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

2025-2026

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: Diyala

Faculty/Institute: Agriculture

Scientific Department: Soil science and Water Resources

Academic or Professional Program Name: Soil science and Water Resources

Final Certificate Name: Bachelor's degree in Agriculture/ Soil science and Water Resources

Academic System: Semester

Description Preparation Date: 2025-2026

File Completion Date: 1/06/2026

Signature:

Head of Department Name:

Prof.Dr. Ahmed Bahjat Khalaf

Date:1/06/2026

Signature:

Scientific Associate Name:

Prof.Dr. Mohammed Ali Abood

Date:1/06/2026

The file is checked by: Prof.Dr. Basem Rahem Bader

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 1/06/2026

Signature:

Approval of the Dean

Prof.Dr. Raaed Ibrahim Khalil

1/6/2026

1. Program Vision

Leading the Department of Soil Science and Water Resources through research and innovation, employing artificial intelligence to achieve the sustainability of natural resources and food security.

2. Program Mission

Preparing qualified scientific personnel who contribute to the development of soil and water management systems to achieve sustainable development and preserve the environment, and preparing graduates with modern skills that meet the needs of the labor market in the fields of soil science and water resources.

3. Program Objectives

1. Promoting organic farming and the sustainability of natural resources by supporting graduation projects and graduate student research.
2. Applying artificial intelligence and geographic information systems in soil and water management.
3. Developing strategies to combat desertification and enhance soil fertility.
4. Improving the efficiency of water resource use through smart agriculture and the use of modern and sustainable technologies.
5. Establishing memoranda of understanding with governmental and non-governmental entities to conduct training courses and workshops for faculty development.

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	11	21	11.67	Basic
College Requirements	15	43.5	24.17	Basic
Department Requirements	37	115.5	64.16	Basic
Summer Training	Nothing	Nothing	Nothing	Basic
Other	Nothing	Nothing	Nothing	Basic

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
First stage	SSD-1101	Surveying and Engineering Drawing	**2**	**3**
	UD04	Democracy and Human rights	**2**	**3**
	COA-1102	Organic Chemistry	**2**	**3**
	SSD-1103	Principles of Soil Science	**2**	**3**
	UD01	English Language	**2**	**-**
	FCD-1101	Principles of Field Crop	**2**	**-**
	SSD-1205	General Physics	**2**	**3**
	SSD-1206	Principles of Geology	**1**	**3**
	APD-1201	Principles of Animal production	**2**	**-**
	UD03	Computer	**2**	**-**
	UD02	Arabic Language	**1**	**3**
	COA-1202	Mathematics and Statistics	**-**	**3**
Second stage	BIOC205	Biochemistry	**2**	**3**
	PRSS208	Principles of Soil Science	**2**	**3**
	PRIM209	Principles of microbiology	**2**	**3**
	SOEM210	Soil Ecology and Meteorology	**2**	**3**
	VEGP206	Vegetable production	**1**	**3**
	APPC202	Applications in Computer 3	**-**	**3**
	ENGL201	Specialization English Language(2)	**2**	**-**
	PRPP207	Principles of plant protection	**2**	**3**
	CBRI204	The crimes of the Baath regime in Iraq	**2**	**-**
	SPWA214	Soil, plant and water analysis	**2**	**3**
	AGEM212	Agricultural equipment and machinery	**2**	**3**
	PRAE211	Principles of Agriculture extension	**2**	**-**
	PLAP215	Plant physiology	**2**	**3**
	LALG216	Lands Leveling and grading	**2**	**3**

	PRIS213	Principles of Statistics	2	3
	APPC203	Applications in Computer 4	-	3
	ARAL217	Arabic language	2	-
Third stage	SOIP304	Soil physics	2	3
	ORMS305	Organic matter in Soil	2	3
	IRRG306	Irrigation	2	3
	SOWP307	Soil and water pollution	2	3
	EXDA302	Experimental designs and analysis	2	3
	SOIC308	Soil Chemistry	2	3
	ECNS303	Economics of Natural Resources	3	-
	REMS309	Remote sensing	2	3
	SOIS310	Soil Salinity	2	3
	SOIM311	Soil morphology	2	3
	DRAI312	Drainage	2	3
	SOMI313	Soil mineralogy	2	3
	SOIF314	Soil Fertility	2	3
	ENGL301	Specialization English Language(3)	2	-
Fourth stage	SOSC403	Soil survey and classification	2	3
	SOWC402	Soil & Water Conservation	2	3
	SWPR404	Soil-Water-Plant Relationship	2	3
	HYWR405	Hydrology & Water Resource	2	3
	IRST406	Irrigation systems technologies	2	3
	ENGL401	Specialization English Language(4)	2	-
	SEMN407	Seminars	1	-
	GRRP408	Graduate research project	-	3
	SOIM410	Soil microbiology	2	3
	SOMA411	Soil management	2	3
	DESE412	Desertification	2	-
	PLAN413	Plant Nutrition	2	3
	FERT414	Fertilizers technology	2	3
	LANR415	Land Reclamation	2	3
	CRRP409	Graduate research project	-	3

8. Expected learning outcomes of the program

Knowledge

1. Enabling students to obtain knowledge and understanding of the intellectual and applied framework in agricultural sciences in general and soil sciences and water resources in particular.
2. Enabling students to obtain knowledge and understanding of agricultural requirements in accordance with international standards.
3. Informing students about modern techniques in agriculture by showing films, scientific research, and modern agricultural methods

Skills
1. Using the display screen in classrooms
2. Enabling students to visit the library and the Internet
3. Show illustrative pictures of various types of soil
4. Visit weather stations in the geographical area
Ethics
Theoretical tests
Practical tests
Reports and studies
Daily and monthly tests with multiple-choice questions for academic subjects.
Participation marks for difficult competition questions for students.

9. Teaching and Learning Strategies

1- Brainstorming

2- Thinking strategy according to the student's ability. Example (If the student is able to learn the correct concept of water management, he will acquire the skill of managing and organizing his personal life.

3- Critical thinking strategy in learning. Critical Thinking is a term that symbolizes the highest levels of thinking, which aims to pose a problem and then analyze it logically to reach the desired solution.

10. Evaluation methods

Theoretical tests

Practical tests

Reports and studies

Daily and monthly tests with multiple-choice questions for academic subjects.

Participation marks for difficult competition questions for students.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Prof. Dr. Faris Mohammed Suhail	Soil science and Water Resources	Microbiology/ soil and water			1	
Prof. Dr. Raad Al-Tamimi	Soil science and Water Resources	Soil Chemistry			1	
Prof. Dr. Hussein aziz Mohammed	Soil science and Water Resources	Plant Nutrition				
Prof. Dr. Mohammed Ali Abood	Soil science and Water Resources	Soil Physics			1	
Prof. Dr. Basem Rahem Bader	Soil science and Water Resources	Soil Fertilizer and Fertility			1	
Prof. Dr. Hassan Al-Alawy	Soil science and Water Resources	Plant Nutrition			1	
Prof. Dr. Ahmed Bahjat Khalaf	Forests	Forests/ Remote sensing			1	
Asst. Prof. Dr. hussein al-anbaki	Plant Protection	Insects			1	
Asst. Prof. Dr. Ahmad S. Abdullah	Electrical and electronic engineering	Laser and optoelectronics engineering			1	
Asst. Prof. Dr. Aidel Kadum Jassim Al–shamary	engineering	Mechanical			1	
Asst. Prof. Dr. Abbas Abd Ahmed Al-timimi	Agricultural economics and extension	Agricultural economics and extension			1	
Asst. Prof. Dr. Ali Kadhim Ahmed	Machines and machines	Machines and machines			1	
Lect. Dr. luay dawood farhan	Soil science and Water Resources	Soil Fertilizer and Fertility			1	
Lect. Dr. Tareq Saadi Abbas AL-Hayali	Plant Protection	Plant Protection			1	
Lect. Dr. Osama.G. AL-Zuhairi	Biology	Plant Physiology			1	

Lect. Dr. Ibrahim A.Hidres Al-Somaedai	Soil science and Water Resources	Soil Physics			1	
Asst. Lect. Abdulsattat Alzuhairi	Biology	Animal			1	
Asst. Lect. Mohammed ali shehab	Soil science and Water Resources	Soil survey and classification			1	
Asst. Lect. myasar riyadh	Horticulture	designing gardens			1	
Asst. Lect. Ghufran Zidane	Master of Science	Chemistry			1	
Asst. Lect. Ebtehal Mohammed	Master of Science	Biology			1	

Professional Development

Mentoring new faculty members

Urging new teachers to participate in the development courses held by the university and college, as well as to participate in practical lessons as a listener to learn from the old professors teaching methods, classroom management, and dealing with students.

Professional development of faculty members

Directing teachers to participate in conferences, workshops, and seminars, especially international ones, as well as emphasizing their involvement in development courses held by the university and college to increase knowledge of modern learning methods and keep pace with development.

12. Acceptance Criterion

Central admission by the Ministry of Higher Education and Scientific Research after the student graduates from the sixth grade of middle school and chooses the College of Agriculture, then competes for the scientific section according to the average.

13. The most important sources of information about the program

1- Academic research

2- Central Library

3- Books and resources related to the department

4- The Internet

5- The accumulated scientific experiences of the department's staff

6- Feedback from the labor market

14. Program Development Plan
Addressing weaknesses that may appear during the implementation of academic programs and developing executive plans for development and improvement.

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
First stage First semester	SSD-1101	Surveying and Engineering Drawing	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	UD04	Democracy and Human rights	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	COA-1102	Organic Chemistry	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	SSD-1103	Principles of Soil Science	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	UD01	English Language	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	FCD-1101	Principles of Field Crop	Basic	√	√	√	√	√	√	√	√	√	√	√	√
First stage Second semester	SSD-1205	General Physics	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	SSD-1206	Principles of Geology	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	APD-1201	Principles of Animal production	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	UD03	Computer	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	UD02	Arabic Language	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	COA-1202	Mathematics and Statistics	Basic	√	√	√	√	√	√	√	√	√	√	√	√

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
Second stage First semester	BIOC205	Biochemistry	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	PRSS208	Principles of Soil Science	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	PRIM209	Principles of microbiology	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	SOEM210	Soil Ecology and Meteorology	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	VEGP206	Vegetable production	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	APPC202	Applications in Computer 3	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	ENGL201	Specialization English Language (2)	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	PRPP207	Principles of plant protection	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	CBRI204	The crimes of the Baath regime in Iraq	Basic	√	√	√	√	√	√	√	√	√	√	√	√
Second stage Second semester	SPWA214	Soil, plant and water analysis	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	AGEM212	Agricultural equipment and machinery	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	PRAE211	Principles of Agriculture extension	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	PLAP215	Plant physiology	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	LALG216	Lands Leveling and grading	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	PRIS213	Principles of Statistics	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	APPC203	Applications in Computer 4	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	ARAL217	Arabic language	Basic	√	√	√	√	√	√	√	√	√	√	√	√

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
Third stage First semester	SOIP304	Soil physics	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	ORMS305	Organic matter in Soil	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	IRRG306	Irrigation	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	SOWP307	Soil and water pollution	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	EXDA302	Experimental designs and analysis	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	SOIC308	Soil Chemistry	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	ECNS303	Economics of Natural Resources	Basic	√	√	√	√	√	√	√	√	√	√	√	√
Third stage Second semester	REMS309	Remote sensing	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	SOIS310	Soil Salinity	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	SOIM311	Soil morphology	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	DRAI312	Drainage	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	SOMI313	Soil mineralogy	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	SOIF314	Soil Fertility	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	ENGL301	Specialization English Language (3)	Basic	√	√	√	√	√	√	√	√	√	√	√	√

				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
Fourth stage First semester	SOSC403	Soil survey and classification	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	SOWC402	Soil & Water Conservation	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	SWPR404	Soil-Water-Plant Relationship	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	HYWR405	Hydrology & Water Resource	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	IRST406	Irrigation systems technologies	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	ENGL401	Specialization English Language(4)	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	SEMN407	Seminars	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	GRRP408	Graduate research project	Basic	√	√	√	√	√	√	√	√	√	√	√	√
Fourth stage Second semester	SOIM410	Soil microbiology	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	SOMA411	Soil management	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	DESE412	Desertification	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	PLAN413	Plant Nutrition	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	FERT414	Fertilizers technology	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	LANR415	Land Reclamation	Basic	√	√	√	√	√	√	√	√	√	√	√	√
	CRRP409	Graduate research project	Basic	√	√	√	√	√	√	√	√	√	√	√	√

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

Course Description Form of Surveying and Engineering Drawing

1. Course Name:	
Surveying and Engineering Drawing	
2. Course Code:	
SSD-1101	
3. Semester / Year:	
First semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Aidel Kadum Jassim Al-shamary **Email: adelkadumalshamary@uodiyala.edu.iq**	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	The student gets to know the tools used in engineering drawing. The student gets to know the scale of drawing. The student will be able to draw, able to imagine drawing, and the student to recognize the types of lines when drawing The student will be familiar with the tools used in surveying, measuring length, and drawing a linear map
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	Definition of Plan surveying	**Surveying and Engineering Drawing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	and its importance	**Surveying and Engineering Drawing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Survey methods	**Surveying and Engineering Drawing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Types of space	**Surveying and Engineering Drawing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Measurement units	**Surveying and Engineering Drawing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	The English system of grandmothers	**Surveying and Engineering Drawing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	The metric system of units	**Surveying and Engineering Drawing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Revision	**Surveying and Engineering Drawing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Measuring distances on flat terrain	**Surveying and Engineering Drawing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Measuring distances on flat terrain	**Surveying and**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

			Engineering Drawing		
11	**2**	Measuring horizontal distances	**Surveying and Engineering Drawing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	On accounts sloping terrain	**Surveying and Engineering Drawing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	Columns to measure areas	**Surveying and Engineering Drawing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Obstacles and their types	**Surveying and Engineering Drawing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
15	**2**	Areas and volumes	**Surveying and Engineering Drawing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	Measure distances in steps	**Surveying and Engineering Drawing**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Learn about engineering drawing tools	**Surveying and Engineering Drawing**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Measuring with tape and orienting with signs	**Surveying and Engineering Drawing**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Types of engineering drawing lines	**Surveying and Engineering Drawing**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Column drop experiment	**Surveying and Engineering Drawing**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Dimensions and how to sign them	**Surveying and**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

			Engineering Drawing		
7	**3**	Column erection experience	**Surveying and Engineering Drawing**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Performing some simple engineering operations	**Surveying and Engineering Drawing**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Experiment with obstacle distances	**Surveying and Engineering Drawing**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Arcs, curves and tangents	**Surveying and Engineering Drawing**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Experience obstacles	**Surveying and Engineering Drawing**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Projection and explanation of the three projections	**Surveying and Engineering Drawing**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
13	**3**	Leveling device experience	**Surveying and Engineering Drawing**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	First Mid Exam	**Surveying and Engineering Drawing**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation

Examination Monthly & daily exams with discussion questions inside the lecture.
The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources

Required Textbooks (Curricular Books, If Any)	Iraqi academic scientific journals Flat area. Fawzi Al-Khalisi. College of Engineering - University of Baghdad.
Main References (Sources)	Engineering and cadastral surveying. Ziad Abdul Jabbar Al-Bakr
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic Journal
Electronic References, Websites	Soil Science Society of America Library Genesis

Course Description Form of Democracy and human right

1. Course Name:	
Democracy and human right	
2. Course Code:	
UD04	
3. Semester / Year:	
First semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 hours (2 hours theoretical per week) for 14 weeks, number of units 2 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Abdullateef Jassim Mayyadah mayyadahabdullateef@uodiyala.edu.iq	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	Students about the importance of the concept of freedom and development, with increasing cultural awareness to students by recognizing the philosophical concepts that meant the freedoms in general, and knowledge of all kinds of freedoms and departments through access to external sources and write comprehensive reports for all freedoms, as well as a full understanding of the concept of (Democratic) through the era of the term, and a comparison between him and the concept (Shura).
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	- Introductory lecture on the subject and its importance	**Democracy and human right**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	- Definition of right and human, and the importance of human rights in the Islamic religion and ancient civilizations	**Democracy and human right**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	International, regional and local sources of human rights. -	**Democracy and human right**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	-The role of constitutional and legal human rights guarantees Human rights guarantees at the international level-	**Democracy and human right**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	- Human rights guarantees in Islam The role of regional organizations in protecting human rights-	**Democracy and human right**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	First month test	**Democracy and human right**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	- Characteristics of human rights and definition of public freedoms and their types and comparison between them- and other rights. -International human rights law, international humanitarian law and the Red Cross. 2 hours	**Democracy and human right**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	-The future of human rights and ways to develop them	**Democracy and human right**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

9	**2**	Globalization and human rights-	**Democracy and human right**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	-Definition of democracy and its historical development and its most important principles -Democracy between universality and privacy- Forms of democracy-	**Democracy and human right**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	1-Direct democracy 2-Semi-direct democracy 3-Representative democracy -Pillars of the representative system- -Forms of the representative system-	**Democracy and human right**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	-Second month test	**Democracy and human right**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	Parliament and its types - Parliament and its types- -Election and its conditions- -Electoral body- -Organizing the election process- -Determining electoral districts- Electoral lists- Candidates- -Electoral campaign -Voting	**Democracy and human right**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	- Election systems	**Democracy and human right**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
15	**2**	-The relationship between democracy and human rights and how to influence and be influenced		**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11. Course Evaluation					

Examination Monthly & daily exams with discussion questions inside the lecture. The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	-The concept of contemporary democracy, Ali Khalifa Al-Kuwari, from Al-Mustaqbal Al-Arabi magazine, issue 168, February 1993. -Shura and its impact on democracy, Abdul Hamid Ismail Al-Ansari, Al-Fasliyah Press and its library, 1981 -A message on women's issues, Hussein Darwish Al-Adly, Democracy for All (4) from a series issued by the Islam and Democracy Organization The Universal Declaration of Human Rights, United . .Nations Department of Public Information Trainee's Guide - The Role of Human Rights in . Shaping Government Policies, Human Rights Law .Center, College of Law
Main References (Sources)	
Recommended Books and References (Scientific Journals, Reports...)	
Electronic References, Websites	

Course Description Form of Organic Chemistry

1. Course Name:
Organic Chemistry
2. Course Code:
COA-1102
3. Semester / Year:
First semester/ 2024-2025
4. Description Preparation Date:
15/1/2025
5. Available Attendance Forms:
Full time (theoretical lecture and practical lecture) weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units
7. Course Administrator's Name (Mention All, If More Than One Name)
Name: Eman Rahman Mahdi Abed Email: emanrahman@uodiyala.edu.iq Faris Shaker
8. Course Objectives

Course Objectives: Graduating students who are able to:	The course aims to teach students the basics and concepts of chemistry of saturated and unsaturated aliphatic hydrocarbon compounds. It includes lessons on the chemical bonds and chemical formulas of hydrocarbon compounds. It also includes a definition of each of these compounds, its name, and its derivatives according to the international IUPAC system, as well as the physical properties of each compound and its chemical interactions with other hydrocarbon compounds.

