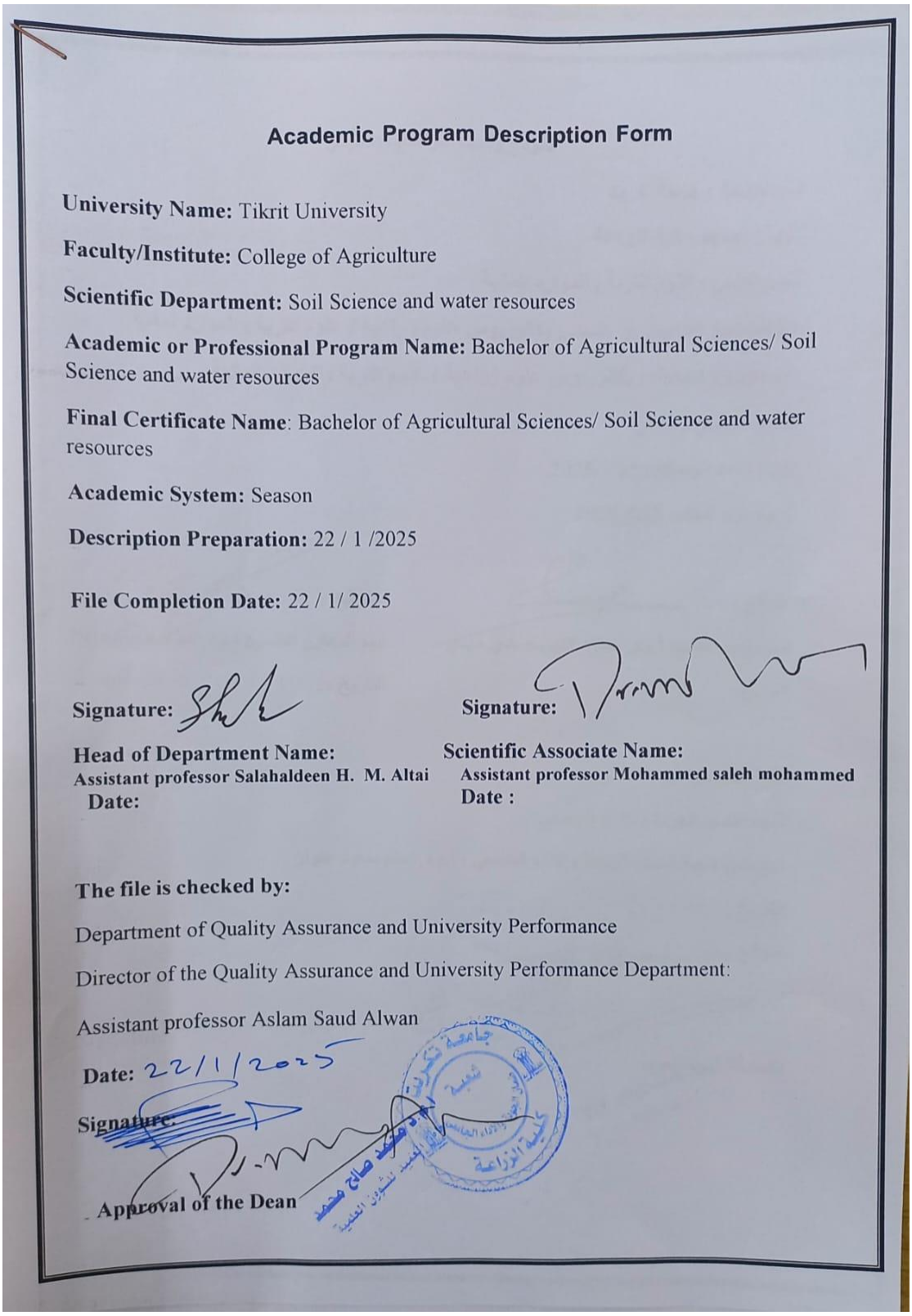
Academic Program Description

Department of Soil Sciences and Water Resources



Academic Program Description Form

University Name: Tikrit University

Faculty/Institute: College of Agriculture

Scientific Department: Soil Science and water resources

Academic or Professional Program Name: Bachelor of Agricultural Sciences/ Soil Science and water resources

Final Certificate Name: Bachelor of Agricultural Sciences/ Soil Science and water resources

Academic System: Season

Description Preparation: 22 / 1 /2025

File Completion Date: 22 / 1/ 2025

Signature:

