elements that order, suborder	3 practical	
Quiz, Homework, Discussion Assignment	Auditory methods, writing on the board	Soil Maps	B14- The student masters how to make soil maps.	2 theoretical	eighth
	Report writing assignment	Entisols and Vertisols	b4- The student masters the the Entisols and Vertisols order	3 practical	
Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue,	Soil Maps	B14- The student masters how to make soil maps.	2 theoretical	Ninth
	Report writing assignment	Drawing scales	C4- The student demonstrates the use of drawing scales	3 practical	
Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue, writing on the board	Aridisols Inceptisols	b5- The student masters how to classify orders of Aridisols and Inceptisols.	2 theoretical	tenth
	Report writing assignment	Using remote sensing in soil mapping	c5- The student demonstrates use of remote sensing technology in mapping.	3 practical	
Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue, writing on the board	Mollisols order	b6- The student masters the classification of Mollisols into suborders and super groups.	2 theoretical	Eleventh
	Report writing assignment	Soil maps used in soil surveying and classification	C6- The student masters the use of remote sensing in mapping.	3 practical	

Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue, writing on the board	Alifisols Order	a6- The student learns about the classification of Alifisols in suborders and supergroups.	2 theoretical	twelfth
	Report writing assignment	Soil survey report, area and survey maps	e1- Determines the types of surveys and their uses	3 practical	
Writing and reporting on scientific trip	Auditory methods, interactive dialogue, writing on the board	Scientific trip	c1- Explain the methods used in surveying, classifying lands	Scientific trip	thirteenth
Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue	Order Ultisols Order Spodosols	c2- Explain the methods of classifying Ultisols order and Spodosols	2 theoretical	fourteenth
	Report writing assignment	Iraqi and international soil survey reports	e3-Decides soil survey reports	3 practical	
Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue	Oxisols and Histisols	c3- The student explains classification of Oxisols , Histisols.	2 theoretical	fifteenth
	Report writing assignment	Soil survey applications in Iraq	c7- Explains survey applications in Iraq	3 practical	

11- Course Evaluation

Relative weight	Grade 100	Calendar appointment	Evaluation methods	
% 13	7 Theoretical 6 Practical	Theoretical week 15 Practical week 1-15	Final theoretical report on soil degradation and its assessment, as well as soil management methods. Final practical report on practical lessons and field visits.	1
% 6	4 theoretical + 2 practical	Week 3	Quiz (1)	2
% 15	10 theoretical + 5 practical	Week 9	Mid. exam (theoretical and practical)	3
%6	4 theoretical + 2 practical	Week 12	Quiz (2)	4
%20	20	Practical exam week	Final practical exam	5

%20	40	Theoretical exam week	Final theoretical exam	6
12- Learning and teaching resources				
Soil Management in Land Use and Planning, Mohamed Khader Abbas			Required textbooks (methodology if any)	
The Origins of Pedology, Walid Al-Aqidi - Soil Survey and Classification, Ahmed Saleh Muhaimid			Main references (sources)	
Academic scientific journals, reports of international organizations on land management and evaluation			Recommended supporting books and references (scientific journals, reports, etc.)	
• Conservation Service in cooperation with The University of Hawaii Agricultural Experiment Station. U.S. Government Printing			Electronic references, websites	

Theoretical Course Instructor: Asst. Prof. Yousif Hasan Al-Naser

Practical Course Instructor: M. Aman Adel Mawloud,

Scientific Committee Chair: Dr. Abdul Qader Abash Sbak

Department Head: Dr. Khaled Anwar Khaled

Course Description/ The relationship of soil, water and plant

1. Course Title:
The relationship of soil, water and plant
2. :Course Code
SWPR451
3. Semester / Year:
first semester –fall- fourth stage -2024-2025
4. The history of preparation of this description
1/9/2024
5. Available Forms of Attendance:
Compulsory
6. Number of Credit Hours (Total) / Number of Units (Total):
2 theoretical + 3 practical / 3.5 units
7. Course administrator's name (if more than one name)
Name: Assist. Prof. Fatih Abid Hassan Name: Assist. Lecturer Reem Waleed Abdalgabbar
8. Course Objectives
- Enabling the student to understand the nature of the relationship between characteristics chemical and physical of soil, water and plant growth. -Enabling the student to recognize the properties of water and potential water and its relationships with soil and Plants. -Increasing the student's ability to know the importance of organic matter and its relationship with soil, water and plants. -Enabling the student to know how to deal with the problems of calcareous , salt, and sand soils. - Enable the student to learn about methods for measuring the water potential of soil and plants. - Introducing the student to the most important methods of measuring transpiration and leaf area. - Introducing the student to the most important methods of measuring soil salinity.