9. Teaching and Learning Strategies	
Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	Introduction to organic chemistry and its importance	Organic Chemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Saturated hydrocarbons (alkanes-paraffins) (nomenclature ,reactions , preparation)	Organic Chemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Unsaturated hydrocarbons (alkenes) (nomenclature ,reactions , preparation)	Organic Chemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Unsaturated hydrocarbons (alkynes-acetylenes)(nomenclature ,reactions , preparation	Organic Chemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	First month exam	Organic Chemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Alkyl halides (nomenclature ,reactions , preparation)	Organic Chemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	Alcohols (nomenclature ,reactions , preparation)	Organic Chemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Ethers(nomenclature ,reactions , preparation	Organic Chemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Carboxylic acids and Its Derivatives (nomenclature ,reactions , preparation)	Organic Chemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Second month exam	Organic Chemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	Aldehydes and ketones (nomenclature ,reactions , preparation)	Organic Chemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

12	**2**	Aromatic compounds(nomenclature ,reactions , preparation)	Organic Chemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	Cyclic compounds (nomenclature ,reactions , preparation)	Organic Chemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Third month exam	Organic Chemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
15	**2**	Amines(nomenclature ,reactions , preparation)	Organic Chemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	**Laboratory safety rules**	Organic Chemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	**Tools and equipment used in organic chemistry laboratory**	Organic Chemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	**Melting point measurement**	Organic Chemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	**Boiling point measurement**	Organic Chemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	**Sublimation**	Organic Chemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	**First month exam**	Organic Chemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
7	**3**	**Recrystallization**	Organic Chemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	**Detection of Alcohol**	Organic Chemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	**Detection of phenols**	Organic Chemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	**Second month exam**	Organic Chemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	**Detection of aldehydes and ketones - Fehling's**	Organic Chemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

		reagent (a specific test for aliphatic aldehydes)			
12	**3**	**Detection of aldehydes and ketones (chromic acid detection)**	Organic Chemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
13	**3**	**Detection of carboxylic acids (detection of sodium carbonate)**	Organic Chemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	**Detection of carboxylic acids (detection of sodium bicarbonate**	Organic Chemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
15	**3**	**Third month exam**	Organic Chemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation
Examination Monthly & daily exams with discussion questions inside the lecture. The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	1- Youssef Ali Al-Fattahi, 1989, Foundations of Organic Chemistry, a methodological book for students of the College of Agriculture and Life Sciences, University of Baghdad, House of Wisdom
Main References (Sources)	Raymond Chang 2002 “Chemistry”7th Ed.McGraw- Hill Higher Compaine. • Richard E. Beleil (2005). General chemistry Lab. Manual, Dakota State university, U.S.A
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic scientific journals
Electronic References, Websites	

Course Description Form

1. Course Name:	
Principles of soil	
2. Course Code:	
SSD−1103	
3. Semester / Year:	
First Semester	
4. Description Preparation Date:	
15/01/2025	
5. Available Attendance Forms:	
Attending	
6. Number of Credit Hours (Total) / Number of Units (Total)	
Number of hours = 5, number of units = 3.5	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Hussein Aziz Email: Husseinaziz@uodiyala.edu.iq	
8. Course Objective	
Course Objectives	• Definition of soil science and how soils originate and develop, and what are the processes and factors affecting that. • Knowledge of the physical properties of soils (texture, structure, soil water, actual and apparent soil density) • Knowledge of the chemical properties of soils (mineral composition, organic matter, ion exchange, soil acidity, alkalinity and salinity). • Knowledge of the biological properties of soils and identification of the basic nutrients and their importance to plants.
9. Teaching and Learning Strategies	
Strategy	In-person lectures for 15 weeks, including two monthly exams and daily exams.
10. Course Structure	

The theoretical part					
Week	**Hours**	**Required Learning Outcome**	**Unite or Subject Name**	**Learning Method**	**Evaluation Method**
1	2	Soil formation and formation	Principles of soil	Lecture with explanation and presentation	Exams
2	2	Soil formation processes and factors	Principles of soil	Lecture with explanation and presentation	Exams
3	2	Soil profile	Principles of soil	Lecture with explanation and presentation	Exams
4	2	Soil physical properties(psp) texture, classes, structure,	Principles of soil	Lecture with explanation and presentation	Exams
5	2	Soil density, Bulk density , soil air , soil temperature ,soil color	Principles of soil	Lecture with explanation and presentation	Exams
6	2	Available water capacity , permeability soil water.	Principles of soil	Lecture with explanation and presentation	Exams
7	2	Soil water (soil water classification)	Principles of soil	Lecture with explanation and presentation	Exams
8	2	Soil Chemical Properties	Principles of soil	Lecture with explanation and presentation	Exams
9	2	Soil minerals	Principles of soil	Lecture with explanation and presentation	Exams
10	2	Colloids and soil properties	Principles of soil	Lecture with explanation and presentation	Exams
11	2	Double electrical layer	Principles of soil	Lecture with explanation and presentation	Exams
12	2	Exchanges ion in the soil	Principles of soil	Lecture with explanation and presentation	Exams
13	2	The properties of bio-soil (soil classification revival)	Principles of soil	Lecture with explanation and presentation	Exams
14	2	The role of biology in the soil to increase soil fertility	Principles of soil	Lecture with explanation and presentation	Exams
15	2	Soil classification	Principles of soil	Lecture with explanation and presentation	Exams
Practical part					

Week	Hours	Required Learning Outcome	Unite or Subject Name	Learning Method	Evaluation Method
1	3	How to take soil samples	Principles of soil	Lecture with explanation and presentation	Exams
2	3	Preparation of samples for laboratory study	Principles of soil	Lecture with explanation and presentation	Exams
3	3	Determination of moisture in the soil	Principles of soil	Lecture with explanation and presentation	Exams
4	3	Distribution (soil texture)	Principles of soil	Lecture with explanation and presentation	Exams
5	3	Distribution volumetric minutes of soil (mechanical analysis)	Principles of soil	Lecture with explanation and presentation	Exams
6	3	Determination density and bulk soil	Principles of soil	Lecture with explanation and presentation	Exams
7	3	How to prepare saturated soil paste and calculate saturation	Principles of soil	Lecture with explanation and presentation	Exams
8	3	Measurement of electrical conductivity	Principles of soil	Lecture with explanation and presentation	Exams
9	3	Measure PH in soil	Principles of soil	Lecture with explanation and presentation	Exams
10	3		Principles of soil	Lecture with explanation and presentation	Exams
11	3	Determination of positive ions from soil and water extract	Principles of soil	Lecture with explanation and presentation	Exams
12	3	Determination of negative ions from soil and water extract	Principles of soil	Lecture with explanation and presentation	Exams
13	3	Estimate calcium carbonate	Principles of soil	Lecture with explanation and presentation	Exams
14	3	Estimation of organic matter	Principles of soil	Lecture with explanation and presentation	Exams
15	3	Estimation of soil biology	Principles of soil	Lecture with explanation and presentation	Exams

11.Course Evaluation

Exams
Daily exams and discussion questions within the lecture
The degree of participation in questions related to the academic subject

12.Learning and Teaching Resources	
Required Textbook (curricular books, if any)	Alani, 1988. Principles of soil
Mean references (sources)	
Recommended books and references (scientific journals, reports…)	Iraqi academic scientific journals
Electronic references, Websites	

Course Description Form of English language

1. Course Name:	
English language	
2. Course Code:	
UD01	
3. Semester / Year:	
First semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 hours (2 hours theoretical per week) for 14 weeks, number of units 2 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Assistant lecturer. Farhad Waleed Hameed farhadwalid@uodiyala.edu.iq	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	Teaching the basic principles and rules and benefiting from them in developing the level of non-native speaking students
9. Teaching and Learning Strategies	
Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure					
Theoretical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject**	**Learning Method**	**Evaluation Method**
1	**2**	Unit 1 / tenses present past future	**English language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Why questions	**English language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Unit 1 / verbs with similar meaning	**English language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Unit 2/present simple	**English language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Unit 2 making conversation	**English language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Past continuous	**English language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	Monthly exam	**English language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Unit 2/ things I like doing	**English language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Past continuous	**English language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Unit 3 regular and irregular verbs	**English language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	present continuous	**English language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	Unit 3/ Adverbs	**English language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	Saying when	**English language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Social expression	**English language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

15	**2**	Monthly exam	**English language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

11. Course Evaluation
Examination Monthly & daily exams with discussion questions inside the lecture. The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	New Headway Plus " Intermediate"
Main References (Sources)	
Recommended Books and References (Scientific Journals, Reports...)	
Electronic References, Websites	

Course Description Form of Principles of Field Crops

1. Course Name:	
Principles of Field Crops	
2. Course Code:	
FCD-1101	
3. Semester / Year:	
First semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Dr. Omar Ali Ahmed Assistant Lecturer. Othman Nassif Jassim	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	Definition of crops science and the methods of divided the crop. Most important crops and the Families of them Environmental factors affecting crop production Agriculture practises from planting until harvest
9. Teaching and Learning Strategies	
Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure					
Theoretical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject**	**Learning Method**	**Evaluation Method**
1	**2**	Definition of Field crops and methods of Divided crops	Principles of Field Crops	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Botanical description of the most important field crops	Principles of Field Crops	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Environmental factors and their effects on the growth of field crops (Climatic factors)	Principles of Field Crops	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Environmental factors and their effects on the growth of field crops (Soil and biological factors)	Principles of Field Crops	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Exam	Principles of Field Crops	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Land preparation for planting (First)	Principles of Field Crops	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	Land preparation for planting (Second)	Principles of Field Crops	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Seeds, germination and seed storage	Principles of Field Crops	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Weeds and weed control methods	Principles of Field Crops	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Agricultural Rotations	Principles of Field Crops	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	Introduction of crop breeding methods	Principles of Field Crops	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	Enhanced seed production of field crops	Principles of Field Crops	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	Exam	Principles of Field Crops	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

14	**2**	The most important annual crops in Iraq	Principles of Field Crops	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	Watching and drawing some field crop plants - scientific and English names	Principles of Field Crops	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Differentiation of crop seeds	Principles of Field Crops	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Germination and Environmental Factors	Principles of Field Crops	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Soil preparation	Principles of Field Crops	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Tillage, leveling and agricultural practices	Principles of Field Crops	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	**Explanation and presentation of the model and lecture**	Principles of Field Crops	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
7	**3**	Fertilizers & Fertilization	Principles of Field Crops	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Agricultural practices of field crops	Principles of Field Crops	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Irrigation & Drainage	Principles of Field Crops	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Weeds and chemical weed control , Winter & Summer Weeds	Principles of Field Crops	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Moccasins and patchwork	Principles of Field Crops	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Grain scale	Principles of Field Crops	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
13	**3**	**Exam**	Principles of Field Crops	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Field visit	Principles of Field Crops	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11. Course Evaluation					

Examination Monthly & daily exams with discussion questions inside the lecture. The degree of participation in the questions related to the subject.	
12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	Basics of field crops. Ministry of Higher Education and Scientific Research. University of Baghdad - Hatem Jabbar Attia 1989.
Main References (Sources)	Scientific foundations for the management, production and improvement of field crops - Ministry of Higher Education. Iyad Hussein Ali - Mohammed Owaid Ghadeer 2018
Recommended Books and References (Scientific Journals, Reports...)	Academic Scientific Journals
Electronic References, Websites	

Course Description Form of General Physics

1. Course Name:
General Physics
2. Course Code:
SSD-1205
3. Semester / Year:
Second semester/ 2024-2025
4. Description Preparation Date:
15/1/2025
5. Available Attendance Forms:
Full time (theoretical lecture and practical lecture) weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units
7. Course Administrator's Name (Mention All, If More Than One Name)
Name : Dr. Ali Kadhim Ahmed Email : **alikahdim@uodiyala.edu.iq**
8. Course Objectives

Course Objectives: Graduating students who are able to:	**− Learn about the most basic concepts and theories in physics and how to correctly deduce and derive physical laws mathematically** **− Providing a scientific and applied basis for students to serve the requirements of studying students of the Facul**

9. Teaching and Learning Strategies

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	Natural states of matter, general properties of matter, mechanical properties of matter	General Physics	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Propositions of kinetic theory, molecular dimensions and interface distances, brownian motion	General Physics	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Molecular velocities, molecular forces, collisions between molecules, thermal properties of matter	General Physics	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Boyle's law, compressibility and elasticity	General Physics	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Mechanics: laws of force and motion, laws of motion in one dimension, free fall of objects	General Physics	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	Semester 1st exam				
7	**2**	About Newton's laws of motion: the first law of motion, the second law of motion, Newton's law of general attraction	General Physics	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Water: its molecular structure, its hydrogen isotropy, and its properties as a solvent	General Physics	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Surface tensile strength, seam angle, capillary property	General Physics	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Diffusion, osmotic phenomenon	General Physics	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

11	**2**	Viscosity, Newton's law of viscosity	General Physics	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	Semester 2nd exam				
13	**2**	Viscosity, Newton's law of viscosity law and Stoke's law, its derivation and applications	General Physics	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Volumetric and weight relations, body density, porosity, surface area and quality, Optical devices, X-rays	General Physics	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	The experiment of finding ground acceleration simple using a pendulum	General Physics	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Finding the density of objects (Non- solid hollow)	General Physics	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Finding the density of objects hollow	General Physics	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	The experiment of finding the surface tensile coefficient by the capillary tube method	General Physics	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Experiment with finding relative humidity using a humidifier (with wet and dry editors)	General Physics	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	Semester 1st exam				
7	**3**	Experiment with finding the mixing ratio of water vapor in the air	General Physics	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Experiment of finding the	General Physics	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

		refractive index of a glass material for a triple prism using a spectrometer			
9	**3**	satellite image classification: Unsupervised classification	General Physics	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	The experiment of finding the internal resistance and electromotive force of an electric cell	General Physics	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Atmospheric pressure measurement experiment using Boyle's law	General Physics	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	Semester 2nd exam				
13	**3**	The experiment of finding the viscosity of water by the flow method, The experiment of finding the speed of sound in the air	General Physics	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Experience of X-rays	General Physics	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation
Daily exams with discussion questions within the lecture The degree of participation in questions related to the academic subject

12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	Fundamentals of physics
Main References (Sources)	Daniel Shum: shum abstracts series theories and problems in university physics
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic journal
Electronic References, Websites	

Course Description Form Principles of Geology

1. Course Name:
Principles of Geology
2. Course Code:
PRIG116
3. Semester / Year:
3. Second semester / first stage
4. Description Preparation Date:
4/2/2025
5. Available Attendance Forms:
presence
6. Number of Credit Hours (Total) / Number of Units (Total)
5 hours (2 hours theoretical and 3 hours practical per week) for 15 wee number of units 3.5 units
7. Course administrator's name (mention all, if more than one name)
Name: Dr.Osama Ghazi Ismaeel Email : osamaghaze@uodiyala.edu.iq
8. Course Objectives

Course Objectives	1- Definition of geology ,its branches and history 2- Geological phenomena 3-Study of Minerals types 4- Study of Rocks types 5- relationship of Geology, agriculture and soil 6- The Water cycle: Surface Water and Groundwater.

9. Teaching and Learning Strategies

Strategy	In-person lectures for 15 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure **Theoretical part**

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction to Geology and its branches	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

٢	٢	Geological phenomena	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
٣	٢	Minerals	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
٤	٢	Classification of Minerals	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
٥	٢	Weathering	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
٦	٢	**weathering**	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
٧	٢	Rocks	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
٨	٢	Igneous Rocks	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
٩	٢	Sedimentary Rocks	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
١٠	٢	Metamorphic Rocks	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
١١	٢	The Water cycle: Surface Water	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
١٢	٢	Groundwater	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
١٣	٢	Natural resources	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
١٤	٢	The relationship of Geology agriculture and soil	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**

١٥	٢	deserts	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
practical part					
١	٣	The relationship of Geology soil	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
٢	٣	minerals: characteristics and classification	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
٣	٣	minerals: characteristics and classification	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
٤	٣	minerals: characteristics and classification	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
٥	٣	minerals: characteristics and classification	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
٦	٣	Rocks : characteristics and classification	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
٧	٣	Rocks : characteristics and classification	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
٨	٣	Rocks : characteristics and classification	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
٩	٣	Rocks : characteristics and classification	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
١٠	٣	Minerals and Natural Rocks in Iraq	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
١١	٣	Minerals and Natural Rocks in Iraq	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**

١٢	٣	Minerals and Natural Rocks in Iraq	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
١٣	٣	Geological formation and Natural phenomena in Iraq	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
١٤	٣	Geological formation and Natural phenomena in Iraq	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
١٥	٣	Collecting Rocks Sample from Iraq	Principles of Geology	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**

11. Course Evaluation

Examination Monthly & daily exams with discussion questions inside the lecture.

The degree of participation in the questions related to the subject.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	Iraqi academic scientific journals
Electronic References, Websites	Soil Science Society of America Library Genesis

Course Description Form of Principles of Animal Production

1. Course Name:	
Principles of Animal Production	
2. Course Code:	
APD-1201	
3. Semester / Year:	
Second semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Attending	
6. Number of Credit Hours (Total) / Number of Units (Total)	
175 hours / 7 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Dr. Raaed Ibrahim Khalil Email : raaedibrahim@uodiyala.edu.iq	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	-Give an idea of importance of animal prodution, types of farm animals ,animal husbandry . -Give an idea of importance of reproduction , nutrition and management . -Animals Housing and Records .
9. Teaching and Learning Strategies	
Strategy	A 14 week attendance lectures, interspersed with two monthly exams, daily exams & reports.

10. Course Structure					
Theoretical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject**	**Learning Method**	**Evaluation Method**
1	**2**	Introduction of importance of animal production.	**Principles of Animal Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Interrelated animal production & plant production , Sciences related to animal production.	**Principles of Animal Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Capabilities & constraint of animal production in Iraq.	**Principles of Animal Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Breed of dairy & beef cattle	**Principles of Animal Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Buffaloes	**Principles of Animal Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	Semester 1st exam				
7	**2**	Milk production in the world and its influencing factors.	**Principles of Animal Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Sheep & goat breeding	**Principles of Animal Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Nutrition requirements, Compound stomach	**Principles of Animal Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Poultry	**Principles of Animal Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	Barns	**Principles of Animal Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	Semester 2nd exam				
13	**2**	Reproductive in farm animals	**Principles of Animal Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Fish culture & production	**Principles of Animal Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	Visit the farm of Agriculture College	**Principles of Animal Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Observation of field operations	**Principles of Animal Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Milking	**Principles of Animal Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Calves suckling	**Principles of Animal Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Scientific Trip	**Principles of Animal Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	Semester 1st exam				
7	**3**	Reproductive physiology & Artificial insemination	**Principles of Animal Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Hatching , Selection of hatching eggs.	**Principles of Animal Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Feedstuffs	**Principles of Animal Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Barns	**Principles of Animal Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Animal diseases	**Principles of Animal Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	Semester 2nd exam				
13	**3**	Applied in animal management	**Principles of Animal Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Observation of field operations	**Principles of Animal Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation	
Examination Monthly & daily exams with discussion questions inside the lecture . The degree of participation in the questions related to the subject.	
12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	-Principles of Animal Production. Al-Jalili et.al.
Main References (Sources)	- Milk cattle production . Alkudsi N.H. 2010. -Sheep & goat Principles of Production and Breeding . Al-Kass et.al. 1993
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic journal
Electronic References, Websites	

Course Description Form Computer 1

1. Course Name:	
Computer 1	
2. Course Code:	
COMP102	
3. Semester / Year:	
First Semester/ 2024-2025	
4. Description Preparation Date:	
15/01/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Asst. Prof. Ahmed Sulaiman Abdullah, Asraa Yaarub Youssef Email: ahmed_alogaidi_eng@uodiyala.edu.iq	
8. Course Objective	
Course Objectives	• Students who complete this course will be able to: • Use a computer for basic tasks. • Identify the hardware components of a computer system. • Create documents using a word processor and presentations. • Research on the Internet.
9. Teaching and Learning Strategies	
Strategy	In-person lectures for 15 weeks, including two monthly exams and daily exams.
10. Course Structure	
The theoretical part	

Week	Hours	Required Learning Outcome	Unite or Subject Name	Learning Method	Evaluation Method
1	2	Introduction to the computer	Computer 1	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
2	2	Computer Components	Computer 1	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
3	2	Computer Components (Cont.)	Computer 1	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
4	2	Operating System and Graphical User Interface GUI	Computer 1	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
5	2	Operating System and Graphical User Interface GUI (Cont.)	Computer 1	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
6	2	Word Processing	Computer 1	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
7	2	Word Processing (Cont.)	Computer 1	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
8	2	Spread Sheet	Computer 1	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
9	2	Spread Sheet (Cont.)	Computer 1	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
10	2	Presentation Software	Computer 1	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily

					reports
11	2	Presentation Software (Cont.)	Computer 1	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
12	2	Introduction to Internet and Web Browsers	Computer 1	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
13	2	Introduction to Internet and Web Browsers (Cont.)	Computer 1	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
14	2	Communications and Emails	Computer 1	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
15	2	Introduction to Cloud Computing and Services	Computer 1	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports

11. Course Evaluation

Exams
Daily exams and discussion questions within the lecture
The degree of participation in questions related to the academic subject

12. Learning and Teaching Resources

Required Textbook (curricular books, if any)	1. Graham Brown, David Watson, "Cambridge IGCSE Information and Communication Technology'' , 3rd Edition (2020). 2. Alan Evans, Kendall Martin, Mary Ann Poatsy, "Technology In Action Complete", 16th Edition (2020).
Mean references (sources)	
Recommended books and references (scientific journals, reports…)	Iraqi academic scientific journals
Electronic references, Websites	

Course Description Form of Arabic

1. Course Name:	
Arabic	
2. Course Code:	
UD02	
3. Semester / Year:	
Second semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical per week) for 14 weeks, number of units 2 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Mayyadah Mohammed Abdullateef **mayyadah abdullateef@uodiyala.edu.iq**	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	Learn the rules of the Arabic language. -Introduce students to the importance of the Arabic language and develop their literary taste. -Students realize the beauty of our Arabic language and learn about its most important sciences, including: Linguistics, morphology, rhetoric, rhetoric, prosody, and grammar. -Students gain pleasure and admiration through reading, and practice the quality of style in terms of clarity, strength, beauty, and magnificence of imagery, Accuracy of thinking, good expression, and skillful choice. -Feeling proud and belonging to the Arabic language as the most perfect

	and most honorable language, and it is the title of the nation and a manifestation of its unity. -Strengthening students' connection to their homeland and what it represents in terms of social, moral, and spiritual values, and introducing them to its history and civilization. - Strengthening students' sense of belonging to their Arab homeland and their greater Islamic world, and the problems it faces through the ability to think and manage.

9. Teaching and Learning Strategies

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	First: Spelling topics: - Alphabets - The difference between the letters - Dhad and Tha	**Arabic**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	-Solar and lunar letters - punctuation marks	**Arabic**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	- Deletion and addition.	**Arabic**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	- First month test	**Arabic**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	- Hamza and its spelling rul - Common linguistic errors	**Arabic**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	-Second: Grammatical topics - - Parts of speech. -The verb and the subject.	**Arabic**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	•Accusatives - Objects: - The direct object. - The absolute object. The object in which	**Arabic**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	The object for which.- - The object with	**Arabic**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

9	**2**	Second month test	**Arabic**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	• Nominatives: - Subject and predicate. - Subject and subject complement.	**Arabic**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	- Kan and its sisters. - An and its sisters	**Arabic**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	• The Majrour: - The Majrour with the preposition. - The Majrour with the addition	**Arabic**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	Free reading + third month test	**Arabic**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Third: Literary topics: - Definition of literature. - The development of the meaning of the word literature throughout the ages	**Arabic**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
15	**2**	- Literary eras - The relationship between literature and life.	**Arabic**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	• Arabic Language for Non-Specialization Departments, by Dr. Abdul Qadir Hassan, Dr. Hamid Ahmed Al-Hiti and others, Mosul, 2000. • Arabic Language for Non-Specialization Departments, by Dr. Abdul Qadir Hassan, Dr. Muhammad Hussein and others, Mosul, 1981.
Main References (Sources)	• Ibn Aqil's commentary on Ibn Malik's Alfiyyah by Chief Justice Baha' al-Din Abdullah al-Aqili al-Hamadani, authored by Muhammad Muhyi al-Din Abd al-Hamid, Beirut, Lebanon. • Lisan al-Arab al-Ibn Manzur, 1st ed., Beirut, Lebanon. • Al-Sihah fi al-Lugha al-Arabiyyah by al-Jawhari.
Recommended Books and References (Scientific Journals, Reports...)	•Reputable Iraqi and Arab academic scientific journals.
Electronic References, Websites	Official, reliable Iraqi and Arab academic journals and theses published on the Internet and available in scientific libraries.