Head of Department Name:
Assistant professor Salahaldeen H. M. Altai
Date:

Signature:

Scientific Associate Name:
Assistant professor Mohammed saleh mohammed
Date :

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Assistant professor Aslam Saud Alwan

Date: 22/1/2025

Signature:

Approval of the Dean

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First class

The manager name	**English specialty 1**	**Class**	**First class**
The manager code	**T.M.Z. 127**	**Planned teaching hours:**	**14**
Unites :	**1**	**Exhortationand availability:**	**Required**
Chapeter	**Autumnal**	**TareeKh preparing the description:**	**22 /1 / 2025**

Description of the curriculum:

Sections of speech, sentence and phrase in English, absorbing

The purpose of teaching the curriculum is:

The article aims to develop students' English language skills in terms of speaking, writing and understanding the importance of this language in the field of soil science and water resources.

Learning results:

The student is able to learn the vocabulary and rules of the English language and employ them within the competence of soil sciences and water resources and review foreign sources in this discipline.

Teaching and learning methods:

- **Exams**
- **The opinions of students and the opinions of faculty members and the opinions of graduates**

- **Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.**
- **Textbooks.**
- **Scientific journals and websites in general.**

Topics: (theoretical part):

Weeks	Topics	Hours
1	Sections of speech, sentence and phrase in English, absorbing	1 hour
2- 3	Names of science, names of nobility, names of material, names of plural, moral names, numbered and non-existent names, tools of identification and denial	2 hours
4- 5	Pronouns, types: personality, monument and traction, property, reflexive, signal, connectivity and question consciences	2 hours
6	Auxiliary actions and their types	1 hour
7- 8	Times in the state of the building for the knowledge: simple time: the present, the past, the future	2 hours
9	Continuous Time: The Present, The Past, the Future	1 hour
10	Full time: present, past, continuous	1 hour
11	Continuous full time: the present, the past, the future	1 hour
12- 13	Qualities: qualities of science, ownership, descriptive, long qualities, short qualities, comparison and analogy	2 hours
14	Sounds in English: Correct, Illness	1 hour

Systematic book:

A Practical English Grammar

A. J. Thomson, A. V. Martinet

Oxford University Press Walton Street, Oxford 0X2 6DP

Auditions:

Only a theoretical part **(lectures)**

A. Continuous evaluation during the school year (40%) and distributed to:

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

B. The final exam (60%) is distributed to:

Part A: Questions with short, comprehensive answers to curriculum 2×15 = 30 degrees (50%)

Part B: Questions for absorption and analysis 1×15 = 15 degrees (25%)

Part C: Objective questions 1×15 = 15 degrees (25%)

The name	**English specialty 2**	**Class:**	**First**
Decision code:	**A.G. 004**	**Planned teaching hours :**	**14**
Units:	**1**	**Available attendance:**	**Required**
Chapter:	**Spring**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

Sections of speech, sentence and phrase in English, absorbing

The purpose of teaching the curriculum is:

The article aims to develop students' English language skills in terms of speaking, writing and understanding the importance of this language in the field of soil science and water resources.

Learning results:

The student is able to learn the vocabulary and rules of the English language and employ them within the competence of soil sciences and water resources and review foreign sources in this discipline.

Teaching and learning methods:

- **Exams**
- **The opinions of students and the opinions of faculty members and the opinions of graduates**
- **Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.**
- **Textbooks.**
- **Scientific journals and websites in general.**

Topics: (theoretical part):

Weeks	Topics	Hours
1	Theyperformed kindness, prepositions, absorption	1 hour
2	Exile, question composition, absorption	1 hour
3	Standard acts, anomalies.	1 hour
4	Times in the case of the building for the unknown: simple: the present, the past, the future	1 hour
5	Times in the case of the building for the unknown: continuous: the present, the past, the future	1 hour

6	Times in the case of the building for the unknown: the complete: the present, the past, the future	1 hour
7	Times in the case of the building for the unknown: the continuous completeness: the present, the past, the future	1 hour
8	Police sentences, their uses and types, absorption	1 hour
9- 10-11	Additional rules : used to, every, else, also, any, some, all, yet	3 hours
12	Since and for،	1 hour
13	Common words, translation, how to translate from Arabic to English and from English to Arabic	1 hour
14	General review	1 hour

Systematic book:

A Practical English Grammar

A. J. Thomson, A. V. Martinet

Oxford University Press Walton Street, Oxford 0X2 6DP

Auditions:

Theoretical part (lectures)

A. Continuous evaluation during the school year (40%) and distributed to:

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

B. The final exam (60%) is distributed to:

Part A: Questions with short, comprehensive answers to curriculum 2×15 = 30 degrees (50%)

Part B: Questions for absorption and analysis 1×15 = 15 degrees (25%)

Part C: Objective questions 1×15 = 15 degrees (25%)

The name	**Geological Principles**	**Class:**	**First**
Decision code:	**TMZ 113**	**Planned teaching hours :**	**70**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Spring**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

Introduction to geology - the concept of its origins and branches, minerals and its classification methods, the rock cycle in nature, the water cycle in nature, the geological relationship to soil and agriculture.

The purpose of teaching the curriculum is:

The article aims to introduce students of the first stage of the Department of Soil Sciences and Water Resources to geological phenomena, types of minerals and rocks and their relationship to soil formation

Learning results:

At the end of the course, the student is able to distinguish between the types of rocks and minerals that make up them, which are the original material of the different soils.

Teaching and learning methods:

- **Exams**
- **The opinions of students and the opinions of faculty members and the opinions of graduates**

- **Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.**
- **Textbooks.**
- **Agricultural scientific journals and websites in general.**
- **View electronic syds to focus knowledge and science in the mind.**

Topics: (theoretical part):

Weeks	Topics	Hours
1	Introduction to geology - the concept of its origins and branches	2 hours
2	Geological phenomena and how they arise	2 hours
3	Minerals and their classification methods	2 hours
4	Minerals and their classification methods	2 hours
5	Weathering: its types and its relationship to soil formation	2 hours
6	Weathering: its types and its relationship to soil formation	2 hours
7	Nature's Rock Cycle, Fiery Rocks	2 hours
8	Sedimentary rocks	2 hours
9	Sedimentary rocks	2 hours
10	Mutant rocks	2 hours
11	Toilet: Surface water	2 hours
12	Groundwater	2 hours
13	Surveying natural resources	2 hours
14	Geological relationship to soil and agriculture	2 hours

Topics: (Practical Part):

Weeks	Topics	Hours
1	The relationship of geology to soil	3 hours
2	Types of minerals: their qualities and methods of classification	3 hours
3	Types of minerals: their qualities and methods of classification	3 hours
4	Types of minerals: their qualities and methods of classification	3 hours
5	Types of minerals: their qualities and methods of classification	3 hours
6	Rocks: their qualities and methods of classification	3 hours
7	Rocks: their qualities and methods of classification	3 hours
8	Rocks: their qualities and methods of classification	3 hours
9	Rocks: their qualities and methods of classification	3 hours
10	Natural minerals and rocks in Iraq	3 hours
11	Natural minerals and rocks in Iraq	3 hours
12	Natural minerals and rocks in Iraq	3 hours
13	Field scenes on geological formation and natural phenomena in Iraq	3 hours
14	Collecting rock models from Iraq	3 hours

Systematic book:

Principles of Geology by Dr. Abdulhadi Al-Sayegh

Auditions:

Theoretical part (lectures)

A. Continuous evaluation during the semester (30%) and distributed to : *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

B. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10 degrees (25%)

Practical part (laboratories)

C. Continuous evaluation during the semester (10%) and distributed to : *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily field and laboratory performance (student activity).

10% commitment and discipline in the laboratory and field.

D. The final exam (20%) is distributed to:

70% field practical test.

30% oral or editorial examination in scientific subject.

The name	**Geometric drawing**	**Class:**	**First**
Decision code:	**T.M.G. 111**	**Planned teaching hours:**	**45**
Units:	**1**	**Available attendance:**	**Required**
Chapter:	**Autumnal**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

The concept of engineering drawing is to learn and introduce the student to the rules and methods of modern and followed engineering drawing and employ them in the correct scientific use in agricultural production (plant and animal) especially with regard to drawing engineering processes in the design of agricultural equipment and machinery and the design and engineering of gardens for graduates of agricultural colleges.