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.	Soil- formation and nature	A1: The student shows the nature formation and emergence processes Soil and factors affecting it	2 Theoretical	1
,Practical quiz 1	Interactive lecture, brainstorming, dialogue and discussion, field training, self-learning.	Methods of designing agricultural experiments	A10: The student learns how design an agricultural experiment	3 Practical	
Semester Exam 1, Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning.	Physical properties of soil (depth –soil texture) and t relationship with water and plar	B1:The student learns the reasons of the hard layer in Soil and how to treat it	2 Theoretical	2
Homework	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Comparing the growth development of systems roots different soils	A11: The student learns about the effect soil texture in nature Root growth and deepening and its spread	3 Practical	
Semester Exam 1, Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Soil texture and its relationship with water and plants	A2:The student is familiar with the types of structure soil and its effect on plant growth	2 Theoretical	3
Homework	Interactive lecture, brainstorming, dialogue and discussion, field training, self-learning	Implementing an a pot experim inside the greenhouse about the effect of some phys properties of soil on plant growth	B4:The student learns how Design and implementation of the pot experiment	3 Practical	
Semester Exam1, Final Exam, Report	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Physical properties of soil (soil texture - air). Soil) and their relationship with water and plants	A3:The student learns about the effect of soil texture and soil air on growth Plant and their relationship With soil water	2 Theoretical	4

,Practical quiz 2	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Complete the pot experiment in the green house	B5 : The student gets to know how to carry out the pot experim	3 Practical	
Semester Exam1, Final Exam, Report	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Soil temperature and relationship with water and plan	A4:The student identifies the factors Influencing soil temperature- how does soil temperature affect soil temperature in plant growth	2 Theoretical	5
Homework	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Conduct some routine analyzes of the experimen, field capacity, soil texture, bulk density	B6:The student is familiar with assessment methods both field capacity ,Soil texture, bulk density .	3 Practical	
Quiz 1, Final Quiz	Interactive lecture, brainstorming, dialogue and discussion, self-learning	The exchange capacity of soil and relationship with water and plan	C1;The student learns about effect soil Cation exchange capa in plant growth and the fact affecting it	2 Theoretical	6
Homework	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Measurement of the cation exchange capacity of Soil and root and their effect on plant growth	B7:Familiarizes the student with assessment methods Exchange capacity of each soil and the roots	3 Practical	
Semester Exam2, Final Exam, Report	Interactive lecture, brainstorming, dialogue and discussion, self-learning	The soil reaction and its relationship with water and plants	B2:The student learns the effect of soil reaction on plant growth and the factors affecting it	2 Theoretical	7
Homework	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, field project, self-learning	Measuring the actual soil reaction and potential soil reaction and its relationship to both EC and CEC	B8:Familiarizes the student with assessment methods of the actual and potential soil reaction	3 Practical	
Semester Exam 2, Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Soil salinity and its relationship w water and plants	A5:The student identifies the fact influencing soil salinity , how d soil salinity affect in plant growt	2 Theoretical	8
Homework	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Preparing saline soil	B9:The student can prepare Soils with different salt concentrations.	3 Practical	
Semester Exam 2, Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	industrial culture	A6:The student learns about the types industrial culture and their benefits , the advantages and disadvantages of each.	2 Theoretical	9
Homework	Interactive lecture, brainstorming, dialogue and discussion, field	nutrient solutions	B10:The student can prepare different concentrated nutrient solutions	3 Practical	

	training, practical exercises, self-learning				
Semester Exam2	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Water composition and its physical and chemical properties	A7:The student is familiar with the nature of structure water and its most important properties Physical and chemical	2 Theoretical	10
Homework	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	transpiration measuring Methods in plants	B11:The student is familiar with the most important measurement methods of transpiration	3 Practical	
Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Water and its relationships in the soil	A8:The student gets to know the types Soil water and types Its movement in the soil and its relationship to plant growth	2 Theoretical	11
Homework	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Methods for measuring soil and plant water potential	B12:Enable the student to recognize on methods of measuring water potential for soil and leaves	3 Practical	
Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	The movement of water from soil to plants and atmosphere	C2:The student learns about the theory of catenary which explains movement water from soil to plant	2 Theoretical	12
Homework	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Estimating the relative moisture content in leaves	B13:The student can measure the relative moisture content of leaves	3 Practical	
Final Exam	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Water stress and plant growth	C3:The student is familiar with the effects of drought on the plant and bearing methods And avoid drought .	2 Theoretical	13
Homework	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Effect of water tension on leaf area. Measure the leaf area	B14:The student learns methods of Measure leaf area .	3 Practical	
Quiz2, Final Quiz, Report	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Organic matter in soil and its relationship with water and the plant	B3:The student understands the importance of the Organic matter and its sources and the steps to analyze it and specifications of acids Organic matter resulting from decomposition	2 Theoretical	14
Practical quiz3	Interactive lecture, brainstorming, dialogue and discussion, field	Measurement of free proline concentration in leaves	B15:Enable the student to measure Proline acid concentrationt in leaves.	3 Practical	