Course Description Form Mathematics and Statistics

1. Course Name:	
Mathematics and Statistics	
2. Course Code:	
COA–1202	
3. Semester / Year:	
First Semester/ 2024-2025	
4. Description Preparation Date:	
15/01/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Asst. Prof. Ahmed Sulaiman Abdullah, Asraa Yaarub Youssef Email: ahmed_alogaidi_eng@uodiyala.edu.iq	
8. Course Objective	
Course Objectives	1. Enable students to think critically and find new solutions to problems using mathematics. 2. Develop the ability to apply mathematical concepts to realworld challenges in agriculture, such as improving productivity and reducing negative environmental impacts. 3. Engage in scientific research in agriculture and the environment, where agricultural research relies on the analysis and use of mathematical data and information
9. Teaching and Learning Strategies	
Strategy	In-person lectures for 15 weeks, including two monthly exams and daily exams.
10. Course Structure	

The theoretical part					
Week	**Hours**	**Required Learning Outcome**	**Unite or Subject Name**	**Learning Method**	**Evaluation Method**
1	2	Function and its graphs	Mathematics and Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
2	2	The Range and Domain of Functions	Mathematics and Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
3	2	Limits of Functions	Mathematics and Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
4	2	Continuity	Mathematics and Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
5	2	Derivation of Function	Mathematics and Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
6	2	Indefinite Integration	Mathematics and Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
7	2	Derivative and integral of trigonometric functions and their properties	Mathematics and Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
8	2	Derivative and integral of logarithmic functions and their properties	Mathematics and Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
9	2	Statistical symbols	Mathematics and Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
10	2	Display and	Mathematics and Statistics	Dialogue & discussion	Daily,

		summarize data		Brainstorming	monthly and final exams and daily reports
11	2	Frequency distribution tables	Mathematics and Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
12	2	Graphical presentation	Mathematics and Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
13	2	Normal distribution	Mathematics and Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
14	2	Measures of central tendency	Mathematics and Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
15	2	Measures of Dispersion or Variation	Mathematics and Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports

11. Course Evaluation

Exams
Daily exams and discussion questions within the lecture
The degree of participation in questions related to the academic subject

12. Learning and Teaching Resources

Required Textbook (curricular books, if any)	- Al-Rawi, Khashi Mahmoud, 1985. Introduction to Statistics,University of Baghdad, College of Agriculture - George B. Thomas, 2003. Calculus and Analytic Geometry.
Mean references (sources)	Al-Rawi, Khashi Mahmoud, 1985. Introduction to Statistics,University of Baghdad, College of Agriculture
Recommended books and references (scientific journals, reports…)	Iraqi academic scientific journals
Electronic references, Websites	

Course Description Form English Language

1. Course Name:
English Language
2. Course Code:
ENGL203
3. Semester / Year:
First semester/ 2024-2025
4. Description Preparation Date:
15/1/2025
5. Available Attendance Forms:
Full time (theoretical lecture) weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
2 hours (2 hours theoretical per week) for 14 weeks, number of units 2 units
7. Course Administrator's Name (Mention All, If More Than One Name)
Name: Assistant lecturer Sohaib Saeed Hameed **Email: sohaibsaeedhameed@gmail.com**
8. Course Objectives

Course Objectives: Graduating students who are able to:	1. Facilitating students in smoothly acquiring knowledge, concepts, and attitudes in English language pronunciation. 2. Facilitating the comprehension of concepts. 3. Showcasing the diverse talents of students. 4. Mastering the English language.

9. Teaching and Learning Strategies	
Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	2	Unit 1 / Questions / Social expressions 1	English Language	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
2	2	Unit 2 / Present tenses	English Language	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
3	2	Unit 3 / Past tenses	English Language	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
4	2	Word formation	English Language	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
5	2	Time expressions	English Language	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
6	2	Unit 4 / Countable and uncountable / Articles	English Language	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
7	2	Discussion	English Language	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
8	2	Unit 5/ Verb patterns 1 / Hot verbs	English Language	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
9	2	Future Forms	English Language	Lecture Dialogue &	Daily, monthly and

				discussion Brainstorming	final exams and daily reports
10	**2**	**Unit 6 / Comparatives and superlatives**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	**Synonyms and antonyms / Directions**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12		**Unite 7 / Present perfect**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	**For & since / word pairs**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	**Have (got) to / should & must**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
15	**2**	**Grammar Revision**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

11. Course Evaluation

Examination Monthly & daily exams with discussion questions inside the lecture.
The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources

Required Textbooks (Curricular Books, If Any)	**New Headway Plus " Pre-Intermediate "**

Main References (Sources)	
Recommended Books and References (Scientific Journals, Reports...)	
Electronic References, Websites	

Course Description Form of Computer applications

1. Course Name:	
Computer applications3	
2. Course Code:	
APPC202	
3. Semester / Year:	
First semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3 hours (3 hours practical per week) for 14 weeks, number of units 3 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name : Dr. Ahmed Sulaiman / M.M. Asraa Yaarub Youssef **Email :** asraaalsady@uodiyala.edu.iq	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	• Teaching students the most important foundations and applications in Excel. • The student's ability to use Excel to process, interpret, and analyze data • The student will learn how to insert tables and images • Learn how to deal with mathematical equations in the program
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Practical part

Week	Hours	Required learning outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	**3**	Introduction to Excel	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	How to use tapes and tools	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Create texts with special effects	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Insert basic shapes into Excel	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Inserting basic images into Excel	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Charts in Excel	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
7	**3**	Tables built into Excel	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Ascending and descending order of data in Excel	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Learn about saving formulas in Excel	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Preparing a multi-page project in Excel	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Processing documents in Excel	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

12	**3**	Add and edit images in Excel	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
13		Insert mathematical equations	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14		Print documents and tables	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation
Examination Monthly & daily exams with discussion questions inside the lecture . The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	Computer applications book 4(2016)
Main References (Sources)	General option of MS-Exel(2010)
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic journal
Electronic References, Websites	**www.youtube.com.**

Course Description Form The crimes of the Baath regime in Iraq

1. Course Name:	
The crimes of the Baath regime in Iraq	
2. Course Code:	
CBRI204	
3. Semester / Year:	
First semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 hours (2 hours theoretical per week) for 14 weeks, number of units 2 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Assistant teacher .Anaam salih mahdi Email: Anaamsalih53@gmail.com	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	This curriculum seeks to familiarize students with the crim committed by the previous regime during the years of rule through documents, analysis and study
9. Teaching and Learning Strategies	
Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure					
Theoretical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject**	**Learning Method**	**Evaluation Method**
1	**2**	For the student to become familiar with humanitarian laws	**The crimes of the Baath regime in Iraq**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	The student gets to know the concept of crimes and their categories	**The crimes of the Baath regime in Iraq**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	The student gets to know the types of international crimes	**The crimes of the Baath regime in Iraq**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	The student should learn about the crimes committed by the previous regime	**The crimes of the Baath regime in Iraq**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	The student will be familiar with psychological and social crimes	**The crimes of the Baath regime in Iraq**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	The student will learn about the effects of psychological crimes on the individual	**The crimes of the Baath regime in Iraq**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	For the student to recognize the effects of social crimes on the individual	**The crimes of the Baath regime in Iraq**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	The student should recognize the previous regime's violation of Iraqi laws	**The crimes of the Baath regime in Iraq**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	The student should become familiar with the locations of prisons and detention in the previous regime	**The crimes of the Baath regime in Iraq**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	The student gets to know environmental crimes	**The crimes of the Baath regime in**	**Lecture Dialogue & discussion**	Daily, monthly and final exams

			Iraq	**Brainstorming**	and daily reports
11	**2**	The student will learn about the drying of the marshes during the time of the previous regime	**The crimes of the Baath regime in Iraq**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12		The student will learn about the leveling of orchards during the time of the previous regime	**The crimes of the Baath regime in Iraq**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	For the student to learn about the crimes of social graves during the time of the previous regime	**The crimes of the Baath regime in Iraq**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	The student will be familiar with the chronological classification of mass graves during the time of the previous regime	**The crimes of the Baath regime in Iraq**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
15	**2**	The student gets to know personal freedom, its dimensions and limits	**The crimes of the Baath regime in Iraq**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

11. Course Evaluation

Examination Monthly & daily exams with discussion questions inside the lecture.
The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources

Required Textbooks (Curricular Books, If Any)	The crimes of the Baath regime in Iraq
Main References (Sources)	
Recommended Books and References (Scientific Journals, Reports...)	
Electronic References, Websites	

Course Description Form of Biochemistry

1. Course Name:	
Biochemistry	
2. Course Code:	
BIOC205	
3. Semester / Year:	
First semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Assistant Lecturer . Elaf Abdul wahab Shihab Ahmed **Email: elafshihab@uodiyala.edu.iq** **Assistant Lecturer. Noor Hatam**	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	Introducing students to the basics of biochemistry according to the vocabulary of the biochemistry curriculum for second stage students. -The curriculum items included introducing the science of biochemistry and its importance and studying (carbohydrates, lipid, proteins, enzymes, and nucleic acids)
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	introduction of biochemistry,the mponents of a living cell and their functions	Biochemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	carbohydrates -its definition -importance-classification (mono,oligo,poly-saccharides)	Biochemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	monosaccharides-isomerism-derivatives of monosaccharides -cyclic structure of monosaccharide	Biochemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	oligosaccarides-reducing and non-reducing sugars	Biochemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	polysaccharides -homo and hetropoly-saccharides	Biochemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	1st exam	Biochemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	amino acids-classification structuresome important reaction-properties of amino acids	Biochemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Proteins - their composition, structure, and divisions	Biochemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	fatty acids classification -structures-some	Biochemistry	**Lecture**	Daily, monthly and final exams and daily reports

		importance of fatty acids		**Dialogue & discussion Brainstorming**	
10	**2**	simple lipids-fat and oils -waxes-fat index	Biochemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	Compound and derived lipids - their composition - their divisions	Biochemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	2nd exams	Biochemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	enzyme-definition - classification - mechanism action of enzyme-active and inactive enzyme-the effective factors on enzymes activity	Biochemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	nucleic acids-biological roles-nucleotides-function of nucleotide-structure-classification	Biochemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
15	**2**	3rd exam	Biochemistry	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	Introduction and instructions	Biochemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	qualitative detection of carbohydrate (general detection-reducing and non-reducing sugars-reducing power-aldoses and ketoses-pentoses and hexoses	Biochemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

3	**3**	qulitative detection of disaccharides from monosaccharide reducing property test - iodine test	Biochemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	qualtative detection of polysaccharides (general detection reducing property test- iodine test)	Biochemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	hydrolysis of starch - detection of starch hydrolytic products	Biochemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	the first exam + unknown	Biochemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
7	**3**	detection of aromatic amino acid in protein	Biochemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	detection of basic amino acid in protein	Biochemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	protein precipitation - denaturation	Biochemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	2nd exam +unknown	Biochemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	detection of lipids (saturated and unsaturated fatty acid - cupper acctate test - iodine test)	Biochemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	saponification and emulsification test	Biochemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
13	**3**	3rd exam	Biochemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

14	**3**	General (carbohydrates and proteins)	Biochemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
15	**3**	General (carbohydrates and proteins)	Biochemistry	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation
Examination Monthly & daily exams with discussion questions inside the lecture. The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	
Main References (Sources)	Agricultural Biochemistry, written by (Dr. Ali Mohammed Hassan and Dr. Saad Khalil Shihab)
Recommended Books and References (Scientific Journals, Reports...)	
Electronic References, Websites	

Course Description Form of Vegetables Production

1. Course Name:	
Vegetables Production	
2. Course Code:	
VEGP206	
3. Semester / Year:	
First semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Dr. Bssim A. Essa Mobasim1582014@gmail.com	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	Introducing students to the vegetable crops. Vegetables are also divided according to environmental factors, as well as according to the botanical division of these crops, and to identify some of the seed families that include vegetable crops.
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	Introduction, definition of horticulture and some of the sciences related to this specialty, including the production of ,vegetable crops	**Vegetables Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Environmental factors affecting vegetable crops Temperature: light, gases	**Vegetables Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Soil factors affecting the success of growing vegetable crops: soil texture, acidity and salinity of the soil,	**Vegetables Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Vegetable crops service operations. Irrigation, irrigation methods	**Vegetables Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Transplantation and acclimatization of vegetable crop seedlings	**Vegetables Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Botanical division of vegetable crops according to plant families, genera and varieties	**Vegetables Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	Plant families / winter vegetable crops - the Cruceferae family / appropriate environmental conditions,	**Vegetables Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

		nutritional value, planting and harvesting dates			
8	**2**	study of vegetables belonging to the Alliaceae family - environmental conditions and nutritional value of these crops	**Vegetables Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Study of vegetables belonging to the legumenosae family - environmental conditions and nutritional value - and planting dates for these crops	**Vegetables Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Study of vegetable crops belonging to the umbilefera family. Environmental conditions - Nutritional value - Planting dates	**Vegetables Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	Summer vegetable crops - Solanaceae family - Potatoes - Tuber dormancy - Transplantation - Planting dates	**Vegetables Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	Solanaceae family / Tomato - Environmental conditions - Nutritional value - Plant breeding methods - Cultivation dates in Iraq	**Vegetables Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	cucurbetceae-family crops / nutritional value - suitable environmental conditions - cultivation methods	**Vegetables Production**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	cucurbetceae-family crops / nutritional value - suitable	**Vegetables Production**	**Lecture Dialogue & discussion**	Daily, monthly and final exams and daily reports

		environmental conditions - cultivation methods		**Brainstorming**	
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	identification of agricultural facilities such as vegetable fields and green houses	**Vegetables Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	preparing the soil for planting vegetable crops	**Vegetables Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	preparing the field soil for growing vegetables, dividing the field soil	**Vegetables Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	preparation of plantets for cultivation in the field	**Vegetables Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Methods of reproduction of vegetable crops	**Vegetables Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Agricultural operations in green and plastic houses	**Vegetables Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
7	**3**	Cruceferae family / botanical description of crops belonging to this family, varieties, cultivation method and service operations	**Vegetables Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Botanical description of Alliaceae family plants and pollination method	**Vegetables Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Study of the botanical description of crops of the legumenosae family, flowers and method of pollination	**Vegetables Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Study the botanical description of	**Vegetables Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

		Umbilefera family crops Flowers and pollination method - Varieties			
11	**3**	Botanical description of Solanaceae family crops Cultivation method - Flowers and pollination – Varieties	**Vegetables Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Botanical description of the tomato crop - Methods of cultivation in greenhouses Limited and unlimited varieties	**Vegetables Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
13	**3**	Botanical description of the cucurbitaceae family crops - the nature of flowering - the nature of pollination in these plants	**Vegetables Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Botanical description of the cucurbitaceae family crops - the nature of flowering - the nature of pollination in these plants	**Vegetables Production**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation

Examination Monthly & daily exams with discussion questions inside the lecture.
The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources

Required Textbooks (Curricular Books, If Any)	1-Vegetable Production (Part One, Part Two) Prof. Dr. Adnan Naser Matlub
Main References (Sources)	2.- Prof. Dr. Ezzedine Sultan - Prof. Dr. Karim Salih Abdoul- 1980.
Recommended Books and References (Scientific Journals, Reports...)	
Electronic References, Websites	

Course Description Form of Principles of plant protection

1. Course Name:	
Principles of plant protection	
2. Course Code:	
PRPP210	
3. Semester / Year:	
Second semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name : Dr. Tareq Saadi Abbas - Email : tariq.saadi@uodiyala.edu.iq -Abdel Sattar Mansour Abdel	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	The science of plant protection studies the preservation of p production using various methods and means of p protection….. Differentiate between symptoms and signs of disease. Knowing harmful insects by knowing the method of dam through knowing the mutations of the parts of the mouth Differentiate between different plant pathogens Knowledge of different control methods…..
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	2	The student gets to know the economic importance of agricultural pests	of Principles plant protection	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
2	2	The student will learn about the factors that help insects survive and succeed in the environment	of Principles plant protection	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
3	2	The student gets to know the methods of insect reproduction	Principles of plant protection	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
4	2	For the student to recognize the types of mouth parts in insects	Principles of plant protection	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
5	2	The student gets to know the environmental factors affecting the life and activity of insects	Principles of plant protection	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
6	Semester 1st exam				
7	2	The student will learn about ways to combat harmful insects	Principles of plant protection	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
8	2	The student will be familiar with the pictures of manufacturing chemical pesticides	Principles of plant protection	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
9	2	For the student to become familiar with the external anatomy of the agricultural dream, and the important factors of the agricultural dream	Principles of plant protection	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
10	2	The student gets to know the nature of life and the damage caused by non-insect pests (rodents, birds) and ways to combat them	Principles of plant protection	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
11	2	The student gets to know the economic importance of plant diseases	Principles of plant protection	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports

12	Semester 2nd exam				
13	**2**	The student will be familiar with the causes of parasitic plant diseases (biological)	**Principles of plant protection**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	The student will be familiar with the causes of non-parasitic (abiotic) plant diseases.	**Principles of plant protection**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	Taxonomic position of insects	**of Principles plant protection**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Characteristics of the phylum Arthropoda	**Principles of plant protection**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Insect class features Insect body structure: head and appendages, thorax and appendages, abdomen and appendages	**Principles of plant protection**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Morphology in insects	**Principles of plant protection**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Classification of insects and features of insect orders	**Principles of plant protection**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	Semester 1st exam				
7	**3**	Classification of insects and features of insect orders	**of Principles plant protection**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Identify the most important symptoms and signs of plant pathogens	**Principles of plant protection**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Identify the most important symptoms and signs of plant pathogens	**Principles of plant protection**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Studying the symptoms of field crop diseases and methods of controlling them	**Principles of plant protection**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Studying the symptoms of field crop diseases and methods of controlling them	**Principles of plant protection**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	Semester 2nd exam				
13	**3**	Studying the symptoms of field crop diseases and	**of Principles plant protection**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

		methods of controlling them			
14	**3**	Studying the symptoms of field crop diseases and methods of controlling them	**Principles of plant protection**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation	
Examination Monthly & daily exams with discussion questions inside the lecture . The degree of participation in the questions related to the subject.	
12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	-١Al-Azzawi, Abdullah Falih, Ibrahim Qaddouri Qaddo, Haider Saleh Al-Haidari. 1990. Entomology. Dar Al-Hekma for Printing and Publishing, 252 pages. 2- Al-Adel, Khaled Muhammad. 2006. Pesticides, basic concepts and their role in the agricultural and health fields. First edition: 422 pages
Main References (Sources)	- Al-Shukri, Mahdi Majeed.1991. The basics of fungi and their plant diseases. Ministry of Higher Education and Scientific Research - University of Baghdad
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic journal
Electronic References, Websites	

Course Description Form

1. Course Name:	
Principles of soil science	
2. Course Code:	
PRSS208	
3. Semester / Year:	
First Semester	
4. Description Preparation Date:	
15/01/2025	
5. Available Attendance Forms:	
Attending	
6. Number of Credit Hours (Total) / Number of Units (Total)	
Number of hours = 5, number of units = 3.5	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Hussein Aziz Email: Husseinaziz@uodiyala.edu.iq	
8. Course Objective	
Course Objectives	• Definition of soil science and how soils originate and develop, and what are the processes and factors affecting that. • Knowledge of the physical properties of soils (texture, structure, soil water, actual and apparent soil density) • Knowledge of the chemical properties of soils (mineral composition, organic matter, ion exchange, soil acidity, alkalinity and salinity). • Knowledge of the biological properties of soils and identification of the basic nutrients and their importance to plants.
9. Teaching and Learning Strategies	
Strategy	In-person lectures for 15 weeks, including two monthly exams and daily exams.
10. Course Structure	

The theoretical part					
Week	**Hours**	**Required Learning Outcome**	**Unite or Subject Name**	**Learning Method**	**Evaluation Method**
1	2	Soil formation and formation	Principles of soil science	Lecture with explanation and presentation	Exams
2	2	Soil formation processes and factors	Principles of soil science	Lecture with explanation and presentation	Exams
3	2	Soil profile	Principles of soil science	Lecture with explanation and presentation	Exams
4	2	Soil physical properties(psp) texture, classes, structure,	Principles of soil science	Lecture with explanation and presentation	Exams
5	2	Soil density, Bulk density , soil air , soil temperature ,soil color	Principles of soil science	Lecture with explanation and presentation	Exams
6	2	Available water capacity , permeability soil water.	Principles of soil science	Lecture with explanation and presentation	Exams
7	2	Soil water (soil water classification)	Principles of soil science	Lecture with explanation and presentation	Exams
8	2	Soil Chemical Properties	Principles of soil science	Lecture with explanation and presentation	Exams
9	2	Soil minerals	Principles of soil science	Lecture with explanation and presentation	Exams
10	2	Colloids and soil properties	Principles of soil science	Lecture with explanation and presentation	Exams
11	2	Double electrical layer	Principles of soil science	Lecture with explanation and presentation	Exams
12	2	Exchanges ion in the soil	Principles of soil science	Lecture with explanation and presentation	Exams
13	2	The properties of bio-soil (soil classification revival)	Principles of soil science	Lecture with explanation and presentation	Exams
14	2	The role of biology in the soil to increase soil fertility	Principles of soil science	Lecture with explanation and presentation	Exams
15	2	Soil classification	Principles of soil science	Lecture with explanation and presentation	Exams
Practical part					