The purpose of teaching the curriculum is:

1. Preparing students specialized in engineering drawing in some scientific departments in the faculties of agriculture
2. Employing engineering expertise through engineering applications for engineering drawing in the agricultural field
3. Preparing students specialized in the engineering and design of gardens through the practical application of the foundations of engineering drawing

Learning results:

1. Covering the lack of technical expertise
2. Increased technical development in agricultural work
3. Increased scientific expertise in the engineering design of some agricultural machinery based on engineering drawing

Teaching and learning methods:

- **Exams**
- **The opinions of students and the opinions of faculty members and the opinions of graduates**
- **Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.**
- **Textbooks.**
- **Agricultural scientific journals and websites in general.**

- **View electronic syds to focus knowledge and science in the mind.**

Topics: (Practical Part):

Weeks	Topics	Hours
1	Introduction to geometric painting	**3 hours**
2	Drawing font types	**3 hours**
3	Drawing the initial geometric shapes in the drawing	**3 hours**
4	How to place dimensions for geometric shapes	**3 hours**
5	Drawing the oval section using engineering processes	**3 hours**
6	Drawing the engineering processes of the diamond arches	**3 hours**
7	Drawing engineering applications for engineering processes	**3 hours**
8	Computing applications on engineering sections	**3 hours**
9	Drawing the three catches of the body	**3 hours**
10	Drawing the catches for slanted geometric shapes	**3 hours**
11	Drawing triangular clamps of circular cut shapes	**3 hours**
12	Drawing and finding the third missing project	**3 hours**
13	Stereoscopic drawing in the manner of the measured drawing	**3 hours**
14	Stereoscopic drawing in slanted drawing	**3 hours**
15	Computing applications to draw holograms	**3 hours**

Systematic book:

- Engineering drawing for students of agricultural colleges. Dr. Naqash Sabri Hassan. 1999

Auditions:

Only practical part (studio)

A. Continuous evaluation during the school year (40%) and distributed to:

70% two practical practical tests.

20% daily practical performance (student activity).

10% commitment and discipline.

B. The final exam (60%) is distributed to:

70% practical practical application test.

30% applied or editorial examination in scientific subject.

The name	**area**	**Class:**	**First**
Decision code:	**TMZ 122**	**Planned teaching hours :**	**57**
Units:	**2**	**Available attendance:**	**Required**
Chapter:	**Spring**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

1. Space ... Defined.. Types... Importance.
2. Measurement systems and united measurement.
3. Scale.
4. Scan with string or tape.
5. Lifting with flat panel

6. Settlement and contour maps

The purpose of teaching the curriculum is:

1. Get the basic information and data needed to prepare and map.
2. The main means of carrying out land-related operations of settlement, division and reclamation.
3. Planning and construction of projects such as canals, dams and roads...

Learning results:

Make the student able to measure distances and direct and indirect spaces and raise areas, leveling and drawing standards of all kinds and how to use them

Teaching and learning methods:

- **Exams**
- **The opinions of students and the opinions of faculty members and the opinions of graduates**
- **Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.**
- **Textbooks.**
- **Agricultural scientific journals and websites in general.**
- **View electronic syds to focus knowledge and science in the mind.**

Topics: (theoretical part):

Weeks	Topics	Hours
1	Definition of space, types of surveys, requirements for good surveying, importance of space in agriculture.	**1 hour**
2	Measurement systems and measurement units errors and errors.	**1 hour**

3-4	Direct distance measurement and bar scanning, station selection conditions, field book, chain permitting methods	**2 hours**
5	Indirect distance measurement, indirect measurement bases, indirect measuring devices and instruments, theodolite device.	**1 hour**
6	Urban exam.	**1 hour**
7	The scale of the drawing its types and the factors of determining it	**1 hour**
8	Spaces, regular and irregular shapes, spaces in coordinates	**1 hour**
9	Lifting using tape	**1 hour**
10	Lifting using flat panel	**1 hour**
11	Leveling and calculating points levels	**1 hour**
12	Longitudinal and transverse sections	**1 hour**
13	Urban exam.	**1 hour**
14	Finding drilling and depth of filling, calculating cutting and filling areas	**1 hour**
15	Topographic maps and methods of representation	**1 hour**

Topics: (Practical Part):

Weeks	Topics	Hours
1	Tools used in space, qualities, defects and control	**3 hours**
2	Adjust steering in measurement and calculate flat and oblique distances	**3 hours**
3	Accommodation and projection methods, clear my field using tape	**3 hours**

4	Long-term scale and station stabilization	**3 hours**
5	Urban exam.	**3 hours**
6	Drawing a linear map by measuring an appropriate drawing	**3 hours**
7	Applications in the scale	**3 hours**
8	Apps in space calculation, app examples, boxes and deletion	**3 hours**
9	Applications in calculating irregular form spaces	**3 hours**
10	Identify the level of its parts and accessories.	**3 hours**
11	Find the placements in the way of height and decrease and the way the device rises	**3 hours**
12	Urban exam.	**3 hours**
13	Drawing on graph paper and determining the size of drilling and filling and the economics of the project	**3 hours**
14	Theodolite device, device tuning, horizontal and anchor angles measurement	**3 hours**

Systematic book:

- Al-Khafaf, Riad Saleh. (2000). Second edition, Mosul University, Faculty of Agriculture and Forestry.