	training, practical exercises, self-learning				
Quiz3, Final Quiz	Interactive lecture, brainstorming, dialogue and discussion, self-learning	Microorganisms and t relationship with soil and water And the plant	A9:The student recognizes the Importance of soil microorganisms and its relationship with water and plants	2 Theoreti cal	15
Homework	Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning	Discussing the results of the pots experiment in the green house	A12:Introducing the student to the steps write a report on the results Plastic house experiment and discuss the results	3 Practical	

11. Course Evaluation

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

12. Learning and Teaching Resources

The relationship of soil, water and plants - Dr. Saad Allah Al-Nuaimi	Required textbooks (methodology, if an
Water in plant life - Dr. Riad Abdel Latif	Main references (sources)
The relationship of soil, water and plants - Dr. Qutaiba Muhammad Hassa Plant physiology. Dr.. Abdul Azim Kazem	Recommended books and references (scientific journals, reports…)
	Electronic References, Websites

Theoretical subject lecturer
Assist. Pro. Fatih Abid Hassan

Practical subject lecturer
Assist. Lecturer Reem Waleed Abdalgabbar

:

Chairman of the Scientific Committee:
Dr. Abdul Qader Abash Sabak

Head of the Department of Soil Sciences:
Dr. Khalid Anwar Khalid

Course Description Form

1. Course name:
Soil management
2. Course code:
SOMA454
3. Semester/Year: Annual
Second semester (spring) 2024-2025
4. Date of preparation of this description
1/2 /2025
5. Available forms of attendance:
presence
6. Number of study hours (total) / Number of units (total):
2 theoretical + 3 practical / 3.5 units
7. Name of the course supervisor (if more than one name is mentioned)
Assist. Prof. Yousif Hasan Yousif alnaseryousif10@uomosul.edu.iq Practical teacher: Ms. Aman Adel, Ms. Shaimaa Ghanem, Ms. Osama Hosam Fadal
8. Course objectives
The learner will be able to identify the important physical, chemical, biological, and environmental properties of soil that influence soil management. Distinguish between soil evaluation systems in terms of agricultural suitability and soil productivity. Understand sound methods for agricultural soil management. Understand the impact of good physical, chemical, and fertility properties on soils to prevent soil degradation. Understand the basics of assessing the suitability and productivity of agricultural lands according to the type of agricultural crops.
9. Teaching and learning strategies
- Interactive lectures -brainstorming -Dialogue and discussion -field training -Practical exercises -field projects -Interactive lectures -brainstorming -Self-learning

10. Course structure					
Evaluation method	Learning method	Name of unit or topic	Required learning outcomes	Hours	Week
Quiz, Homework,	Auditory methods, interactive dialogue and slide presentation	The relationship of soil management to pedological and other sciences	a1- Understand the concept of soil management and .the terms used	2 theoretical	first

Discussion Assignment	Report writing assignment	The importance of studying soil from a pedological perspective	a9- Identify management concepts and the most important soil problems.	3 practical	
Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue and slide presentation	Types and degrees of soil degradation	a2- Identify the types of soil degradation, and influencing .factors	2 theoretical	second
	Report writing assignment	agricultural soil degradation	b7- Discover deterioration and methods of assessing them.	3 practical	
Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue, and slide presentation	Soil degradation: 1- Salinization, 2- Waterlogging, 3- Erosion	a3- Soil salinization, waterlogging, its causes and treatment methods	2 theoretical	Third
	Report writing assignment	Waterlogging	b8 - Discover types waterlogging problems	3 practical	
Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue, writing on the board	4- Calcification 5- Gypsum	a4- Identify the problems of Iraqi soils, calcification and gypsum.	2 theoretical	Fourth
	Report writing assignment	Calcification , Gypsum	c2- Identify the types of calcareous and gypsum soils.	3 practical	
Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue	6- Impenetrable layers, 7- Surface conditions	a5- Identify the impermeable layers	2 theoretical	Fifth
	Report writing assignment	Surface conditions	b9- Discover the types of impervious layers	3 practical	
Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue,	Land Evaluation: 1- Types of Evaluation 2- Methods	b1- Judge land valuation methods, valuation techniques	2 theoretical	Sixth
	Report writing assignment	desertification	c3- Determines land assessment desertification	3 practical	

Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue, writing on the board	Land suitability assessment 1- Storie Index method	b2- The student classify agricultural lands according to the land's productive capacity.	2 theoretical	eventh
	Report writing assignment	Soil susceptibility and degradation	b10- Discover the types of soil suitability	3 practical	
Quiz, Homework, Discussion Assignment	Auditory methods, writing on the board	Agricultural Capability (LCC) 2- Agricultural Capability Index	b3- The student masters the assessment of the suitability	2 theoretical	eighth
	Report writing assignment	Soil suitability and water erosion	b11- Discover the suitability and limit soil erosion	3 practical	
Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue,	Land evaluation according to the suitability index	b4- The student masters land evaluation	2 theoretical	Ninth
	Report writing assignment	Susceptibility of agricultural soils to wind erosion	c4- Identify methods for land productivity and wind erosion	3 practical	
Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue, writing on the board	Land suitability classification and evaluation (LSC)	b5- The student masters the evaluation of the suitability	2 theoretical	tenth
	Report writing assignment	New Earth Problems	c5—Distinguish methods of land adaptation and land problems	3 practical	
Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue, writing on the board	Land evaluation and classification according to the Productivity Index (PI)	b6 - The student masters how to evaluate and classify agricultural lands	2 theoretical	Eleventh
	Report writing assignment	Fertilization and soil fertility	C6-Distinguish the productive capacity of land, soil fertility	3 practical	
Quiz, Homework,	Auditory methods, interactive dialogue, writing on the board	Soil management methods: !- Organic matter management	a6- The student learns about soil management methods in terms of organic matter.	2 theoretical	twelfth

Discussion Assignment	Report writing assignment	Organic matter	e1- Determines the most important managing organic matter.	3 practical	
Writing and reporting on scientific trip	Auditory methods, interactive dialogue, writing on the board	Scientific trip	c6- Distinguish and identify methods and techniques of soil management	Scientifi c trip	thirteent h
Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue, writing on the board	Soil management methods: 2- Tillage and service operations	c1- Explains soil management, tillage and service operations.	2 theoretic al	fourteen th
	Report writing assignment	Tillage and crop service operations	c7- Distinguish between soil management	3 practical	
Quiz, Homework, Discussion Assignment	Auditory methods, interactive dialogue	Soil management method : -3 Agricultural cycles	a7- Familiar with soil management methods	2 theoretic al	fifteenth
	Report writing assignment	Agricultural cycles	b12- Experiment with the importance of crop rotation	3 practical	

11- Course Evaluation

Relative weight	Grade 100	Calendar appointment	أساليب التقييم	
% 13	7 Theoretical 6 Practical	Theoretical week 15 Practical week 1-15	Final theoretical report on soil degradation and its assessment, as well as soil management methods. Final practical report on practical lessons and field visits.	1
% 6	4 theoretical + 2 practical	Week 3	Quiz (1)	2
% 15	10 theoretical + 5 practical	Week 9	Mid. exam (theoretical and practical)	3
%6	4 theoretical + 2 practical	Week 12	Quiz (2)	4
%20	20	Practical exam week	Final practical exam	5
%20	40	Theoretical exam week	Final theoretical exam	6

12- Learning and teaching resources

Soil Management in Land Use and Planning, Mohamed Khader Abbas	Required textbooks (methodology if any)

The Origins of Pedology, Walid Al-Aqidi - Soil Survey and Classification, Ahmed Saleh Muhaimid	Main references (sources)
Academic scientific journals, reports of international organizations on land management and evaluation	Recommended supporting books and references (scientific journals, reports, etc.)
• Conservation Service in cooperation with The University of Hawaii Agricultural Experiment Station. U.S. Government Printing Office, Washington, D.C. • Service in cooperation with Hawaii Institute of Topical Agriculure and Human Resources. University of Hawaii at Manoa, Honolulu.	Electronic references, websites

Theoretical Course Instructor: Asst. Prof. Yousif Hasan Al-Naser

Practical Course Instructor: M. Aman Adel Mawloud, M. Shaimaa Ghanem Daoud, M. Osama Hossam

Chair of the Scientific Committee: Dr. Abdul Qader Abash Sbak

Head of the Department of Soil Science and Water Resources: Dr. Khaled Anwar Khaled