Week	Hours	Required Learning Outcome	Unite or Subject Name	Learning Method	Evaluation Method
1	3	How to take soil samples	Principles of soil science	Lecture with explanation and presentation	Exams
2	3	Preparation of samples for laboratory study	Principles of soil science	Lecture with explanation and presentation	Exams
3	3	Determination of moisture in the soil	Principles of soil science	Lecture with explanation and presentation	Exams
4	3	Distribution (soil texture)	Principles of soil science	Lecture with explanation and presentation	Exams
5	3	Distribution volumetric minutes of soil (mechanical analysis)	Principles of soil science	Lecture with explanation and presentation	Exams
6	3	Determination density and bulk soil	Principles of soil science	Lecture with explanation and presentation	Exams
7	3	How to prepare saturated soil paste and calculate saturation	Principles of soil science	Lecture with explanation and presentation	Exams
8	3	Measurement of electrical conductivity	Principles of soil science	Lecture with explanation and presentation	Exams
9	3	Measure PH in soil	Principles of soil science	Lecture with explanation and presentation	Exams
10	3		Principles of soil science	Lecture with explanation and presentation	Exams
11	3	Determination of positive ions from soil and water extract	Principles of soil science	Lecture with explanation and presentation	Exams
12	3	Determination of negative ions from soil and water extract	Principles of soil science	Lecture with explanation and presentation	Exams
13	3	Estimate calcium carbonate	Principles of soil science	Lecture with explanation and presentation	Exams
14	3	Estimation of organic matter	Principles of soil science	Lecture with explanation and presentation	Exams
15	3	Estimation of soil biology	Principles of soil science	Lecture with explanation and presentation	Exams

11.Course Evaluation

Exams
Daily exams and discussion questions within the lecture
The degree of participation in questions related to the academic subject

12.Learning and Teaching Resources	
Required Textbook (curricular books, if any)	Alani, 1988. Principles of soil
Mean references (sources)	
Recommended books and references (scientific journals, reports…)	Iraqi academic scientific journals
Electronic references, Websites	

Course Description Form of Principles of microbiology

1. Course Name:	
Principles of microbiology	
2. Course Code:	
PRIM209	
3. Semester / Year:	
First semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Prof.Dr. Faris M. Suhail farissuhail@.uodiyala.edu.iq	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	Introduce students the basics of microbiology according to the vocabulary of substance of microbiology for students of second stage of the students Soil and water resources department .
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	Definition and development of microbiology	**Principles of microbiology**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Taxonomy site of microorganisms in the world of biology	**Principles of microbiology**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Naming microbiology - Classification of microbiology	**Principles of microbiology**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Bacteria, presence, components, forms	**Principles of microbiology**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	The bacterial cell wall and its components, cytoplasmic membrane and its components	**Principles of microbiology**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Permeability and the transition across membranes cytoplasmic	**Principles of microbiology**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	Bacterial flagella, pilli	**Principles of microbiology**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Cytoplasm, nucleic acids	**Principles of microbiology**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Objects moderation, Spores, plasmids, cysts	**Principles of microbiology**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

10	**2**	Fungi, described the fungus, its importance	**Principles of microbiology**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	Installation of the fungal cell, the cytoplasm and its contents	**Principles of microbiology**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	Algae, types, presence, growth and reproduction	**Principles of microbiology**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	Microbiology nutrition, reproduction microbiology	**Principles of microbiology**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	viruses	**Principles of microbiology**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	Identify the microbiology laboratory – Instruments and tools- general guidelines and safety methods .	**Principles of microbiology**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Sterilization , the microscope , type of microscope	**Principles of microbiology**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Culture media , types, methods of preparation	**Principles of microbiology**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Sampling methods of microorganisms- Isolate microorganisms	**Principles of microbiology**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Sampling methods of microorganisms- Isolate microorganisms	**Principles of microbiology**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Diagnosis of bacteria , shape of bacteria	**Principles of microbiology**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

7	**3**	Fungi, Diagnosis of fungi , shape of fungi . Diagnosis of molds and yeasts	**Principles of microbiology**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Staining of bacteria , simple staining	**Principles of microbiology**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Staining of bacteria , simple staining	**Principles of microbiology**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Compound staining , spore staining	**Principles of microbiology**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Compound staining , spore staining	**Principles of microbiology**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Mobility of bacteria hanging (drop preparation)	**Principles of microbiology**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
13	**3**	The minimum inhibitory concentration using antibiotics .	**Principles of microbiology**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	The minimum inhibitory concentration using antibiotics .	**Principles of microbiology**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation

Examination Monthly & daily exams with discussion questions inside the lecture.
The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources

Required Textbooks (Curricular Books, If Any)	
Main References (Sources)	1-Principles of microbiology. Dr. Faaz Aziz al-Ani and Dr. Amin Suleiman Badawi. 2000 .University of Mosul.
Recommended Books and References (Scientific Journals, Reports...)	2-microbiology. Authoring a committee of my teaching Department of Life Sciences - Baghdad University, Dar al-Hikma for printing and publishing in 1991
Electronic References, Websites	

Course Description Form Soli Ecology and Meteorology

1. Course Name:
Soli Ecology and Meteorology
2. Course Code:
SOEM210
3. Semester / Year:
Second semester/ 2024-2025
4. Description Preparation Date:
15/01/2025
5. Available Attendance Forms:
Full time (theoretical lecture and practical lecture) weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, numb of units 3.5 units
7. Course administrator's name (mention all, if more than one name)
Name: Dr.Osama Ghazi Ismaeel **Email : osamaghaze@uodiyala.edu.iq**
8. Course Objectives

Course Objectives	1- Study of Ecology, Ecosystem and Environmenal factors Physical Properties of the soil 2- Biotic and Abiotic components 3-Soil 4- Temperature, moisture, Light and Rain 5- Frost and Wind 6- Pollution , Desertification and Global Warming

9. Teaching and Learning Strategies

Strategy	In-person lectures for 15 weeks, including two monthly exams, daily exams, and scientifi reports

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	The environment and its relationship with humans	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

2	2	The environment and its relationship with humans	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
3	2	Eceology and Ecosystem	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
4	2	Climate , Climate cycle , Soil climate	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
5	2	Energy radiation Temperature Winds Atmospheric pressure	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
6	2	Water, the relationship of water to plants, humidity	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
7	2	fog and Evaporation	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
8	2	Environmenal Properties fo the soil	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
9	2	Soil Moisture Content	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
10	2	Soil air and aeration	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
11	2	Soil Structure	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**

12	2	Soil texture	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
13	2	Vegetation	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
14	2	Pollution	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
15	2	Human role in the environment	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
practical part					
1	**3**	Eceology and environment factor	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
2	**3**	Temperature measuring devices			**Daily, monthly and final exams and daily reports**
3	**3**	Solar radiation measuring devices	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
4	**3**	Humidity measuring devices	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
5	**3**	Rain measuring devices	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**

6	**3**	Winds measuring devices	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
7	**3**	Atmospheric pressure measuring devices	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
8	**3**	Evaporation and measuring devices	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
9	**3**	Devices for measuring soil properties	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
10	**3**	Natural plant environments in the world and Iraq	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
11	**3**	Desertification in the Iraq and world	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
12	**3**	Aquatic ecosystem	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
13	**3**	Vegetation in Iraq and the world	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**

14	**3**	field experiment	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**
15	**3**	visit to a weather station	**Soli Ecology and Meteorology**	**Lecture Dialogue & discussion Brainstorming**	**Daily, monthly and final exams and daily reports**

11. Course Evaluation

Examination Monthly & daily exams with discussion questions inside the lecture.
The degree of participation in the questions related to the subject.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	Iraqi academic scientific journals
Electronic References, Websites	Soil Science Society of America Library Genesis

Course Description Form of Computer applications

1. Course Name:	
Computer applications4	
2. Course Code:	
APPC203	
3. Semester / Year:	
Second semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3 hours (3 hours practical per week) for 14 weeks, number of units 3 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name : Dr. Ahmed Suleiman / M.M. Asraa Yaarub Youssef **Email :** asraaalsady@uodiyala.edu.iq	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	• Teaching students the most important foundations, applications and modern programs in computer technologies to serve them in various fields. • The student's ability to use various software to process, interpret and analyze data • The student will gain knowledge and understanding of computer networks • Getting to know the Internet
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Practical part

Week	Hours	Required learning outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	**3**	Basics of networks and the Internet	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	A comprehensive definition of the Internet	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Components of Internet networks	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Methods of communication on the Internet	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Electronic messages and conversations	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	Semester 1st exam				
7	**3**	Browsing and searching the Internet	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Internet search engines	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	A comprehensive definition of e-mail	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Cloud Computing	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	The most important Internet protocols & Benefits and harms of the Internet	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

12	Semester 2nd exam				
13	**3**	Benefits and disadvantages of cloud	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Methods of communication on the Internet	Computer applications	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation
Examination Monthly & daily exams with discussion questions inside the lecture . The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	Computer applications book 4(2016)
Main References (Sources)	Computer Network+ Certification, by Jill West, 2023
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic journal
Electronic References, Websites	**www.youtube.com.**

Course Description Form

1. Course Name:	
Principles of agricultural extension	
2. Course Code:	
Second course	
3. Semester / Year:	
First semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture)	
٦. Number of Credit Hours (Total) / Number of Units (Total)	
2hours per week for 14 weeks/ 2.5 units	
٧. Course Administrator's Name (Mention All, If More Than One Name)	
Hala Abd Al-Haseeb Mohammed Saleh halaabdulhaseeb@uodiyala.edu.iq	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	• Preparing a guidance program. • Providing extension programs to introduce farmers and encourage them to use modern agricultural methods.. • Analyzing the reality of farmers and solving the problems they face in their agricultural work
9. Teaching and Learning Strategies	
Strategy	• Enable students to obtain knowledge and understanding of the types of ponds for culture. • Enable students to obtain knowledge and understanding of the types of fish used in aquaculture. • Enabling students to obtain knowledge and understanding of the methods used in fish collection methods. • Introducing the student to laboratory work, applying theoretical information and linking it to the reality of laboratory work.
10. Course Structure	

Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**5**	Introducing students to general information about agricultural extension extension	A general introduction to agricultural extension and its philosophy	Lectures Theoretical Display methods +Dialogue and discussio	Daily, monthly and final exams and daily reports
2	**5**	Introducing students to the principles of agricultural	Principles of agricultural extension	Theoretical and + presentation methods + dialogue and discussion	Daily, monthly and final exams and daily reports
3	**5**	Introducing the objectives of agricultural extension	Definition of goals The role of agricultural extension in development	Theoretical and presentation methods + dialogue and discussion	Daily, monthly and final exams and daily reports
4	**5**	Clarifying and explaining the position of agricultural	Identify the areas of research in agricultural extension and extension	Theoretical and presentation methods + dialogue and discussion	Daily, monthly and final exams and daily reports
5	**5**	Completing the explanation of the indicative organization	Elements of organization and building a model for the indicative	Theoretical andpractical lectures + presentation methods + dialogue and discussion	Daily, monthly and final exams and daily reports
6	**5**		First examination		
7	**5**	Explanation and clarification of the tasks and duties of the network of	The extension farm, its organizational chart, and the organizational	Theoretical and + presentation methods + dialogue and discussion	Daily, monthly and final exams and daily reports
8	**5**	Clarify and explain the guidance communication process	Communication and its concepts, theories, definition and elements	Theoretical andpractical lectures + presentation methods + dialogue and discussion	Daily, monthly and final exams and daily reports
9	**5**	Explaining the stages of adopting agricultural ideas and methods	Adopting agricultural ideas and methods, adoption, dissemination, and	Theoretical and + presentation methods + dialogue and discussion	Daily, monthly and final exams and daily reports
10	**5**	Explain and clarify the leadership process	Leadership definition and elements. Definition of the leader	Theoretical and + presentation methods + dialogue and discussion	Daily, monthly and final exams and daily reports

11	**5**	Clarifying and defining the types of leadership	Types of leadership and its sign of guidance work	Theoretical and presentation methods + dialogue and discussion	Daily, monthly and final exams and daily reports
12	**5**		Second examination		
13	**5**	Illustrate and explain the qualities of a local rural leader	Characteristics of a local rural leader and program planning	Theoretical andpractical lectures + presentation methods + dialogue and discussion	Daily, monthly and final exams and daily reports
14	**5**	Explain and explain the importance of planning	The importance of agricultural extension planning, its principles, the	Theoretical and presentation methods + dialogue and discussion	Daily, monthly and final exams and daily reports

11. Course Evaluation

Distribution of 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 Sources

Required Textbooks (Curricular Books, If Any)	
Main References (Sources)	**Dr.. Ahmed Ismail Hussein and others (2009)**
Recommended Books and References (Scientific Journals, Reports...)	Many research papers have been published on Agricultural guidance
Electronic References, Websites	

Course Description Form of Agricultural equipment and machinery

1. Course Name:	
Agricultural equipment and machinery	
2. Course Code:	
(AGEM213)	
3. Semester / Year:	
Second semester/ 2024-2025	
4. Description Preparation Date:	
20/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Dr. Ali Kadhim Ahmed , Dr. Amer Khalid Ahmed . **Email: alikadhim@uodiyala.edu.iq , amerkhalid@uodiyala.edu.iq .**	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	**Studying the types of agricultural machines and machine used in agricultural fields and how to use and maintain them and identify** **On the components of** **Each machine and its field of Use and identification of**
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	2	Basic and Derivative Units Introduction to agricultural machinery	Agricultural equipment and machinery	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	2	The type and importance of agricultural tractors motion	Agricultural equipment and machinery	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	2	Transmission in agricultural tracto clutch, gearbox, and differential device properties of matter	Agricultural equipment and machinery	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	2	Power transmission devices in agricultural tractor like Drawbar, P.T.O. shaft, etc.	Agricultural equipment and machinery	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	2	Types of internal combustion engines, engine parts,	Agricultural equipment and machinery	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	Semester 1st exam				
7	2	The difference between a two-stroke and a four-stroke engine, as well as the difference between a diesel engine and a gasoline engine	Agricultural equipment and machinery	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	2	Explanation of cooling system electrical circuit, and lubricatio system	Agricultural equipment and machinery	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	2	Surface tensile strength, seam angle, capillary property	Agricultural equipment and machinery	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	2	Tillage equipment (plowing) primary and secondary, Cultivating equipment	Agricultural equipment and machinery	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	2	Sowing and planting equipment,	Agricultural equipment and machinery	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

12	Semester 2nd exam				
13	**2**	Fertilizing equipment , Harvesting equipment	Agricultural equipment and machinery	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Plant protection equipment Irrigation equipment (canal opener, pumps)	Agricultural equipment and machinery	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	Exercises on Basic and Deriva Units	Agricultural equipment and machinery	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Field view of the agricultural tractor, and the agricultural equipment	Agricultural equipment and machinery	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	knowing and watching the transmission devices in the agricultural tractor	Agricultural equipment and machinery	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	knowing and watching the power transmission devices in agricultural tractor	Agricultural equipment and machinery	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Watching the engine parts	Agricultural equipment and machinery	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	Semester 1st exam				
7	**3**	knowing and watching the tillage equi[ment and calculating	Agricultural equipment and machinery	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	knowing and watching the cultivating equipment	Agricultural equipment and machinery	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	knowing and watching the sowing and planting equipment	Agricultural equipment and machinery	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	knowing and watching the fertilizing equipment	Agricultural equipment and machinery	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11	**3**	knowing and watching the irrigation equipment,	Agricultural equipment and machinery	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	Semester 2nd exam				
13	**3**	Identify, view and calculate prevention mechanisms.	Agricultural equipment and machinery	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Plant protection equipment Irrigation equipment (canal opener, pumps)	Agricultural equipment and machinery	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation
Daily exams with discussion questions within the lecture The degree of participation in questions related to the academic subject

12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	1. Tractors and Orchard mechanization equipment (prepared by Dr. Abdul Rahman Ayoub Al-Sabbagh) 2.Al-Tahan, Yassin Hashim, and Mohammed Jassim Al-Naama (2000) agricultural machinery and machinery, House of books for printing and publishing, University of Mosul, Ministry of higher education and scientific research Iraq
Main References (Sources)	Agricultural tractors and plant protection equipment (prepared by Lutfi Hussein Mohammed Ali)
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic journal
Electronic References, Websites	

Course Description Form Principles of Statistics

1. Course Name:
Principles of Statistics
2. Course Code:
PRIS213
3. Semester / Year:
Second Semester/ 2024-2025
4. Description Preparation Date:
15/01/2025
5. Available Attendance Forms:
Full time (theoretical lecture and practical lecture) weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units
7. Course administrator's name (mention all, if more than one name)
Name: Asst. Prof. Ahmed Sulaiman Abdullah Email: ahmed_alogaidi_eng@uodiyala.edu.iq
8. Course Objective

Course Objectives	1. Identify the nature of data and statistical symbols. 2. Methods of tabulating raw data and creating frequency distribution tables 3. Testing hypotheses and making decisions based on statistical hypotheses 4. Correlation and regression in the obtained data.

9. Teaching and Learning Strategies	
Strategy	In-person lectures for 15 weeks, including two monthly exams and daily exams.
10. Course Structure	

The theoretical part					
Week	**Hours**	**Required Learning Outcome**	**Unite or Subject Name**	**Learning Method**	**Evaluation Method**
1	2	A historical overview of statistics and Definition of statistics.	Principles of Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
2	2	Statistical symbols	Principles of Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
3	2	Display and summarize data	Principles of Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
4	2	Frequency distribution tables	Principles of Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
5	2	Positioning metrics	Principles of Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
6	2	Measures of dispersion	Principles of Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
7	2	Principles of probability Combinations and permutations	Principles of Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
8	2	Probability distributions Binomial distribution	Principles of Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
9	2	Normal distribution	Principles of Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
10	2	Hypothesis testing Statistical errors	Principles of Statistics	Dialogue & discussion Brainstorming	Daily, monthly and

					final exams and daily reports
11	2	Z- test	Principles of Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
12	2	t- distribution Hypothesis testing- t- distribution	Principles of Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
13	2	f distribution - Hypothesis testing-f	Principles of Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
14	2	Chi-square test	Principles of Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
15	2	Simple linear correlation and simple linear regression	Principles of Statistics	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports

Practical part					
Week	**Hours**	**Required Learning Outcome**	**Unite or Subject Name**	**Learning Method**	**Evaluation Method**
1	3	Definitions of statistical terms	Principles of Statistics	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
2	3	Examples of statistical symbols	Principles of Statistics	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
3	3	Practical examples of types of graphical displays	Principles of Statistics	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
4	3	Examples of frequency distribution tables	Principles of Statistics	Observation Dialogue & discussion	Daily, monthly and final exams and daily

					reports
5	3	Examples of concentration metrics	Principles of Statistics	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
6	3	Examples of measures of dispersion	Principles of Statistics	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
7	3	Examples of permutations and combinations	Principles of Statistics	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
8	3	Examples of probability distributions and binomial distributions	Principles of Statistics	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
9	3	Examples of normal distribution and calculating areas under the normal curve	Principles of Statistics	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
10	3	Examples of hypothesis testing	Principles of Statistics	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
11	3	Z –test	Principles of Statistics	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
12	3	Examples of uses of the t- test to test statistical hypotheses	Principles of Statistics	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
13	3	Examples of the uses of the f- test in testing statistical hypotheses	Principles of Statistics	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
14	3	Examples of the uses of the chi-square test in testing statistical	Principles of Statistics	Observation Dialogue & discussion	Daily, monthly and final exams and daily

		hypotheses			reports
15	3	Examples of simple linear correlation and simple linear regression	Principles of Statistics	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports

11. Course Evaluation

Exams
Daily exams and discussion questions within the lecture
The degree of participation in questions related to the academic subject

12. Learning and Teaching Resources

Required Textbook (curricular books, if any)	- Al-Rawi, Khashi Mahmoud, 1985. Introduction to Statistics,University of Baghdad, College of Agriculture - Steel, R. D. and J. H. Torrie , 1980. Principles and procedures of statistics.
Mean references (sources)	Al-Rawi, Khashi Mahmoud, 1985. Introduction to Statistics,University of Baghdad, College of Agriculture
Recommended books and references (scientific journals, reports…)	Iraqi academic scientific journals
Electronic references, Websites	

Course Description Form Soil, water and plant analysis

1. Course Name:
Soil, water and plant analysis
2. Course Code:
SPWA21
3. Semester / Year:
Second Semester/ 2024-2025
4. Description Preparation Date:
15/01/2025
5. Available Attendance Forms:
Full time (theoretical lecture and practical lecture) weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units
7. Course administrator's name (mention all, if more than one name)
Name: Alaa Hasan Fahmi Email: alaahfahmi@uodiyala.edu.iq Abtehal Mohammed Abed
8. Course Objective

Course Objectives	1- The student knows how to take soil, water and plant samples 2- The student is introduced to basic analysis methods 3- Review some basic concepts in the field of quantitative analysis 4- Introducing the student to methods of instrumental analysis of elements 5- The use of X-rays for mineral and quantitative analysis

9. Teaching and Learning Strategies

Strategy	In-person lectures for 15 weeks, including two monthly exams and daily exams.