Auditions:

Theoretical part (lectures)

A. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

B. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10 degrees (25%)

Practical part (laboratories)

C. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily field and laboratory performance (student activity).

10% commitment and discipline in the laboratory and field.

D. The final exam (20%) is distributed to:

70% field practical test.

30% oral or editorial examination in scientific subject.

The name	**Soil environment**	**Class :**	**Second**
Decision code:	**T.M.Z. 317**	**Planned teaching hours :**	**75**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Autumnal**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

The article includes various environmental concepts (environment, ecology, ecosystem, surrounding factors, biological relationships, self-feeding organisms" products, feeding-certified organisms, "consumables", biodegradation of organic compounds and the rotation of elements by analysts, as well as the material includes factors surrounding outside the soil environment, which is related to atmospheric nuances .

The purpose of teaching the curriculum is:

This course aims to introduce the student to the concept of soil environment, which means organism "living factors" and factors surrounding "non-living factors" and recognizes the organisms found in the soil, including the roots of plants, the extent of diversity and differences between soil revival and different biological relationships, as well as recognizes the factors surrounding physic, chemical and fertility that affect and affect organisms present in the soil environment, Also through this article, the student learns how to maintain a clean environment, environmental balance and the use of bioprocessors to rid the soil of pollutants.

The student is also introduced to the factors surrounding outside the soil environment, which relates to the weather.

Learning results:

After receiving this material, the learner is able to deal with various organic wastes and use them usefully in plant production and maintain a clean environment.

Teaching and learning methods:

- Exams
- The opinions of students and the opinions of faculty members and the opinions of graduates
- Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.
- Textbooks.
- Agricultural scientific journals and websites in general.
- View electronic syds to focus knowledge and science in the mind.

Topics: (theoretical part):

Weeks	Topics	Hours
1	The environment, its concept and its relationship with man	2 hours
2	The environment, its concept and its relationship with man	2 hours
3	Departments of Ecology, Ecosystem	2 hours
4	Climate, climate cycle, soil climate	2 hours
5	Energy, radiation, heat, wind, atmospheric pressure	2 hours
6	Water, water relationship with plant, precipitation, atmospheric humidity, clouds	2 hours
7	Snow and ice, cold, fog, evaporation	2 hours

8	Environmental qualities of soil	2 hours
9	Soil moisture content	2 hours
10	Soil air and ventilation, heat	2 hours
11	factors influencing, key characteristics, soil construction,	2 hours
12	Porosity, soil tissue	2 hours
13	Study of vegetation characteristics	2 hours
14	Environmental pollution, population explosion	2 hours
15	The role of man in the environment	2 hours

Topics: (Practical Part):

Weeks	Topics	Hours
1	Ecology and surrounding factors	3 hours
2	Temperatures and temperature gauges in the air and soil	3 hours
3	Solar radiation and measuring devices	3 hours
4	Humidity and measuring devices in the air and soil	3 hours
5	Precipitation, rain and dew measuring devices	3 hours
6	Wind, wind speed and direction measurement devices	3 hours
7	Atmospheric pressure and measuring devices	3 hours
8	Evaporation and evaporation metering devices	3 hours
9	Soil, soil characteristics, salinity, reaction degree, soil components and minutes	3 hours

10	**Natural plant environments in the world and Iraq, alpine environments, steppes, savannahs, grasses, tundra**	**3 hours**
11	**Desert cover in the world and Iraq**	**3 hours**
12	**The aquatic ecosystem on earth, aquatic and salt plants**	**3 hours**
13	**Forest vegetation in the world and Iraq**	**3 hours**
14	**Climate charts and vocabulary, field experience**	**3 hours**
15	**Visit to Anwa Air Station**	**3 hours**

Systematic book:

Plant Ecology. Dr. Majid Rashid Al-Hilli and Dr. Hikmat Abbas Al-Ani. Mosul University

Auditions:

Theoretical part (lectures)

A. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

B. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10 degrees (25%)

Practical part (laboratories)

C. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily field and laboratory performance (student activity).

10% commitment and discipline in the laboratory and field.

D. The final exam (20%) is distributed to:

70% field practical test.

30% oral or editorial examination in scientific subject.

The name	**Analysis of soil, water and plant**	**Class:**	**Second**
Decision code:	**TMZ 215**	**Planned teaching hours :**	**64**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Spring**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

Introduction to soil, water and plant analysis, obtaining samples, reviewing some basic concepts in quantitative and qualitative analysis of the most important compounds and elements in soil, water and plant.

The purpose of teaching the curriculum is:

The purpose of the article is to introduce the students of the second stage in the Department of Soil Sciences and Water Resources to the methods of analysing soil, water

and plant samples as an entry point for the study of different disciplines and soil sciences in advanced stages, which include practical lessons and laboratories requiring scientific background in different methods of analysis.

Learning results:

The student learned about the methods, chemicals and devices used to estimate different elements and ions in the soil, water and plant.

Teaching and learning methods:

- Exams
- The opinions of students and the opinions of faculty members and the opinions of graduates
- Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.
- Textbooks.
- Agricultural scientific journals and websites in general.
- View electronic syds to focus knowledge and science in the mind.

Topics: (theoretical part):

Weeks	Topics	Hours
1	**Introduction to soil, water and plant analysis**	**2 hours**
2	**Get samples**	**2 hours**
3	**Review some key concepts in quantitative analysis**	**2 hours**
4	**Processing results and verifying the accuracy of analyses**	**2 hours**

5	Methods of weight analysis	2 hours
6	Volumetric analysis methods	2 hours
7-8	Electrical analysis methods	4 hours
9	Spectrometer-based analysis methods	2 hours
10	Analysis methods based on atomic absorption spectrum measurement	2 hours
11	Analysis methods based on atomic emission spectrum measurement	2 hours
12	Use of X-rays in metal and quantitative analysis	2 hours
13-14	Use of radioactive and stable isotopes in the field of quantitative analysis of elements	4 hours

Topics: (Practical Part):

Weeks	Topics	Hours
1	Take soil samples and prepare them for analysis	3 hours
2	Plant sampling and water samples	3 hours
3	Calculate and configure standard solutions	3 hours
4	Preparation of extracts and measurement of pH and EC	3 hours
5	Estimate of mutual images and the interoperability of CEC positive ions	3 hours
6	Estimate the level of organic carbon	3 hours
7	Estimate ready nitrogen and ready-made potassium	3 hours
8	Estimate ready-made phosphorus	3 hours
9	Estimate the total soil content of the elements	3 hours

10	**X-Ray** metal analysis	**3 hours**
11	**Set oxidation and reduction effort for soil**	**3 hours**
12	**Digest plant samples and set their content of elements**	**3 hours**

Systematic book:

Chemical Analysis of Soil by Dr. Hamdallah Suleiman Rahi, Dr. Ismail Ibrahim Khudhair, Mohammed Ali Jamal Al Obaidi

Auditions:

Theoretical part (lectures)

A. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

B. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10 degrees (25%)

Practical part (laboratories)

C. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily field and laboratory performance (student activity).

10% commitment and discipline in the laboratory and field.

D. The final exam (20%) is distributed to:

70% field practical test.

30% oral or editorial examination in scientific subject.

The name	**Land settlement and modification**	**Row:**	**Second**
Decision code:	**---**	**Planned teaching hours :**	**70**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Spring**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

A settlement, settlement devices, settlement methods, contours, contouring, spaces and stones, calculation of volumes

The purpose of teaching the curriculum is:

The settlement is a branch of the area that specializes in measuring the vertical dimension between two or more points on the earth's surface directly or indirectly based on a fixed level called the comparison level (average sea level) and therefore vertical dimensions are positive if they are above the comparison level and negative if they are below the comparison level and use vertical dimensions in tracking equal-height lines (contour lines), drawing terrain sections and identifying points at certain altitudes for construction purposes, so the settlement process is important. Very for data and use for applied purposes.

Learning results:

After receiving this article, the learner will be able to learn and apply to the settlement, use the settlement devices, know and apply the methods of settlement, prepare the contours, and calculate the spaces and stones.