10. Course Structure
The theoretical part

Week	Hours	Required Learning Outcome	Unite or Subject Name	Learning Method	Evaluation Method
1	2	Introduction to so water and plant anal	Soil, water and plant analysis	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
2	2	Sampling of samples	Soil, water and plant analysis	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
3	2	Review some basic concepts in the field of quantitative analysis	Soil, water and plant analysis	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
4	2	Process the results and verify the accuracy of the analyzes	Soil, water and plant analysis	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
5	2	Gravimetric analysis methods	Soil, water and plant analysis	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
6	2	Semester First exam	Soil, water and plant analysis	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
7	2	Volumetric analysis methods	Soil, water and plant analysis	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
8	2	Electrolysis methods	Soil, water and plant analysis	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
9	2	Spectrometry-analysis methods	Soil, water and plant analysis	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
10	2	Analysis methods ba on atomic absorpti spectrometry	Soil, water and plant analysis	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
11	2	Analysis methods based on atomic emission spectrometry	Soil, water and plant analysis	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
12	2	The use of X-rays in field of metallurgi and quantitative anal	Soil, water and plant analysis	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
13	2	The use of radioact and stable isotopes the field of quantita analysis of elemer	Soil, water and plant analysis	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
14	2	Second Semester exam	Soil, water and plant analysis	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports

Practical part

Week	Hours	Required Learning Outcome	Unite or Subject Name	Learning Method	Evaluation Method
1	3	sampling soil	Soil, water and	Observation	Daily, monthly and final

		samples and preparing them for analysis	plant analysis	Dialogue & discussion	exams and daily reports
2	3	sampling Plant and water samples	Soil, water and plant analysis	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
3	3	Calculation and preparation of standard solutions	Soil, water and plant analysis	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
4	3	Preparation of extracts and measurement of pH and EC	Soil, water and plant analysis	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
5	3	Determination of Exchange cation capacity of CEC	Soil, water and plant analysis	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
6	3	Estimation of organic carbon	Soil, water and plant analysis	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
7	3	Determination of available nitrogen and available potassium	Soil, water and plant analysis	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
8	3	Determination of available phosphorus	Soil, water and plant analysis	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
9	3	Estimation of the total soil content of elements	Soil, water and plant analysis	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
10	3	Metal analysis by X-ray	Soil, water and plant analysis	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
11	3	Determination of redox potential of soil	Soil, water and plant analysis	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
12	3	Digestion of plant samples and determination of their content of elements	Soil, water and plant analysis	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
13	3	Digestion of	Soil, water and	Observation	Daily, monthly and final

		plant samples and determination of their content of elements	plant analysis	Dialogue & discussion	exams and daily reports
14	3		Soil, water and plant analysis	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports

11. Course Evaluation

Exams
Daily exams and discussion questions within the lecture
The degree of participation in questions related to the academic subject

12. Learning and Teaching Resources

Required Textbook (curricular books, if any)	
Mean references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic references, Websites	

Course Description Form of Plant physiology

1. Course Name:	
Plant Physiology	
2. Course Code:	
PLAP215	
3. Semester / Year:	
Second semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 15 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Prof.Dr. Hassan Hadi Mustafa Email : **hassanalalawy@uodiyala.edu.iq**	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	1. Study of the plant cell, its functions and parts 2. Studdy of the types of solutions 3. Introduce the student to the physiological prossess that the plant performs during its life cycle.
9. Teaching and Learning Strategies	
Strategy	In-person lectures for 15 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure					
Theoretical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject**	**Learning Method**	**Evaluation Method**
1	**2**	True solution, colloidal systems and suspensions	Plant Physiology	**Lecture with explanation and presentation**	Daily, monthly and final exams and daily reports
2	**2**	Diffusion and permeability between cells	Plant Physiology	**Lecture with explanation and presentation**	Daily, monthly and final exams and daily reports
3	**2**	Water potential and how to absorb water	Plant Physiology	**Lecture with explanation and presentation**	Daily, monthly and final exams and daily reports
4	**2**	Water absorption and factors affecting it	Plant Physiology	**Lecture with explanation and presentation**	Daily, monthly and final exams and daily reports
5	**2**	The process of transpiration and the factors affecting it	Plant Physiology	**Lecture with explanation and presentation**	Daily, monthly and final exams and daily reports
6	**2**	The imbibition process and the factors affecting it	Plant Physiology	**Lecture with explanation and presentation**	Daily, monthly and final exams and daily reports
7	**2**	Ascending sap and descending sap	Plant Physiology	**Lecture with explanation and presentation**	Daily, monthly and final exams and daily reports
8	**2**	Carbon assimilation process	Plant Physiology	**Lecture with explanation and presentation**	Daily, monthly and final exams and daily reports
9	**2**	Difference between C3 and C4 and succulent plant	Plant Physiology	**Lecture with explanation and presentation**	Daily, monthly and final exams and daily reports
10	**2**	The respiration process in plants	Plant Physiology	**Lecture with explanation and presentation**	Daily, monthly and final exams and daily reports
11	**2**	Plant growth, dormancy, squaring and artificial squaring	Plant Physiology	**Lecture with explanation and presentation**	Daily, monthly and final exams and daily reports
12	**2**	Growth regulators	Plant Physiology	**Lecture with explanation and presentation**	Daily, monthly and final exams and daily reports
13	**2**	Auxins, gibberellins, cytokinins,ethylene, abscisic acid	Plant Physiology	**Lecture with explanation and presentation**	Daily, monthly and final exams and daily reports
14	**2**	Photocompatibility	Plant Physiology	**Lecture with explanation and presentation**	Daily, monthly and final exams and daily reports
15	**2**	Long day and short day plants	Plant Physiology	**Lecture with explanation and presentation**	Daily, monthly and final exams and daily reports
Practical part					

Week	Hours	Required learning outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	**3**	Preparation standard and molar solution	Plant Physiology	**Lecture with practical experience describing the case**	Daily, monthly and final exams and daily reports
2	**3**	Prepare percentage solution	Plant Physiology	**Lecture with practical experience describing the case**	Daily, monthly and final exams and daily reports
3	**3**	Experiment on diffusion	Plant Physiology	**Lecture with practical experience describing the case**	Daily, monthly and final exams and daily reports
4	**3**	Preparation of an artificial membrane	Plant Physiology	**Lecture with practical experience describing the case**	Daily, monthly and final exams and daily reports
5	**3**	Preparation of hydrophilic colloidal system	Plant Physiology	**Lecture with practical experience describing the case**	Daily, monthly and final exams and daily reports
6	**3**	Preparation of hydrophobic colloidal system	Plant Physiology	**Lecture with practical experience describing the case**	Daily, monthly and final exams and daily reports
7	**3**	Precipitation of hydrophilic colloidal system	Plant Physiology	**Lecture with practical experience describing the case**	Daily, monthly and final exams and daily reports
8	**3**	An experience about permeability	Plant Physiology	**Lecture with practical experience describing the case**	Daily, monthly and final exams and daily reports
9	**3**	Measuring transpiration speed	Plant Physiology	**Lecture with practical experience describing the case**	Daily, monthly and final exams and daily reports
10	**3**	Effect of osmotic potential on imbibition	Plant Physiology	**Lecture with practical experience describing the case**	Daily, monthly and final exams and daily reports
11	**3**	Estimation of osmotic potential by plasmolysis method	Plant Physiology	**Lecture with practical experience describing the case**	Daily, monthly and final exams and daily reports
12	**3**	Estimation of water potential by the failing drop method	Plant Physiology	**Lecture with practical experience describing the case**	Daily, monthly and final exams and daily reports
13	**3**	Conduct an experiment on plasmolysis	Plant Physiology	**Lecture with practical experience describing the case**	Daily, monthly and final exams and daily reports
14	**3**	Conduct an experiment on imbibition	Plant Physiology	**Lecture with practical experience describing the case**	Daily, monthly and final exams and daily reports
15	**3**	Experiment on cohesion and adhesion	Plant Physiology	**Lecture with practical experience describing the case**	Daily, monthly and final exams and daily reports

11. Course Evaluation	
Examination Monthly & daily exams with discussion questions inside the lecture. The degree of participation in the questions related to the subject.	
12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	1.Abdel-Athem, Mohammed Khadhum and Al-Younis, Moayead Ahmed. 1991. Principles of plant physiology. Baghdad University. Dar Alhekma. Baghdad.
Main References (Sources)	2- Taiz , L. and E. Zeiger .2010 . Plant Physiology. 5th (ed.).
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic journal
Electronic References, Websites	

Course Description Form Lands Levelling and Grading

1. Course Name:
Leveling and Grading
2. Course Code:
LALG216
3. Semester / Year:
Second Semester/ 2024-2025
4. Description Preparation Date:
15/01/2025
5. Available Attendance Forms:
Full time (theoretical lecture and practical lecture) weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units
7. Course administrator's name (mention all, if more than one name)
Name: Aidel Kadum Jassim Al-shamary Email: adelkadumalshamary@uodiyala.edu.iq

8. Course Objective	
Course Objectives	Getting to know the concept of leveling, the scientific foundations, the equipment used for the leveling process and contour lines, how to calculate the volumes of earthworks resulting from leveling and adjustment operations, and the use of modern technologies in leveling and adjustment work

9. Teaching and Learning Strategies	
Strategy	In-person lectures for 15 weeks, including two monthly exams and daily exams.

10. Course Structure

The theoretical part					
Week	**Hours**	**Required Learning Outcome**	**Unite or Subject Name**	**Learning Method**	**Evaluation Method**
1	2	Definition of settlement and basic terms used	Levelling and Grading	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
2	2	Devices used in the settlement and adjustment process	Levelling and Grading	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
3	2	Methods of calculating levels	Levelling and Grading	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
4	2	Semester first exam	Levelling and Grading	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
5	2	Longitudinal sections	Levelling and Grading	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
6	2	Sequential settlement	Levelling and Grading	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
7	2	Cross sections	Levelling and Grading	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
8	2	Sources of error in settlement and mutual settlement work	Levelling and Grading	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
9	2	Contour lines, the contour interval, their specifications, and the direct method for preparing contour lines	Levelling and Grading	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
10	2	The indirect method of preparing contour lines	Levelling and Grading	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
11	2	Volumes, their shapes, and methods of calculating volumes from longitudinal and cross-sections	Levelling and Grading	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
12	2	Calculating volumes from the levels of grid	Levelling and Grading	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports

		settlement points			
13	2	Calculating volumes from contour lines	Levelling and Grading	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
14	2	Laser leveling	Levelling and Grading	Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required Learning Outcome**	**Unite or Subject Name**	**Learning Method**	**Evaluation Method**
1	3	Identify the leveling devices	Levelling and Grading	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
2	3	Practical use of the leveling device	Levelling and Grading	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
3	3	A practical application for calculating	Levelling and Grading	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
4	3	a point level using a leveling device	Levelling and Grading	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
5	3	Extracting several levels of	Levelling and Grading	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
6	3	sequential settlement points	Levelling and Grading	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
7	3	How to use the leveling device to	Levelling and Grading	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
8	3	calculate excavation and backfilling for longitudinal sections	Levelling and Grading	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
9	3	How to use the leveling device to	Levelling and Grading	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
10	3	calculate	Levelling and Grading	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
11	3	Excavation and backfilling of cross	Levelling and Grading	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
12	3	sections	Levelling and Grading	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports

13	3	Exercises and problems for	Levelling and Grading	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports
14	3	preparing settlement tables	Levelling and Grading	Observation Dialogue & discussion	Daily, monthly and final exams and daily reports

11. Course Evaluation

Exams
Daily exams and discussion questions within the lecture
The degree of participation in questions related to the academic subject

12. Learning and Teaching Resources

Required Textbook (curricular books, if any)	1- Riyad Saleh Al-Khafaf. Foundations of plane space and topography. 2000
Mean references (sources)	Soil Survey Laboratory method manual, 2004. Soil survey Investigation report. No. 42, version 4.0, USDA.
Recommended books and references (scientific journals, reports…)	Iraqi academic Journal
Electronic references, Websites	Soil Science Society of America Library Genesis

Course Description Form of Natural Resource Economics

1. Course Name:	
Natural Resource Economics	
2. Course Code:	
ECNS303	
3. Semester / Year:	
Second semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
(2 theoretical hours per week) for 14 weeks, number of units: 3 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Dr. Abbas Abd Ahmed Email : **abbasahmed@uodiyala.edu.iq**	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	• Teaching students the most important foundations of exploiting natural resources and sustaining their use. • Students' ability to analyze natural resources and determine their available uses and how to manage them. • The student learns how to employ natural resources and exploit them in the best way that achieves benefit from them. • Identifying the problems facing agricultural and non-agricultural land resources and how to address them. • Students learn how to manage water resources and their sources and benefit from them in the best way.
9. Teaching and Learning Strategies	

Strategy	14 weeks of face-to-face lectures, including monthly exams, daily exams and scientific reports.

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	Introduction: The importance of natural resources and their definition	**Natural Resource Economics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Separation of economic and non-economic natural resources	**Natural Resource Economics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Land resources concepts	**Natural Resource Economics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Basic problems in land resource economics	**Natural Resource Economics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Demand for and uses of land resources	**Natural Resource Economics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	First month exam			
7	**2**	Land resource intensity	**Natural Resource Economics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Show land resources and how to increase them	**Natural Resource Economics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Land resource rent	**Natural Resource Economics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Agricultural land rental	**Natural Resource Economics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	Land resources in Iraq	**Natural Resource Economics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	Second month exam			
13	**2**	Water Resources	**Natural Resource Economics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

14	**2**	Agricultural land calendar	**Natural Resource Economics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

10. Course Evaluation
Daily and monthly exams, reports and student effectiveness during the lecture.

11. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	1- Dr. Hassoun Mohammed Ali Al-Haddad, Natural Resources Economics, University of Basra, 1990. 2- Dr. Hashim Alwan Hussein Al-Samarrai, Abdullah Mohammed Jassim Al-Mashhadani, Natural Resources Economics, University of Baghdad, 1992.
Main References (Sources)	1- Mustafa, Mohamed Madhat. (2001). Water Resources Economics. 1st ed., Faculty of Agriculture - Menoufia University - Egypt.
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic journal
Electronic References, Websites	

Course Description Form of Soil Physics

1. Course Name:	
Soil Physics	
2. Course Code:	
SOIP304	
3. Semester / Year:	
First semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Phd. Ibraheem Ahmad Hdraes Email: ibraheeahmad@uodiyala.edu.iq	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	1 -The student's knowledge of methods for analyzing soil particles 2 -Knowing the physical characteristics of the soil and the extent of their impact on plant production 3- Methods of water transport between soil particles
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	Introduction and definition of soil science, the location of soil physics in it, and some related relationships	**Soil Physics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Soil texture and particle size distribution: methods for finding particle sizes, texture triangle, Stokes' law	**Soil Physics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	The specific area of soil and methods for determining it physically and chemically	**Soil Physics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Soil construction: its definition, importance, and how to study it	**Soil Physics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Methods of studying soil construction and evidence of soil construction	**Soil Physics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Stability of soil aggregates, methods of studying them, and factors affecting the formation of aggregates	**Soil Physics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	Soil water and general water properties	**Soil Physics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Properties of water related to porous media (soil)	**Soil Physics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Soil water energy and methods of expressing and measuring it	**Soil Physics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Water flow in saturated soil	**Soil Physics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

11	**2**	Water flow in unsaturated soils	**Soil Physics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	Water flow in the soil: methods for measuring it and equations	**Soil Physics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	Soil air, air capacity and gas exchange in soil	**Soil Physics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Soil temperature, soil temperature, and heat flow in the soil	**Soil Physics**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	The effect of different soil textures on water retention and methods for expressing and measuring soil water content	**Soil Physics**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Analysis of soil particle sizes using sieves, hydrometers and pipettes	**Soil Physics**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Analysis of soil particle sizes using sieves, hydrometers and pipettes	**Soil Physics**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Measuring the apparent and actual soil density and calculating the total porosity	**Soil Physics**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Measuring the apparent and actual soil density and calculating the total porosity	**Soil Physics**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Measurement of saturated water conductivity in homogeneous soil columns	**Soil Physics**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
7	**3**	Measuring water flow in horizontal and vertical soil columns	**Soil Physics**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Measuring water flow in horizontal and vertical soil columns	**Soil Physics**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Measurement of saturated water conductivity in	**Soil Physics**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

		homogeneous soil columns			
10	**3**	Measuring water flow in horizontal and vertical soil columns	**Soil Physics**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Measurement of the specific area of soil material	**Soil Physics**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Methods for measuring moisture tension and moisture contents in soil	**Soil Physics**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
13	**3**	Measuring soil temperature	**Soil Physics**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Measure soil aeration	**Soil Physics**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation

Examination Monthly & daily exams with discussion questions inside the lecture.
The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources

Required Textbooks (Curricular Books, If Any)	1- Basics of soil physics. Written by Hillel, Daniel. Translated by Dr. Mahdi Ibrahim Odeh. 1990. 2- Fundamental of soil physics. D. Hillel. 1980.
Main References (Sources)	1- Principles of Soil Physics. Lal ana Shukla. 2004. USA. 2- Environment of Soil Physics. D. Hillel. 2004. USA.
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic scientific journals
Electronic References, Websites	

Course Description Form of Organic matter in the soil

1. Course Name:	
Organic matter in the soil	
2. Course Code:	
ORMS305	
3. Semester / Year:	
first semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Basem R.Bader Email: basemrbader@uodiyala.edu.iq	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	Studying the concept of defining organic matter, distinguishing between types of soil according to their organic content, identifying the transformations of organic matter, the relationship between the organic and mineral complex, the nature of the carbon groups and their implications for the agricultural and environmental value of the soil.
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	Defining organic matter and determining its origin and nature in the soil	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Distinguish between types of soils according to their organic content and its relationship to climatic and environmental conditions	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	. The concept of soil environment, biological activity, and the food web in it	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Processes of transformation of organic matter in soil, such as decomposition and mineralization	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Classification of organic matter in the soil according to the speed of its decomposition, the degree of its dissolution, and the ratio of carbon to nitrogen	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Factors affecting the formation of humus in soil	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	Soil environment, nature of the main components of organic matter and microbial mass	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Types of humus according to the type of vegetation cover, the degree of its solubility with alkaline	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

		solvents, and its saturation .with basic cations			
9	**2**	Physical and chemical properties of humic acids and humene	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	The organometallic complex and the relationship between active groups	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	The ratio of fulvic acid to humic acid in soil composition	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	The nature of carbon categories and their implications for the agricultural value of soils	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	How to preserve the organic stock in the soil and manage it sustainably	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	The necessity of fertilizing with animal waste and compost to preserve agricultural soil	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
15	**2**	Sustainable agriculture and its relationship with the environment and matter	Organic matter in the soil	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	Examining and distinguishing the organic layers in a cross-section of cultivated and uncultivated soils and collecting soil samples	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Prepare samples by sifting and grinding, then estimate soil moisture and calculate the dry weight at 105°C	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Estimating the percentage of organic matter in the soil by dry oxidation at 450°C	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

4	**3**	Measurement of organic carbon in soil using the wet oxidation method (Walkley Black)	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Extracting organic matter that is easy to decompose with cold and hot water	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Physical fractionation of organic matter in soil according to its bulk density with sodium iodide solution	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
7	**3**	Physical fractionation of organic matter in the soil according to its size by separating it using acoustic vibrations	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Chemical fractionation of organic matter in soil with alkaline and acidic solvents	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Qualitative analysis of humic substances through the identification of active aggregates by spectrophotometry	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Extracting fatty substances from the soil with chloroform using a Soxhlet device	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Testing the degree of solubility in water (wettability) of the extracted fatty organic matter	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Extraction of proteins and amino acids in soil using chromatography	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
13	**3**	Choose the speed of water permeation and soil erosion with different levels of organic content	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Applications in how to calculate the percentage of organic matter in the soil	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
15	**3**	Estimation of the percentage of humic acid	Organic matter in the soil	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11. Course Evaluation					

Examination Monthly & daily exams with discussion questions inside the lecture. The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	1-Soil Chemistry, Ahmed Abdel Hadi Al-Rawi, Ahmed Haider Al-Zubaidi, and Nazima Saleh Qaddouri, 1991, Ministry of Higher Education and Scientific Research 2-Tseel and Nelson, Soil Fertility and Fertilizers, translated by Nizar Yahya Nazhat, 1991, Ministry of Higher Education And scientific research
Main References (Sources)	Magdoff, F. and R.R.Weil.2004. Soil organic matter in sustainable agriculture. CRC
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic journal
Electronic References, Websites	**www.noor-book.com.** **www.youtube.com.**

Course Description Form of Irrigation

1. Course Name:	
Irrigation	
2. Course Code:	
IRRG306	
3. Semester / Year:	
First semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Prof.dr.Mohammed Ali Abood Email: Mohammed.Ali.Abood@uodiyala.edu.iq	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	1- Irrigation science examines the sources of irrigation water a methods of controlling it, exploiting it, and delivering it to agricultural fields. 2- It includes planning, designing and implementing irrigation facilities 3- Transferring and distributing irrigation water and studying ways to add it 4- Calculating plant water needs by studying the relationship c water, soil and climate 5- Studying problems related to adding water, such as problem of salinization, drainage, and soil reclamation 6- Calculating the cost of maintaining irrigation and drainage projects as part of production costs

9. Teaching and Learning Strategies	
Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	Irrigation concept, irrigation and its spread	**Irrigation**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Irrigation water sources	**Irrigation**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Irrigation water quality	**Irrigation**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Physical soil properties associated with irrigation	**Irrigation**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Water-soil relationship, soil moisture constants, water movement in soil, water infiltration	**Irrigation**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Water measurement	**Irrigation**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	Plant water consumptive use	**Irrigation**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Water requirements and irrigation scheduling	**Irrigation**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Irrigation water transportation and distribution	**Irrigation**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Water movement in open pipes and channels	**Irrigation**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	Design of earthen and lined irrigation channels	**Irrigation**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	Irrigation adequacy, efficiency and consistency	**Irrigation**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

13	**2**	Traditional irrigation methods and modern irrigation methods	**Irrigation**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Scientific trip	**Irrigation**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	Survey the land and draw a contour map.	**Irrigation**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Level measurement and calculation of excavation and backfilling quantity for irrigation canal	**Irrigation**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	soil moisture measurement	**Irrigation**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Water measurement by different methods. Buoy, weir, manholes, Parshall flume, pump discharge.	**Irrigation**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Water infiltration measurement	**Irrigation**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Applications in water consumption calculation. CropWat program application in ET0 calculation	**Irrigation**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
7	**3**	crop factor	**Irrigation**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Applications in calculating plant water requirements	**Irrigation**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Applications in calculating water quantity and irrigation intervals	**Irrigation**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Applications in calculating the sufficiency, efficiency and consistency of irrigation water distribution	**Irrigation**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Channel Design: Earthen Irrigation Channel	**Irrigation**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	lined irrigation canal	**Irrigation**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

13	**3**	Pump capacity calculation	**Irrigation**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Scientific trip	**Irrigation**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation
Examination Monthly & daily exams with discussion questions inside the lecture. The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	Irrigation, its basics and applications, written by Dr. Nabil Ibrahim Al-Tayef and Dr. Issam Khudair Hamza Al-Hadithi, 1988, Ministry of Higher Education and Scientific Research - University of Baghdad Irrigation and drainage, written by Dr. Laith Khalil Ismail, 2000, Ministry of Higher Education and Scientific Research - University of Mosul Design and Management of Field Irrigation Systems, written by Dr. Samir Muhammad Ismail, 2002, Faculty of Agriculture - Alexandria University Modern irrigation technologies and other topics in the water issue, written by Dr. Issam Khudair Al-Hadithi, Dr. Ahmed Madloul Al-Kubaisi, and Dr. Yas Khudair Hamza Al-Hadithi, 2010, Ministry of Higher Education and Scientific Research - Anbar University
Main References (Sources)	Irrigation, its basics and applications, written by Dr. Nabil Ibrahim Al-Tayef and Dr. Issam Khudair Hamza Al-Hadithi, 1988, Ministry of Higher Education and Scientific Research - University of Baghdad
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic scientific journals
Electronic References, Websites	

Course Description Form of Soil and water pollution

1. Course Name:	
Soil and water pollution	
2. Course Code:	
SOWP307	
3. Semester / Year:	
first semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Alaa Hasan Fahmi Email: alaahfahmi@uodiyala.edu.iq Abtehal Mohammed Abed	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	1-Introducing the student to the concept of soil and water pollution 2 -Introducing the ecosystem and its types , 3 -Definition of pollution - its causes and sources 4 -Identify the cycles of elements and their impact on environmental pollution, then identify water pollution, including surface and groundwater pollution 5 -Identify bacterial and virus water pollution, industrial water pollutants and pesticide behavior in the water environment , 6- Identify soil pollution such as biological soil pollution, soil pollution with pesticides, and biodegradation of pesticides in the soil

9. Teaching and Learning Strategies	
Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	To explain to the student the ecosystem and the definition of pollution, its causes and sources	Soil and water pollution	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	To familiarize the student with the cycles of elements (nitrogen, phosphorus, oxygen, carbon, and sulfur)	Soil and water pollution	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	The student should recognize surface, groundwater and Seawater pollution.	Soil and water pollution	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	The student should recognize bacterial and viruses water contamination and worms.	Soil and water pollution	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	The student should be acquainted with the industrial pollutants of water, battery, and fertilizer factories	Soil and water pollution	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Semester First exam	Soil and water pollution	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	The student should be familiar with the behavior of pesticides in the water environment. The behavior of pesticides on .water organisms	Soil and water pollution	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	To familiarize the student with biological pollution, sewage waste , fertilization effect on water pollution	Soil and water pollution	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

9	**2**	The student should know the table use of water according to its properties for different uses	Soil and water pollution	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Biological soil pollution: Pollution by urban waste, effluents, solid waste, waste Hospitals (Satisfactory)	Soil and water pollution	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	Pesticide contamination of soil: pesticide behavior in different types of soil, biodegradation of pesticides in soil and factors affecting the rate of breakdown, physical factors that control inhibition of pesticide action	Soil and water pollution	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	Soil contamination with heavy metals: sources of heavy metals, toxicity of heavy metals, soil and water pollution standards: - concentration of heavy metals, pollution index, pollution factor, ground accumulation index, pollution load index, enrichment factor	Soil and water pollution	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	To familiarize the student with global warming, Ozone layer, heat pollution, radioactive pollution	Soil and water pollution	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Semester second exam	Soil and water pollution	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

Practical part

Week	Hours	Required learning outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	**3**	Identify the equipment and tools used in measuring pollution	Soil and water pollution	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Environmental pollution, sources of pollution, factors affecting water	Soil and water pollution	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

		quality, water and soil chemical properties.			
3	**3**	Water pollutants, pollution with chloride salts Nacl, measurement of soil salinity and water	Soil and water pollution	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Acidity and alkalinity of water, methods of measuring total acidity in water and soil	Soil and water pollution	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Alkalinity in water and soil, alkalinity measurement methods of CaCO3	Soil and water pollution	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Measurement of free carbon dioxide in water (dissolved), measurement of chlorine in water	Soil and water pollution	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
7	**3**	Measurement of hardness in water, total hardness, calcium hardness Magnesium hardness in water	Soil and water pollution	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Dissolved oxygen in water	Soil and water pollution	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Measurement of bio oxygen requirements BOD	Soil and water pollution	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Organic matter dissolved in water	Soil and water pollution	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Microbial contamination of soil and water	Soil and water pollution	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Methods for measuring pesticide residues in soil, water and plant The effect of pesticides on soil microorganisms, measurement methods and recognition of devices	Soil and water pollution	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
13	**3**	The effect of some pesticides on the revival of displaced soil, especially economic soil	Soil and water pollution	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Measurement of the concentration of certain toxic elements and	Soil and water pollution	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

		methods of assessing their hazards			

11. Course Evaluation
Examination Monthly & daily exams with discussion questions inside the lecture. The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	Environmental pollution – 2013. Faleh Hasan Ahmed and Baha Abd Aljabar- University of Baghdad
Main References (Sources)	Environmental pollution – 2013. Faleh Hasan Ahmed and Baha Abd Aljabar- University of Baghdad
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic Journal
Electronic References, Websites	Soil Science Society of America Library Genesis

Course Description Form of Soil Chemistry

1. Course Name:	
Soil chemistry	
2. Course Code:	
SOIC308	
3. Semester / Year:	
First semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Prof. Dr. Raad Abdel-Kareem Himdan Email : raadaltamimi@uodiyala.edu.iq	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	1 Soil chemistry deals with chemical and physicochemical properties of soil (mineral and organic colloids and electrochemical properties). 2 Concept of CEC and adsorption by soil, affecting factors and models describing them. 3 Soil solution and factors affecting. 4 Soil pH and acidity. 5 Nutrient minerals fixation and retention.
9. Teaching and Learning Strategies	
Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	2	Introduction: concept of soil chemistry and its relation with soil properties.	Soil chemistry	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
2	2	Structure of mineral and chemical soil colloids	Soil chemistry	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
3	2	Adsorption concept	Soil chemistry	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
4	2	Models characterizing adsorption	Soil chemistry	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
5	2	CEC and models characterizing it	Soil chemistry	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
6	2	1st exam			
7	2	Factors controlling CEC	Soil chemistry	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
8	2	Relative displacement capacity	Soil chemistry	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
9	2	Anion and cation exchange and its importance in soil	Soil chemistry	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
10	2	Soil solution	Soil chemistry	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
11	2	Oxidation-Reduction in soil	Soil chemistry	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
12	2	2nd exam			
13	2	Fixation and retention of nutrient elements	Soil chemistry	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
14	2	Soil-pH and acidity	Soil chemistry	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports

Practical part

Week	Hours	Required learning outcomes	Unit or Subject Name	Learning Method	Evaluation Method

1	**3**	Soil sampling	**Soil chemistry**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Soil solution separation	**Soil chemistry**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	EC and pH determination	**Soil chemistry**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Surface area determination	**Soil chemistry**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Calculation of ionic strength	**Soil chemistry**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	1st Exam			
7	**3**	Redox potential determination	**Soil chemistry**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Determination exchangeable ions: Na & K	**Soil chemistry**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Determination exchangeable ions: Ca & Mg	**Soil chemistry**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	CEC determination	**Soil chemistry**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	O.M determination	**Soil chemistry**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	2nd Exam			
13	**3**	Determination of Gypsum	**Soil chemistry**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Buffering capacity determination	**Soil chemistry**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation

Examination Monthly & daily exams with discussion questions inside the lecture.
The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources

Required Textbooks (Curricular Books, If Any)	Al-Rawi, A. A. et. al., 1989. Soil Chemistry. Ministry of Higher Education & Scientific Research, Univ. of Baghdad

Main References (Sources)	
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic journal
Electronic References, Websites	**www.noor-book.com.** **www.youtube.com.**

Course Description Form English Language

1. Course Name:
English Language
2. Course Code:
ENGL303
3. Semester / Year:
First semester/ 2024-2025
4. Description Preparation Date:
15/1/2025
5. Available Attendance Forms:
Full time (theoretical lecture) weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
2 hours (2 hours theoretical per week) for 14 weeks, number of units 2 units
7. Course Administrator's Name (Mention All, If More Than One Name)
Name: Assistant lecturer Sohaib Saeed Hameed **Email: sohaibsaeedhameed@gmail.com**
8. Course Objectives

Course Objectives: Graduating students who are able to:	1. Facilitating students in smoothly acquiring knowledge, concepts, and attitudes in English language pronunciation. 2. Facilitating the comprehension of concepts. 3. Showcasing the diverse talents of students. 4. Mastering the English language.

9. Teaching and Learning Strategies	
Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	**unit 1 / Auxiliary verbs do- be- have**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	**Negatives and short answers**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	**Unit 2 / present simple**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	**present continuous**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	**Unit 3 / past simple**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	**Past continuous**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	**Discussion**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	**Unit 4 / Modal verbs / can – can not**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	**Must – must not / Have to / allowed to**	**English Language**	**Lecture**	Daily, monthly and

				Dialogue & discussion Brainstorming	final exams and daily reports
10	**2**	**Unit 5 / The future**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	**present continuous**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12		**Unit 6 / Do you like?**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	**Want to do**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	**Present Perfect**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
15	**2**	**Grammar Revision**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

11. Course Evaluation
Examination Monthly & daily exams with discussion questions inside the lecture. The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	**New Headway Plus " Pre-Intermediate "**

Main References (Sources)	
Recommended Books and References (Scientific Journals, Reports...)	
Electronic References, Websites	

Course Description Form of Remote Sensing

1. Course Name:	
Remote Sensing	
2. Course Code:	
REMS309	
3. Semester / Year:	
Second semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Dr.Ahmed Bahjat Khalaf Email : raaedibrahim@uodiyala.edu.iq Israa Yarab Youssef	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	1 Teaching students the most important foundations, applications and modern programs in remote. sensing techniques to serve them in the agricultural field. 2 The student's ability to use different software to process, interpret and analyze satellite images. 3 The student will learn how to distinguish and compare between different ground targets. 4 Learn about geographic information systems (GIS) and their uses.
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	Introduction: History of remote sensing and objectives	**Remote Sensing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Electromagnetic energy and parts of the electromagnetic spectrum	**Remote Sensing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Electromagnetic energy interactions	**Remote Sensing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Spectral reflectivity and factors affecting it	**Remote Sensing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Aerial photography and its development stages	**Remote Sensing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Semester 1st exam			
7	**2**	Rules for classifying aerial images and their applications	Remote Sensing	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Types and characteristics of platforms and satellites in the world	Remote Sensing	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Sensors: their types and characteristics	Remote Sensing	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Satellite images: their types and characteristics	Remote Sensing	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	Improving satellite images	Remote Sensing	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	Semester 2nd exam			
13	**2**	Applications in remote sensing	Remote Sensing	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	GIS and their uses	Remote Sensing	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	Applications on the interpretation of aerial photographs and the preparation of maps.	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Satellite images and spectral bands	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	How to import and export satellite images using the ERDAS program	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Spectral band merging and spatial enhancement	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Regular and irregular satellite image segments of the areas under study	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Semester 1st exam			
7	**3**	satellite data interpretation: Visual interpretation	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	satellite data interpretation: Automatic interpretation	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	satellite image classification: Unsupervised classification	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	supervised classification	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Using natural indicators, vegetation cover indicator, water, minerals, soil	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Semester 2nd exam			
13	**3**	Applications on satellite images	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Applications on the interpretation of satellite images and the preparation of maps	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation
Examination Monthly & daily exams with discussion questions inside the lecture. The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	1.Al-Mashhadani, Ahmed Saleh and Ahmed Madloul Al-Kubaisi. (2014). Remote Sensing Science. Ministry of Higher Education and Scientific Research. University of Baghdad. College of Agriculture. University House for Printing, Publishing and Translation. 2. Khalaf, Ahmed Bahjat. (2021). Processing, analyzing and interpreting satellite images using the ERDAS IMAGINE program. Central Press. University of Diyala
Main References (Sources)	Al-Daghestani, Nabil Sobhi, (2003 AD), Remote Sensing: Basics and Applications, Dar Al-Manahj, Amman, Jordan.
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic journal
Electronic References, Websites	**www.noor-book.com.** **www.youtube.com.**

Course Description Form of Soil Salinity

1. Course Name:	
Soil Salinity	
2. Course Code:	
SOIS310	
3. Semester / Year:	
Second semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Dr. Hassan Hadi Mustafa Email : **hassanalalawy@uodiyala.edu.iq**	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	Studying the spread of salinity in Iraq and the world and its impact on agricultural production - identifying sources of salts and means of transporting them - classifying and naming salts affected soils - the effect of salinity on plant growth - quality of irrigation water – salinity control and methods of coexistence with it.
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 15 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	Distribution and spread of salinity in Iraq and the world	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Sources of salts components	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Means and mechanisms for transporting salts	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Soil formation conditions of salts affected soils and salt accumulation cycles.	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Factors and conditions responsible for the formation and spread of salt-affected soils	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Chemical and physical properties of salts accumulated in the soil	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	Chemical and physical properties of salts accumulated in the soil	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Phases of salt accumulation in soil, cation exchange capacity in salts affected soils	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Methods of expressing soil salinity	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Classification and nomenclature of soils affected by salts	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	The effect of soil salinity on plant growth	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

12	**2**	Indicators used to determine plant resistance to salinity	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	Methods used to increase plant resistance to salinity	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Irrigation water quality	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
15	**2**	soil salinity controlling and ways to live with it	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

Practical part

Week	Hours	Required learning outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	**3**	collection and preparation soil samples of salts affected soils	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Salinity measurement methods - saturated paste	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Salinity measurement methods - diluted suspension	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Salinity measurement methods - gravimetric method	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Calculating the amount of salts in the soil	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	The effect of the type of salts on the germination of seeds of some plants	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
7	**3**	The effect of the type of salts on the germination of seeds of some plants	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	The effect of the type of salts on the germination of seeds of some plants	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	The effect of the type of salts on the germination of seeds of some plants	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	The effect of salinity on plant growth	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Phenotypic changes in plants due to salinity	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

12	**3**	Evaluation of irrigation water quality	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
13	**3**	Irrigation water classification: USDA system	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Irrigation water classification: FAO system.	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
15	**3**	The relationship between salinity and sodicity	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation

Examination Monthly & daily exams with discussion questions inside the lecture.
The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources

Required Textbooks (Curricular Books, If Any)	A. Al-Zubidi. 1989, Soil Salinity-Theoritical and Practical Fundumentals, Ministry of Higer Education, Iraq.
Main References (Sources)	
Recommended Books and References (Scientific Journals, Reports...)	FAO reports
Electronic References, Websites	Internet

Course Description Form of Soil morphology

1. Course Name:
Soil morphology
2. Course Code:
SOIM311
3. Semester / Year:
first semester/ 2024-2025
4. Description Preparation Date:
15/1/2025
5. Available Attendance Forms:
Full time (theoretical lecture and practical lecture) weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units
7. Course Administrator's Name (Mention All, If More Than One Name)
Name: Basem R.Bader **Email: basemrbader@uodiyala.edu.iq**
8. Course Objectives

Course Objectives: Graduating students who are able to:	• Teaching students about soil morphology, the emergence and development of soils. • The student's ability to distinguish between educational horizons and diagnose them. • For the student to know how to distinguish and compare different soils and how to classify them. • Identifying the types of soil through color and the use of a stained guide
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	Definition of morphology and its position in the system of pedological sciences, the system of ideological sciences, and the engineering system	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Origin and development of soil	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Soil formation factors: climate, soil temperature regimes and soil moisture	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Topographic factor, biology	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Soil formation factors: parent material, time	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Soil formation processes: genetic group	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	Soil formation processes: general group	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	.Soil horizon	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Naming and main prospects	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Diagnostic horizons: superficial	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	Diagnostic horizons: subsurface	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

12	**2**	Soil morphological characteristics	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	Soil morphological characteristics	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Soil micromorphology - characterization - uses and applications	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	Identify the morphological description form and the tools used in morphological description	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Choosing the location of the soil bed and the factors affecting it	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Training in identifying soil textures in the laboratory and field	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Studying the characteristics of soil color and spotting and training on them in the field	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Studying the nature of soil construction and training on it in the field	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Studying the qualities of strength and welding and training on them in the field	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
7	**3**	Study of the internal drainage characteristic and how to measure it in the field	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Studying some other morphological characteristics: root distribution, porosity, salinity, pH, and how to record them in the morphological description document.	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

9	**3**	Studying the property of slope, how to measure it, and its relationship to morphological phenomena in addition to soil depth	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Study of the calcareous property and the limits of horizons	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Practice conducting a morphological description of a complete soil bed and recording the characteristics in the morphological description document	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Morphological characteristics of the world's soils	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
13	**3**	Field observations of soil types in Iraq	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Preparing a report with a morphological description document	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation

Examination Monthly & daily exams with discussion questions inside the lecture.
The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources

Required Textbooks (Curricular Books, If Any)	1- Soil Survey Staff, 2003, Soil Survey Manual, USDA 2- FAO, 1990, Guide line for soil profile description, FAO
Main References (Sources)	**3-** Dr. Walid Khaled Al-Akidi and Dr. Shaker Mahmoud Al-Issawi. 1989. Soil morphology. ,, Ministry of Higher Education and Scientific Research. University of Baghdad
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic journal
Electronic References, Websites	**www.noor-book.com.** **www.youtube.com.**

Course Description Form of Drainage

1. Course Name:	
Drainage	
2. Course Code:	
REMS309	
3. Semester / Year:	
Second semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Phd. Ibraheem Ahmad Hdraes Email: ibraheeahmad@uodiyala.edu.iq	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	1 -Drilling examines the sources of irrigation water and methods of controlling it in agricultural fields 2 -It includes planning, designing and implementing puncture networks 3 -Transporting drainage water and studying methods of disposal 4 -Studying problems related to adding water, such as salinization, drainage, and soil reclamation 5- Calculating the cost of puncture maintenance as part of production costs
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	The concept of puncture, justifications for establishing punctures, the relationship of puncture to plant growth and productivity	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Physical soil properties related to drilling	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	The hydrological cycle and the location of irrigation and drainage	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Water flow in the soil, its forms, and its relationship to the concept of drainage, flow analysis	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Puncture and soil salinity, washing requirements and salt balance	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Investigations required to establish trocars, exploratory and design investigations	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	Measurement of saturated water conductivity above and below the groundwater level	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Types of trocars, their classification, and the objectives of their construction	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Open trocars	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Covered trocars	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

11	**2**	Incisive and vertical trocars	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	Designs of open and covered puncture systems and calculation of distances between trocars	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	Mechanization of trocars and supplies for implementing trocars	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Maintenance of open and covered trocars	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
15	**2**	Maintenance of covered trocars	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	Investigations required to establish trocars, exploratory and operational investigations	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Surveys, adjustment and settlement procedures and their calculations	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Measurement of saturated water conductivity in the laboratory	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Measurement of saturated water conductivity in the field above the groundwater level	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Measurement of saturated water conductivity in the field below the groundwater level	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Measuring ground water levels	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
7	**3**	Calculation of water drainage in open trocars	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Open trocar design	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Design of covered trocars	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

10	**3**	Applications in calculating the distance between trocars, under stable flow conditions	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Applications in calculating the distance between trocars, under unstable flow conditions	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Using the electronic computer to design puncture systems	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
13	**3**	Horizontal, vertical and radial flow of water into the trocars	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	A field visit to one of the puncture projects	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
15	**3**	A field visit to one of the puncture projects	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation

Examination Monthly & daily exams with discussion questions inside the lecture.
The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources

Required Textbooks (Curricular Books, If Any)	1- Inspection, investigations, designs, implementation and maintenance. Written by Dr. Mohsen Muhareb Al-Lami and Dr. Alaa Saleh Al-Janabi. 1991.
Main References (Sources)	1- Inspection, investigations, designs, implementation and maintenance. Written by Dr. Mohsen Muhareb Al-Lami and Dr. Alaa Saleh Al-Janabi. 1991.
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic scientific journals
Electronic References, Websites	Soil Science Society of America Library Genesis

Course Description Form of Soil Mineralogy

1. Course Name:	
Soil Mineralogy	
2. Course Code:	
SOMI313	
3. Semester / Year:	
Second semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Prof. Dr. Raad Abdel-Kareem Himdan Email : raadaltamimi@uodiyala.edu.iq	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	1 It deals with primary and secondary minerals of soil. 2 Study the concept of primary and secondary soil minerals origin. 3 The student will learn the crystallography of soil minerals. 4 Teach the general classification of minerals and silicates minerals structure. 5 Study some primary minerals and clay minerals and its importance in soil..
9. Teaching and Learning Strategies	
Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure					
Theoretical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject N**	**Learning Method**	**Evaluation Method**
1	**2**	The importance of studying soil mineralogy and their relation with soil properties.	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Minerals – classification of minerals- components of earth crust	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Magma – chemical composition of magma – crystallization process and formation of primary minerals	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Crystal structure of minerals: Unit cell – types of chemical bonds	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Ionization energy- electrical affinity - electronegativity- isomorphism- polymorphism	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Semester 1st exam			
7	**2**	Unit cell of silicate structure- Tetrahedra - Octahedra	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Silicate minerals structure systems	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Primary soil minerals: Quartz, Feldspars, Olivine, pyroxenes, amphiboles	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Clay mineralogy: Amorphous clay minerals, 1:1 crystalline clay minerals	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	2:1 crystalline clay minerals: Mica, its structure, types and properties	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	Semester 2nd exam			
13	**2**	Smectite minerals: formation, types, importance and its relation with soil properties	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Soil chlorites: types and identification – Fibrous clay minerals	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	Soil sampling and preparation for analysis	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Sand separation by wet sieving	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Heavy and light minerals separation	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Glass slide preparation for examination of heavy and light minerals	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Examination of heavy and light minerals by optical microscope	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Semester 1st exam			
7	**3**	Cementing agent removal from soil sample: removal of carbonate & OM	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Cementing agent removal from soil sample: removal of free iron oxides	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Separation of silt from clay	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Soil separates saturation with Mg	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Preparation of glass slides for XRDA	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Semester 2nd exam			
13	**3**	Bragg's law	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	XRDA & identification of clay minerals in specimen	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation

Examination Monthly & daily exams with discussion questions inside the lecture.
The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources

Required Textbooks (Curricular Books, If Any)	**Dixon, J.B. et. al., 1989. Minerals in Soil Environment. S.S.S.AM**
Main References (Sources)	
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic journal
Electronic References, Websites	**www.noor-book.com.** **www.youtube.com.**

Course Description Form of Soil fertility

1. Course Name:	
Soil fertility	
2. Course Code:	
SOIF314	
3. Semester / Year:	
first semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: dr.Luay Dawood Farhan Email: luayfarha@uodiyalay.edu.iq	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	-Learn about the concept of soil fertility and its relationship to productivity -Studying the interactions of nutrients in the soil and the factors affecting its readiness -Identify mineral and organic fertilizers and their interactions in the soil
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	A brief history of soil fertility science	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Growth and factors affecting it	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	The basics of the relationship between soil and plants	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Soil fertility and biological readiness	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	The elements necessary for plant growth, their classification and the foundations on which they depend	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Nitrogen	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	Phosphorus	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Potassium	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Calcium, magnesium, sulfur	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Factors affecting the readiness of microelements	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	Iron, manganese, zinc, copper	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	Boron, molybdenum, chlorine, nickel	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

13	**2**	Beneficial elements	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Organic matter in soil and its importance in terms of fertility	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
15	**2**	Soil fertility assessment	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

Practical part

Week	Hours	Required learning outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	**3**	Methods used for fertility assessment	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Conducting a pot experiment to evaluate soil fertility	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Calculate the amount of fertilizer	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Learn about the types of biological experiments	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Steps for taking soil samples	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Estimation of available nitrogen	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
7	**3**	Estimation of available phosphorus	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Estimation of available potassium	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	available of Calcium and magnesium estimate	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Estimation of available sulfur	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Boron Estimation	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Iron Estimation	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
13	**3**	Zinc Estimation	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Organic matter estimation	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

15	**3**	Factors affecting fertility assessment	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation
Examination Monthly & daily exams with discussion questions inside the lecture. The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	1- Awad, Kazem Mashhout (1987) Fertilization and Soil Fertility, Ministry of Higher Education and Scientific Research, University of Basra. 2- Al-Naimi, Saadallah (1999) Fertilizers and soil fertility. Ministry of Higher Education and Scientific Research, University of Mosul.
Main References (Sources)	1- Awad, Kazem Mashhout (1987) Fertilization and Soil Fertility, Ministry of Higher Education and Scientific Research, University of Basra. 2- Al-Naimi, Saadallah (1999) Fertilizers and soil fertility. Ministry of Higher Education and Scientific Research, University of Mosul.
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic scientific journals
Electronic References, Websites	Soil Science Society of America Library Genesis

Course Description Form English Language

1. Course Name:
English Language
2. Course Code:
ENGL401
3. Semester / Year:
First semester/ 2024-2025
4. Description Preparation Date:
15/1/2025
5. Available Attendance Forms:
Full time (theoretical lecture) weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
2 hours (2 hours theoretical per week) for 14 weeks, number of units 2 units
7. Course Administrator's Name (Mention All, If More Than One Name)
Name: Assistant lecturer Sohaib Saeed Hameed **Email: sohaibsaeedhameed@gmail.com**
8. Course Objectives

Course Objectives: Graduating students who are able to:	1. Facilitating students in smoothly acquiring knowledge, concepts, and attitudes in English language pronunciation. 2. Facilitating the comprehension of concepts. 3. Showcasing the diverse talents of students. 4. Mastering the English language.

9. Teaching and Learning Strategies	
Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	2	Unit 1 /The tense system	English Language	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
2	2	Informal language / Compound words	English Language	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
3	2	Unit 2 / Present tenses / Hot verbs	English Language	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
4	2	Present Perfect / Exclamations	English Language	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
5	2	Unit 3 / Narrative tenses	English Language	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
6	2	Giving news and responding	English Language	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
7	2	Discussion	English Language	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
8	2	Unit 4 /Questions and negatives	English Language	Lecture Dialogue & discussion Brainstorming	Daily, monthly and final exams and daily reports
9	2	Prefixes and antonyms	English Language	Lecture	Daily, monthly and

				Dialogue & discussion Brainstorming	final exams and daily reports
10	**2**	**Unite 5 / Future forms**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	**Unit 6 /Expressions of quantity**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12		**Model verbs / probability**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	**Unite 7 / Making suggestions**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	**Base and strong adjectives**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
15	**2**	**Grammar revision**	**English Language**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

11. Course Evaluation

Examination Monthly & daily exams with discussion questions inside the lecture.
The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources

Required Textbooks (Curricular Books, If Any)	**New Headway Plus " Pre-Intermediate "**
Main References (Sources)	
Recommended Books and References (Scientific Journals, Reports...)	
Electronic References, Websites	

Course Description of Soil & Water Conservation

1. Course Name:	
Soil & Water Conservation	
2. Course Code:	
SOWC402	
3. Semester / Year:	
First semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Prof.Dr. Hassan Hadi Mustafa hassanalalawy@uodiyala.edu.iq	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	1 -Knowledge of ways to control soil erosion 2 -The ability to control water erosion 3- Create windbreaks to control erosion
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning	Unit or Subject	Learning Method	Evaluation Method
1	**2**	Introduction to soil and water conservation	Soil & Water Conservation	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	The fallen one	Soil & Water Conservation	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Al-Sih	Soil & Water Conservation	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Water erosion	Soil & Water Conservation	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Controlling water erosion	Soil & Water Conservation	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Controlling water erosion	Soil & Water Conservation	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	Controlling water erosion	Soil & Water Conservation	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Wind erosion	Soil & Water Conservation	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Controlling wind erosion	Soil & Water Conservation	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Grassy water channels	Soil & Water Conservation	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	Terraces	Soil & Water Conservation	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	Temporary and permanent	Soil & Water Conservation	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

		maintenance designs			
13	**2**	Small earth dams and water reservoirs	Soil & Water Conservation	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Planning the soil and water management system	Soil & Water Conservation	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	Visit a weather station to learn about rain measuring methods	Soil & Water Conservation	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Rain data analysis	Soil & Water Conservation	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Calculating the maximum flow rate and using the basic water relations device	Soil & Water Conservation	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Design a field experiment to estimate water erosion	Soil & Water Conservation	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Applications based on the general equation for soil losses	Soil & Water Conservation	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Calculating the general equation factors for soil losses in	Soil & Water Conservation	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

		the field and choosing the appropriate method for soil maintenance in the field			
7	**3**	Watching explanations of water erosion and ways to control it by undertaking a scientific trip or showing films	Soil & Water Conservation	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Estimating the amounts of wind erosion in the field using the general equation for wind erosion	Soil & Water Conservation	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Estimating the susceptibility of some soils to wind erosion using a wind tunnel	Soil & Water Conservation	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Conducting designs for grassed water channels	Soil & Water Conservation	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Conducting terrace designs	Soil & Water Conservation	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Applications to temporary and permanent maintenance designs using	Soil & Water Conservation	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

		illustrative methods			
13	**3**	Applications on small earth dams and water reservoirs using illustrative methods	Soil & Water Conservation	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Field observations on soil and water management procedures	Soil & Water Conservation	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation
Examination Monthly & daily exams with discussion questions inside the lecture. The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	1-Altayef, Nabil Ibrahim 1991. Soil and water conservation. Ministry of Higher Education and Scientific Research, University of Baghdad 2-Ismail, Laith Khalil, 1985. Soil Conservation. Ministry of Higher Education and Scientific Research. University of Mosul. Nineveh. Translator.
Main References (Sources)	3-Al-Ani, Abdel Fattah Abdullah, 1987. Soil Conservation. Ministry of Higher Education and Scientific Research. Technical Institutes Foundation. Baghdad . 4-Fahd, Ali Abd. 1984. Soil and Water Conservation Engineering. Ministry of Higher Education and
Recommended Books and References (Scientific Journals, Reports...)	
Electronic References, Websites	

Course Description Form of Soil survey and classification

1. Course Name:	
Soil survey and classification	
2. Course Code:	
SOSC403	
3. Semester / Year:	
First semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Phd. Ibraheem Ahmad Hdraes Email: ibraheeahmad@uodiyala.edu.iq	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	1-Knowledge of soil development 2-Distinguishing between soil horizons and diagnosing them 3 -Preparing soil survey maps 4-Knowing the most influential factors on the development of soils and distinguishing their horizons
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	A historical overview of the classification of soils in the world	Soil survey and classification	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	The relationship between pedological sciences and the objectives of the classification year	Soil survey and classification	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Horizons: genetic horizons	Soil survey and classification	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Superficial and subsurface diagnostic horizons	Soil survey and classification	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Genetic systems for soil classification: Russian systems	Soil survey and classification	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Canadian regulations, FAO system, WRB	Soil survey and classification	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	The old American system	Soil survey and classification	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	American quantitative system	Soil survey and classification	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	The structure of the system and the foundations for determining annual terms	Soil survey and classification	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

10	**2**	Inheritance and distinctive characteristics of soil classes	Soil survey and classification	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	Inheritance and distinctive characteristics of soil classes	Soil survey and classification	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	Soil survey: concept and objectives	Soil survey and classification	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	Degrees and survey work	Soil survey and classification	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Soil maps and soil survey report	Soil survey and classification	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
15	**2**	Land classification and uses	Soil survey and classification	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	Field applications for describing soil profile	Soil survey and classification	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	How to prepare and interpret soil maps	Soil survey and classification	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Interpreting aerial photographs and using them as maps	Soil survey and classification	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Step factor and drawing scale	Soil survey and classification	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Soil survey tools and how to record information	Soil survey and classification	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

6	**3**	Comparing Iraqi and international soil survey reports	Soil survey and classification	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
7	**3**	Implementing field sweeping works	Soil survey and classification	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Implementing field sweeping works	Soil survey and classification	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Implementing field sweeping works	Soil survey and classification	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Preparing a soil survey report	Soil survey and classification	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Interpreting soil survey results and preparing maps	Soil survey and classification	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Interpreting soil survey results and preparing maps	Soil survey and classification	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
13	**3**	Characteristics of Iraqi soil units	Soil survey and classification	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Preparing the distribution chart for Iraqi soil units	Soil survey and classification	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation

Examination Monthly & daily exams with discussion questions inside the lecture.
The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources

Required Textbooks (Curricular Books, If Any)	1- Soil survey and classification. Dr. Ahmed Saleh Muhaimid 1994.
Main References (Sources)	2- Pedology. Soil survey and classification. Dr. Walid Khaled Hassan Al-Akidi. 1986.

Recommended Books and References (Scientific Journals, Reports...)	3- Soil genesis and classification, Boul, et.al. 2005
Electronic References, Websites	

Course Description Form of Soil relationship with water and plants

1. Course Name:
Soil relationship with water and plants
2. Course Code:
SOlM410
3. Semester / Year:
First semester/ 2024-2025
4. Description Preparation Date:
15/1/2025
5. Available Attendance Forms:
Full time (theoretical lecture and practical lecture) weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units
7. Course Administrator's Name (Mention All, If More Than One Name)
Name: Basem R.Bader Email: basemrbader@uodiyala.edu.iq
8. Course Objectives

Course Objectives: Graduating students who are able to:	It aims to introduce students to the relationship of soil with wa and plants, a science that seeks to identify and identify the bas concepts of the relationship of soil with water and plants 1 -Learn about the salt balance between the soil-plant-atmosphere system and how this affects it 2 -Physiological processes and plant growth. 3 -The different stresses that the plant is exposed to and how t mitigate those stresses. 4 -The relationship of organic matter and microorganisms in plant growth The article deals with a study 1 -To familiarize the student with the concept of the relationsh between soil, water and plants

	2 -The student classifies the different stresses and their effect o plant growth 3 -The student should separate between physical and chemical properties 4 -The student analyzes the amount of nutrients in the soil and the preservation of soil from pollution 5 -The student should understand the relationship of soil salini and its effect on plant growth, roots, growth and uptake 5- Soil salinity relationship and its effect on plant growth, roots growth and uptake

9. Teaching and Learning Strategies

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	Water, its properties and functions, the physical properties of the soil and their effect on plant growth	Soil relationship with water and plants	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Chemical properties of soil and their effect on plant growth	Soil relationship with water and plants	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Chemical properties of soil and their effect on plant growth and the relationship of water content to soil water potential	Soil relationship with water and plants	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Water and water potential in the soil-plant-atmosphere system	Soil relationship with water and plants	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Water and water potential in the soil-plant-air system and the use of mathematical models	Soil relationship with water and plants	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	First exam	Soil relationship with water and plants	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

7	**2**	The various stresses to which the plant is exposed and stress relief	Soil relationship with water and plants	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	The relationship of organic matter and soil microbiota to plant growth	Soil relationship with water and plants	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Salinity and its effect on plant growth	Soil relationship with water and plants	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Root growth and function	Soil relationship with water and plants	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	The efficiency of water use by plants and influencing factors	Soil relationship with water and plants	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	Physical properties and their relationship to plant growth	Soil relationship with water and plants	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	Fertility properties and their relationship to plant growth	Soil relationship with water and plants	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Movement of water from soil to plants	Soil relationship with water and plants	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
15	**2**	Dissolved ions and their relationship with soil and plants Growth regulators and their relationship to plant growth	Soil relationship with water and plants	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	Training students to compare the growth and development of root systems in soils of different textures.	Soil relationship with water and plants	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

2	**3**	An experiment to determine the effect of tissue on plant growth and root development	Soil relationship with water and plants	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Taking measurements for the experiment	Soil relationship with water and plants	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Writing the report and discussing the results	Soil relationship with water and plants	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	The effect of bulk density on root growth and development (soil compaction)	Soil relationship with water and plants	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Experiment to know the effect of compaction on plant growth and root development	Soil relationship with water and plants	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
7	**3**	Lecture Dialogue & discussion Brainstorming	Soil relationship with water and plants	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Lecture Dialogue & discussion Brainstorming	Soil relationship with water and plants	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Lecture Dialogue & discussion Brainstorming	Soil relationship with water and plants	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Lecture Dialogue & discussion Brainstorming	Soil relationship with water and plants	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Lecture Dialogue & discussion Brainstorming	Soil relationship with water and plants	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Lecture Dialogue & discussion Brainstorming	Soil relationship with water and plants	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
13	**3**	Lecture Dialogue & discussion Brainstorming	Soil relationship with water and plants	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

14	**3**	Lecture Dialogue & discussion Brainstorming	Soil relationship with water and plants	**Observation** **Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation
Examination Monthly & daily exams with discussion questions inside the lecture. The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	The relationship of soil, water and plants)
Main References (Sources)	Iraqi academic scientific journals.
Recommended Books and References (Scientific Journals, Reports...)	Soil Science Society Of America Library Genesis.
Electronic References, Websites	Soil Science Society Of America Library Genesis

Course Description Form of Hydrology and Water Resources

1. Course Name:
Hydrology and Water Resources
2. Course Code:
HYWR405
3. Semester / Year:
First semester/ 2024-2025
4. Description Preparation Date:
15/1/2025
5. Available Attendance Forms:
Full time (theoretical lecture and practical lecture) weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units
7. Course Administrator's Name (Mention All, If More Than One Name)
Name: Dr.Ahmed Bahjat Khalaf Email : raaedibrahim@uodiyala.edu.iq Dr. Nasreen Jawad Rashid
8. Course Objectives

Course Objectives: Graduating students who are able to:	1 Identify the concept of hydrology, water resources and their applications. 2 Identify the movement of water from precipitation and methods of measuring it. 3 The student will identify evaporation, surface runoff, groundwater, floods and their causes 4 Know the water balance and its importance.
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	**Introduction to Hydrology, Hydrological Cycle**	**Hydrology and Water Resources**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	**Rainfall, Surface Runoff, Base Flow, Evaporation**	Hydrology and Water Resources	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Rainfall Loss, Capture Loss, Ground Storage Loss	Hydrology and Water Resources	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Deep Percolation Loss. Importance of Loss in Runoff Calculations	Hydrology and Water Resources	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Evaporation and Water Loss from Aquifers	Hydrology and Water Resources	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Semester 1st exam			
7	**2**	Permanent watercourses, intermittent watercourses, seasonal watercourses	Hydrology and Water Resources	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Suspended and dissolved loads in watercourses	Hydrology and Water Resources	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Groundwater	Hydrology and Water Resources	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Groundwater aquifers, their types and characteristics	Hydrology and Water Resources	**Lecture Dialogue & discussion**	Daily, monthly and final exams

				Brainstorming	and daily reports
11	**2**	Hydrograph	Hydrology and Water Resources	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	Semester 2nd exam			
13	**2**	Floods, causes, risks	Hydrology and Water Resources	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Water resources and the importance of water balance	Hydrology and Water Resources	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	**Methods of measuring rainfall**	**Hydrology and Water Resources**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	**Methods of displaying rainfall data**	**Hydrology and Water Resources**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	**Measuring and estimating losses from water reservoirs**	**Hydrology and Water Resources**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	**Means that can be used to reduce evaporation losses from water surfaces**	**Hydrology and Water Resources**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	**Measuring water levels and discharges in waterways (rivers)**	**Hydrology and Water Resources**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Semester 1st exam			
7	**3**	**Methods of measuring the flow and the evidence used in measuring the flow**	**Hydrology and Water Resources**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

8	**3**	**Mathematical applications in groundwater movement**	**Hydrology and Water Resources**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	**Mathematical applications in groundwater movement**	**Hydrology and Water Resources**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	**Applications in flow curves**	**Hydrology and Water Resources**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Applications of standard hydrograph curves	**Hydrology and Water Resources**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Semester 2nd exam			
13	**3**	Methods of base flow separation in hydrograph	**Hydrology and Water Resources**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Methods of base flow separation in hydrograph	**Hydrology and Water Resources**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation
Examination Monthly & daily exams with discussion questions inside the lecture. The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	الهيدرولوجيا الهندسية. ١٩٩٢. محمد سليمان حسن واخرون. جامعة الموصل.
Main References (Sources)	علم المياه.٢٠٠٨. سحر امين كاتوت .دار دجلة
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic journal
Electronic References, Websites	www.noor-book.com. www.youtube.com.

Course Description Form of Irrigation systems technology

1. Course Name:	
Irrigation systems technology	
2. Course Code:	
IRST406	
3. Semester / Year:	
First semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Ibrahim Ahmed Hedres ibraheeahmad@uodiyala.edu.iq	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	Science irrigation looking in irrigation water sources and methods to control it, exploit and delivery of agricultural fields and includes planning, design and implementation of irrigation facilities, transmission and distribution of irrigation water and to study ways to add them and calculate the water requirement of the plant through the study of water relationship, soil and climate in addition to the study of problems related to the addition of water problems to salinity and drainage and reclamation of soils.
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	Introduction to Irrigation	Irrigation systems technology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Basic factors for designing a field irrigation system	Irrigation systems technology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Water infiltration in the soil, factors affecting seepage, relationship between seepage and irrigation method, basic seepage rate	Irrigation systems technology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Surface irrigation	Irrigation systems technology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Surface irrigation systems	Irrigation systems technology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Furrow Irrigation, specifications, advantages, disadvantages	Irrigation systems technology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	Furrow Irrigation, design considerations, design equations	Irrigation systems technology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Basin irrigation, specifications, advantages, disadvantages	Irrigation systems technology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Sprinkler irrigation, principles, advantages, disadvantages	Irrigation systems technology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Sprinkler irrigation	Irrigation systems technology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	Drip irrigation, definition, benefits, disadvantages and problems, basic parts of drip irrigation system, dripper hydraulics,	Irrigation systems technology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

		irrigation depth and irrigation interval, dripper selection, irrigation efficiency and consistency			
12	**2**	Wave or pulse irrigation	Irrigation systems technology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	Wave or pulse, advantages, disadvantages	Irrigation systems technology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Scientific trip	Irrigation systems technology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	Review, soil moisture content, methods of representing moisture percentage, solving mathematical problems.	Irrigation systems technology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Applications and exercises in the efficiency, sufficiency and consistency of irrigation	Irrigation systems technology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Measuring the infiltration, extracting the infiltration rate, cumulative infiltration and basic infiltration rate functions, applications and exercises in infiltration	Irrigation systems technology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Applications and exercises on the advance function and its relation to the infiltration functions, exercises on the concept of water balance in surface irrigation	Irrigation systems technology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Mathematical applications on strip irrigation system design	Irrigation systems technology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Measurement of imbibition in the furrow	Irrigation systems technology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

7	**3**	Applications and exercises about Furrow Irrigation	Irrigation systems technology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Applications and exercises on Basin irrigation design	Irrigation systems technology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Exercises on calculating sprinkler intervals for each arrangement	Irrigation systems technology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Exercises on calculating irrigation consistency, mist losses and irrigation efficiency	Irrigation systems technology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Drip irrigation applications and exercises	Irrigation systems technology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Wave or pulse irrigation applications and exercises	Irrigation systems technology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
13	**3**	Pump capacity calculation	Irrigation systems technology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Scientific trip	Irrigation systems technology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation

Examination Monthly & daily exams with discussion questions inside the lecture.
The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources

Required Textbooks (Curricular Books, If Any)	1- Irrigation, fundamentals and applications written by Dr. Nabil Ibrahim eltaif and Essam Hamza Khudair alhadith .1988 Ministry of Higher Education and Scientific Research - University of Baghdad. 2- Irrigation and drainage written by dr.laith Khalil Ismail . 2000 Ministry of Higher Education and Scientific Research - University of Mosul. 3- Design and management of field irrigation systems written by dr. Samir Mohammed Ismail .2002 College of Agriculture - Alexandria University. 4- Modern irrigation techniques and other topics in the water issue written by Essam Khudair alhadithi ,dr. Ahmed madlool Kubaisi and dr. Yass Khudair Hamza alhadithi.2010 Ministry of Higher Education and Scientific Research University of Anbar.

Main References (Sources)	
Recommended Books and References (Scientific Journals, Reports...)	
Electronic References, Websites	

Course Description Form of Soil Microorganisms

1. Course Name:	
Soil Microorganisms	
2. Course Code:	
SOIM410	
3. Semester / Year:	
Second semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Faris Mohammed Suhail Email: farissuhail@uodiyala.edu.iq Assi. Teacher Asmaa Hussun Abid	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	1- Identify the groups of microorganisms that grow and are active in the soil. 2- Study the biochemical activities that take place in the soil, which lead to analysis of original and added organic materials to the soil and the preparatio nutrients for plants and the role of this in soil activity and productivity. 3- Identifying the environmental conditions that increase the activity of econo microorganisms and benefiting from them to improve soil fertility. 4- Identify the benefits of biofertilization to reduce the addition of chemical fertiliz and reduce costs and pollution. 5- Identify the possibility of using soil revitalizers to remove mineral and org pollutants from the soil

9. Teaching and Learning Strategies	
Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	**2**	Historical overview, definition, importance of studying soil microbiology	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Sections of soil microbiology	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Soil microbial groups: bacteria, fungi, algae, actinomycetes, archaea, mycorrhizae.	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Organic matter: carbon cycle, enzymatic activity in soil	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Historical overview, definition, importance of studying soil microbiology	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	First Semester exam	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	Biological nitrogen fixation	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Biological transformations of phosphorus: its cycle and the role of microorganisms in its transformations	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Biotransformations of sulfur: sulfur cycle, mineralization, microbial metabolism, oxidation, and reduction of inorganic sulfur compounds.	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

10	**2**	Biotransformations of iron: oxidation, reduction, and decomposition of organic iron compounds	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	Decomposition of pesticides in soil	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	Relationships between microorganisms: the area surrounding the roots (rhizosphere) and the activity of microorganisms in this area	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	Relationships between microorganisms: the area surrounding the roots (rhizosphere) and the activity of microorganisms in this area	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Factors affecting the growth of microorganisms, growth of microorganisms	**Soil Microorganisms**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	Methods of taking soil samples for microbiological studies, studying the function of microorganisms using the buried slide method	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Estimating the numbers of bacteria, actinomycetes, and fungi at different depths of soil using the serial dilution method (dilution and plate counting)	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Count and isolate algae and protozoa from soil	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Estimating the number of Azotobacter in different soils using the most probable MPN count method, isolating and	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

		purifying some species and studying their morphological properties.			
5	**3**	Measuring the speed of decomposition of organic compounds with different percentages of carbon and nitrogen in different soils	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Study of nitrogen transformations (nitrification and nitrification processes) in nutrient media and soil	**Soil Microorganisms**		
7	**3**	Isolating root nodule bacteria from different leguminous plants, studying their properties, then multiplying them, and conducting inoculation experiments with their leguminous plants.	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Isolating root nodule bacteria from different leguminous plants, studying their properties, then multiplying them, and conducting inoculation experiments with their leguminous plants.	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Study of biological sulfur transformations	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Study of biological phosphorus transformations, phosphate solubilizing biology	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	The role of microorganisms in the formation of soil aggregates	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	A study on bacteriophages in some soils	**Soil Microorganisms**		
13	**3**	The effect of some pesticides on the revival of displaced soil, especially economic soil	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Methods of isolating nematodes from soil	**Soil Microorganisms**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation	
Examination Monthly & daily exams with discussion questions inside the lecture. The degree of participation in the questions related to the subject.	
12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	1- Soil Microbiology Revival, Radi Al-Rashidi, University of Basra, 1987
Main References (Sources)	2- Soil Microbiology, Ghayath Muhammad Qasim and Mudar Abdel Sattar. University of Mosul 1989
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic Journal
Electronic References, Websites	Soil Science Society of America Library Genesis

Course Description Form of Remote Sensing

1. Course Name:	
Remote Sensing	
2. Course Code:	
REMS309	
3. Semester / Year:	
Second semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Dr.Ahmed Bahjat Khalaf Email : raaedibrahim@uodiyala.edu.iq Israa Yarab Youssef	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	1 Teaching students the most important foundations, applications and modern programs in remote. sensing techniques to serve them in the agricultural field. 2 The student's ability to use different software to process, interpret and analyze satellite images. 3 The student will learn how to distinguish and compare between different ground targets. 4 Learn about geographic information systems (GIS) and their uses.
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	Introduction: History of remote sensing and objectives	**Remote Sensing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Electromagnetic energy and parts of the electromagnetic spectrum	**Remote Sensing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Electromagnetic energy interactions	**Remote Sensing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Spectral reflectivity and factors affecting it	**Remote Sensing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Aerial photography and its development stages	**Remote Sensing**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Semester 1st exam			
7	**2**	Rules for classifying aerial images and their applications	Remote Sensing	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Types and characteristics of platforms and satellites in the world	Remote Sensing	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Sensors: their types and characteristics	Remote Sensing	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Satellite images: their types and characteristics	Remote Sensing	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	Improving satellite images	Remote Sensing	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	Semester 2nd exam			
13	**2**	Applications in remote sensing	Remote Sensing	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	GIS and their uses	Remote Sensing	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	Applications on the interpretation of aerial photographs and the preparation of maps.	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Satellite images and spectral bands	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	How to import and export satellite images using the ERDAS program	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Spectral band merging and spatial enhancement	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Regular and irregular satellite image segments of the areas under study	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Semester 1st exam			
7	**3**	satellite data interpretation: Visual interpretation	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	satellite data interpretation: Automatic interpretation	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	satellite image classification: Unsupervised classification	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	supervised classification	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Using natural indicators, vegetation cover indicator, water, minerals, soil	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Semester 2nd exam			
13	**3**	Applications on satellite images	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Applications on the interpretation of satellite images and the preparation of maps	Remote Sensing	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation
Examination Monthly & daily exams with discussion questions inside the lecture. The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	1.Al-Mashhadani, Ahmed Saleh and Ahmed Madloul Al-Kubaisi. (2014). Remote Sensing Science. Ministry of Higher Education and Scientific Research. University of Baghdad. College of Agriculture. University House for Printing, Publishing and Translation. 2. Khalaf, Ahmed Bahjat. (2021). Processing, analyzing and interpreting satellite images using the ERDAS IMAGINE program. Central Press. University of Diyala
Main References (Sources)	Al-Daghestani, Nabil Sobhi, (2003 AD), Remote Sensing: Basics and Applications, Dar Al-Manahj, Amman, Jordan.
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic journal
Electronic References, Websites	**www.noor-book.com.** **www.youtube.com.**

Course Description Form of Soil Salinity

1. Course Name:	
Soil Salinity	
2. Course Code:	
SOIS310	
3. Semester / Year:	
Second semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Dr. Hassan Hadi Mustafa Email : **hassanalalawy@uodiyala.edu.iq**	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	Studying the spread of salinity in Iraq and the world and its impact on agricultural production - identifying sources of salts and means of transporting them - classifying and naming salts affected soils - the effect of salinity on plant growth - quality of irrigation water – salinity control and methods of coexistence with it.
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 15 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	Distribution and spread of salinity in Iraq and the world	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Sources of salts components	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Means and mechanisms for transporting salts	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Soil formation conditions of salts affected soils and salt accumulation cycles.	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Factors and conditions responsible for the formation and spread of salt-affected soils	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Chemical and physical properties of salts accumulated in the soil	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	Chemical and physical properties of salts accumulated in the soil	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Phases of salt accumulation in soil, cation exchange capacity in salts affected soils	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Methods of expressing soil salinity	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Classification and nomenclature of soils affected by salts	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	The effect of soil salinity on plant growth	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

12	**2**	Indicators used to determine plant resistance to salinity	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	Methods used to increase plant resistance to salinity	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Irrigation water quality	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
15	**2**	soil salinity controlling and ways to live with it	Soil Salinity	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	collection and preparation soil samples of salts affected soils	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Salinity measurement methods - saturated paste	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Salinity measurement methods - diluted suspension	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Salinity measurement methods - gravimetric method	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Calculating the amount of salts in the soil	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	The effect of the type of salts on the germination of seeds of some plants	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
7	**3**	The effect of the type of salts on the germination of seeds of some plants	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	The effect of the type of salts on the germination of seeds of some plants	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	The effect of the type of salts on the germination of seeds of some plants	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	The effect of salinity on plant growth	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Phenotypic changes in plants due to salinity	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

12	**3**	Evaluation of irrigation water quality	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
13	**3**	Irrigation water classification: USDA system	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Irrigation water classification: FAO system.	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
15	**3**	The relationship between salinity and sodicity	Soil Salinity	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation

Examination Monthly & daily exams with discussion questions inside the lecture.
The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources

Required Textbooks (Curricular Books, If Any)	A. Al-Zubidi. 1989, Soil Salinity-Theoritical and Practical Fundumentals, Ministry of Higer Education, Iraq.
Main References (Sources)	
Recommended Books and References (Scientific Journals, Reports...)	FAO reports
Electronic References, Websites	Internet

Course Description Form of Soil morphology

1. Course Name:
Soil morphology
2. Course Code:
SOIM311
3. Semester / Year:
first semester/ 2024-2025
4. Description Preparation Date:
15/1/2025
5. Available Attendance Forms:
Full time (theoretical lecture and practical lecture) weekly
6. Number of Credit Hours (Total) / Number of Units (Total)
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units
7. Course Administrator's Name (Mention All, If More Than One Name)
Name: Basem R.Bader **Email: basemrbader@uodiyala.edu.iq**
8. Course Objectives

Course Objectives: Graduating students who are able to:	• Teaching students about soil morphology, the emergence and development of soils. • The student's ability to distinguish between educational horizons and diagnose them. • For the student to know how to distinguish and compare different soils and how to classify them. • Identifying the types of soil through color and the use of a stained guide
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	Definition of morphology and its position in the system of pedological sciences, the system of ideological sciences, and the engineering system	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Origin and development of soil	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Soil formation factors: climate, soil temperature regimes and soil moisture	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Topographic factor, biology	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Soil formation factors: parent material, time	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Soil formation processes: genetic group	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	Soil formation processes: general group	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	.Soil horizon	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Naming and main prospects	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Diagnostic horizons: superficial	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	Diagnostic horizons: subsurface	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

12	**2**	Soil morphological characteristics	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	Soil morphological characteristics	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Soil micromorphology - characterization - uses and applications	Soil morphology	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	Identify the morphological description form and the tools used in morphological description	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Choosing the location of the soil bed and the factors affecting it	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Training in identifying soil textures in the laboratory and field	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Studying the characteristics of soil color and spotting and training on them in the field	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Studying the nature of soil construction and training on it in the field	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Studying the qualities of strength and welding and training on them in the field	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
7	**3**	Study of the internal drainage characteristic and how to measure it in the field	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Studying some other morphological characteristics: root distribution, porosity, salinity, pH, and how to record them in the morphological description document.	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

9	**3**	Studying the property of slope, how to measure it, and its relationship to morphological phenomena in addition to soil depth	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Study of the calcareous property and the limits of horizons	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Practice conducting a morphological description of a complete soil bed and recording the characteristics in the morphological description document	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Morphological characteristics of the world's soils	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
13	**3**	Field observations of soil types in Iraq	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Preparing a report with a morphological description document	Soil morphology	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation

Examination Monthly & daily exams with discussion questions inside the lecture.
The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources

Required Textbooks (Curricular Books, If Any)	1- Soil Survey Staff, 2003, Soil Survey Manual, USDA 2- FAO, 1990, Guide line for soil profile description, FAO
Main References (Sources)	**3-** Dr. Walid Khaled Al-Akidi and Dr. Shaker Mahmoud Al-Issawi. 1989. Soil morphology. ,, Ministry of Higher Education and Scientific Research. University of Baghdad
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic journal
Electronic References, Websites	**www.noor-book.com.** **www.youtube.com.**

Course Description Form of Drainage

1. Course Name:	
Drainage	
2. Course Code:	
REMS309	
3. Semester / Year:	
Second semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Phd. Ibraheem Ahmad Hdraes Email: ibraheeahmad@uodiyala.edu.iq	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	1 -Drilling examines the sources of irrigation water and methods of controlling it in agricultural fields 2 -It includes planning, designing and implementing puncture networks 3 -Transporting drainage water and studying methods of disposal 4 -Studying problems related to adding water, such as salinization, drainage, and soil reclamation 5- Calculating the cost of puncture maintenance as part of production costs
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	The concept of puncture, justifications for establishing punctures, the relationship of puncture to plant growth and productivity	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Physical soil properties related to drilling	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	The hydrological cycle and the location of irrigation and drainage	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Water flow in the soil, its forms, and its relationship to the concept of drainage, flow analysis	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Puncture and soil salinity, washing requirements and salt balance	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Investigations required to establish trocars, exploratory and design investigations	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	Measurement of saturated water conductivity above and below the groundwater level	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Types of trocars, their classification, and the objectives of their construction	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Open trocars	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Covered trocars	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

11	**2**	Incisive and vertical trocars	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	Designs of open and covered puncture systems and calculation of distances between trocars	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
13	**2**	Mechanization of trocars and supplies for implementing trocars	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Maintenance of open and covered trocars	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
15	**2**	Maintenance of covered trocars	**Drainage**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	Investigations required to establish trocars, exploratory and operational investigations	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Surveys, adjustment and settlement procedures and their calculations	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Measurement of saturated water conductivity in the laboratory	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Measurement of saturated water conductivity in the field above the groundwater level	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Measurement of saturated water conductivity in the field below the groundwater level	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Measuring ground water levels	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
7	**3**	Calculation of water drainage in open trocars	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Open trocar design	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Design of covered trocars	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

10	**3**	Applications in calculating the distance between trocars, under stable flow conditions	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Applications in calculating the distance between trocars, under unstable flow conditions	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Using the electronic computer to design puncture systems	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
13	**3**	Horizontal, vertical and radial flow of water into the trocars	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	A field visit to one of the puncture projects	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
15	**3**	A field visit to one of the puncture projects	**Drainage**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation

Examination Monthly & daily exams with discussion questions inside the lecture.
The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources

Required Textbooks (Curricular Books, If Any)	1- Inspection, investigations, designs, implementation and maintenance. Written by Dr. Mohsen Muhareb Al-Lami and Dr. Alaa Saleh Al-Janabi. 1991.
Main References (Sources)	1- Inspection, investigations, designs, implementation and maintenance. Written by Dr. Mohsen Muhareb Al-Lami and Dr. Alaa Saleh Al-Janabi. 1991.
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic scientific journals
Electronic References, Websites	Soil Science Society of America Library Genesis

Course Description Form of Soil Mineralogy

1. Course Name:	
Soil Mineralogy	
2. Course Code:	
SOMI313	
3. Semester / Year:	
Second semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: Prof. Dr. Raad Abdel-Kareem Himdan Email : raadaltamimi@uodiyala.edu.iq	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	1 It deals with primary and secondary minerals of soil. 2 Study the concept of primary and secondary soil minerals origin. 3 The student will learn the crystallography of soil minerals. 4 Teach the general classification of minerals and silicates minerals structure. 5 Study some primary minerals and clay minerals and its importance in soil..
9. Teaching and Learning Strategies	
Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure					
Theoretical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject N**	**Learning Method**	**Evaluation Method**
1	**2**	The importance of studying soil mineralogy and their relation with soil properties.	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Minerals – classification of minerals- components of earth crust	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	Magma – chemical composition of magma – crystallization process and formation of primary minerals	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Crystal structure of minerals: Unit cell – types of chemical bonds	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	Ionization energy- electrical affinity - electronegativity- isomorphism- polymorphism	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Semester 1st exam			
7	**2**	Unit cell of silicate structure- Tetrahedra - Octahedra	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Silicate minerals structure systems	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Primary soil minerals: Quartz, Feldspars, Olivine, pyroxenes, amphiboles	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Clay mineralogy: Amorphous clay minerals, 1:1 crystalline clay minerals	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	2:1 crystalline clay minerals: Mica, its structure, types and properties	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	Semester 2nd exam			
13	**2**	Smectite minerals: formation, types, importance and its relation with soil properties	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Soil chlorites: types and identification – Fibrous clay minerals	**Soil Mineralogy**	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

Practical part					
Week	**Hours**	**Required learning outcomes**	**Unit or Subject Name**	**Learning Method**	**Evaluation Method**
1	**3**	Soil sampling and preparation for analysis	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Sand separation by wet sieving	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Heavy and light minerals separation	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Glass slide preparation for examination of heavy and light minerals	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Examination of heavy and light minerals by optical microscope	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Semester 1st exam			
7	**3**	Cementing agent removal from soil sample: removal of carbonate & OM	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Cementing agent removal from soil sample: removal of free iron oxides	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	Separation of silt from clay	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Soil separates saturation with Mg	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Preparation of glass slides for XRDA	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Semester 2nd exam			
13	**3**	Bragg's law	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	XRDA & identification of clay minerals in specimen	**Soil Mineralogy**	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation

Examination Monthly & daily exams with discussion questions inside the lecture.
The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources

Required Textbooks (Curricular Books, If Any)	**Dixon, J.B. et. al., 1989. Minerals in Soil Environment. S.S.S.AM**
Main References (Sources)	
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic journal
Electronic References, Websites	**www.noor-book.com.** **www.youtube.com.**

Course Description Form of Soil fertility

1. Course Name:	
Soil fertility	
2. Course Code:	
SOIF314	
3. Semester / Year:	
first semester/ 2024-2025	
4. Description Preparation Date:	
15/1/2025	
5. Available Attendance Forms:	
Full time (theoretical lecture and practical lecture) weekly	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 hours theoretical and 3 hours practical per week) for 14 weeks, number of units 3.5 units	
7. Course Administrator's Name (Mention All, If More Than One Name)	
Name: dr.Luay Dawood Farhan Email: luayfarha@uodiyalay.edu.iq	
8. Course Objectives	
Course Objectives: Graduating students who are able to:	-Learn about the concept of soil fertility and its relationship to productivity -Studying the interactions of nutrients in the soil and the factors affecting its readiness -Identify mineral and organic fertilizers and their interactions in the soil
9. Teaching and Learning Strategies	

Strategy	In-person lectures for 14 weeks, including two monthly exams, daily exams, and scientific reports

10. Course Structure

Theoretical part

Week	Hours	Required learning outcomes	Unit or Subject	Learning Method	Evaluation Method
1	**2**	A brief history of soil fertility science	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
2	**2**	Growth and factors affecting it	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
3	**2**	The basics of the relationship between soil and plants	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
4	**2**	Soil fertility and biological readiness	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
5	**2**	The elements necessary for plant growth, their classification and the foundations on which they depend	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
6	**2**	Nitrogen	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
7	**2**	Phosphorus	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
8	**2**	Potassium	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
9	**2**	Calcium, magnesium, sulfur	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
10	**2**	Factors affecting the readiness of microelements	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
11	**2**	Iron, manganese, zinc, copper	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
12	**2**	Boron, molybdenum, chlorine, nickel	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

13	**2**	Beneficial elements	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
14	**2**	Organic matter in soil and its importance in terms of fertility	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports
15	**2**	Soil fertility assessment	Soil fertility	**Lecture Dialogue & discussion Brainstorming**	Daily, monthly and final exams and daily reports

Practical part

Week	Hours	Required learning outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	**3**	Methods used for fertility assessment	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
2	**3**	Conducting a pot experiment to evaluate soil fertility	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
3	**3**	Calculate the amount of fertilizer	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
4	**3**	Learn about the types of biological experiments	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
5	**3**	Steps for taking soil samples	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
6	**3**	Estimation of available nitrogen	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
7	**3**	Estimation of available phosphorus	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
8	**3**	Estimation of available potassium	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
9	**3**	available of Calcium and magnesium estimate	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
10	**3**	Estimation of available sulfur	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
11	**3**	Boron Estimation	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
12	**3**	Iron Estimation	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
13	**3**	Zinc Estimation	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports
14	**3**	Organic matter estimation	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

15	**3**	Factors affecting fertility assessment	Soil fertility	**Observation Dialogue & discussion**	Daily, monthly and final exams and daily reports

11. Course Evaluation
Examination Monthly & daily exams with discussion questions inside the lecture. The degree of participation in the questions related to the subject.

12. Learning and Teaching Sources	
Required Textbooks (Curricular Books, If Any)	1- Awad, Kazem Mashhout (1987) Fertilization and Soil Fertility, Ministry of Higher Education and Scientific Research, University of Basra. 2- Al-Naimi, Saadallah (1999) Fertilizers and soil fertility. Ministry of Higher Education and Scientific Research, University of Mosul.
Main References (Sources)	1- Awad, Kazem Mashhout (1987) Fertilization and Soil Fertility, Ministry of Higher Education and Scientific Research, University of Basra. 2- Al-Naimi, Saadallah (1999) Fertilizers and soil fertility. Ministry of Higher Education and Scientific Research, University of Mosul.
Recommended Books and References (Scientific Journals, Reports...)	Iraqi academic scientific journals
Electronic References, Websites	Soil Science Society of America Library Genesis