Teaching and learning methods:

- **Exams**
- **The opinions of students and the opinions of faculty members and the opinions of graduates**
- **Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.**
- **Textbooks.**
- **Agricultural scientific journals and websites in general.**
- **View electronic syds to focus knowledge and science in the mind.**

Topics: (theoretical part):

Weeks	Topics	Hours
1	Definition and objectives of settlement and land adjustment	2 hours
2	Methods of calculating placements (direct methods)	2 hours
3	Placement calculation methods (indirect methods)	2 hours
4	Definitions and terms of settlement and adjustment processes	2 hours
5	Calculating longitudinal sections	2 hours
6	Cross-section account	2 hours

7	Urban exam.	2 hours
8	Sources of errors in the settlement work	2 hours
9	Identify the contours, their purposes and specifications	2 hours
10	Contour maps	2 hours
11	Al-Hijum's account	2 hours
12	Account data sources	2 hours
13	Account of volumes from contour maps	2 hours
14	Urban exam.	2 hours

Topics: (Practical Part):

Weeks	Topics	Hours
1	Different ways to find the relationship between different heights	3 hours
2	Identification and use of land modification settlement devices	3 hours
3	How to verify the accuracy of settlement devices	3 hours
4	Planning and mathematical applications in calculating placements in indirect ways	3 hours
5	Planning and mathematical applications in calculating placements in indirect ways	3 hours
6	Sources of errors in the settlement work	3 hours
7	Urban exam.	3 hours
8	Drilling and filling calculations of longitudinal and transverse sections	3 hours
9	Planning and mathematical applications in contour mapping	3 hours
10	Contour mapping and inking	3 hours

11	**Applications in regular volume account**	**3 hours**
12	**Applications in irregular volume account**	**3 hours**
13	**Applications in the calculation of volumes of contour maps**	**3 hours**
14	**Urban exam.**	**3 hours**

Systematic book:

1. In1975, Riad Saleh al-Khafaf was wiped out in the public area.
2. The foundations of the flat and topographic area / Riad Saleh Al-Khaf / 2000.

Auditions:

Theoretical part (lectures)

A. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

B. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10

degrees (25%)

Practical part (laboratories)

C. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily field and laboratory performance (student activity).

10% commitment and discipline in the laboratory and field.

D. The final exam (20%) is distributed to:

70% field practical test.

30% oral or editorial examination in scientific subject.

The name	**Principles of microscopic revival**	**Class**	**Second**
Decision code:	**T.M.G. 211**	**Planned teaching hours :**	**70**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Autumnal**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

Definition of microbiology, the development of microbiology, microbiology aggregates, morphological and anatomical bacteria properties and bacteria growth, fundamentals of fungi, algae, protozoa and viruses, the relationship of microbiology to diseases and agricultural production, the study of families and bacterial races.

The purpose of teaching the curriculum is:

Introducing the student to living organisms that are not seen with the naked eye (bacteria, aryanism, fungi, algae, protozoa and viruses) in terms of their spread in different environments and their reproduction, reproduction, grading, metabolism and inheritance.

The student is also introduced to the relationship between these organisms and other organisms - human, animal, plant - and their beneficial and harmful effects.

Learning results:

After receiving this course, the student learned how to deal with microbiology in terms of development, diagnosis, purification, examination, prevention and exploitation of beneficial events.

Teaching and learning methods:

- Examinations

- Opinions of students, opinions of faculty members and opinions of graduates

Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.

Books.

Agricultural scientific journals and websites in general.

Presentation of electronic precursors to focus knowledge and science in the mind.

Topics: (theoretical part):

Weeks	Topics	Hours
1	Definition and evolution of microbiology	2 hours
2	The classification site of microbiology in the world of biology	2 hours
3	Microbiology Designation - Biology Classification	2 hours
4	Bacteria - their presence - their forms	2 hours
5	Bacterial cell wall and its components - sitoblasmi membrane and its components	2 hours
6	Permeability and selectivity through cytoblasmic membranes	2 hours
7	Bacterial levels - capillaries - organelles outside the sito plasm	2 hours
8	Cytopslasm - Nucleic Acids - Nuclear Acid Synthesis	2 hours
9	Medial bodies - plasmids spurs – follicles	2 hours
10	Fungi - description of the body of mushrooms - their importance - economic importance and damage	2 hours

11	**Fungal cell structure - cytoplasm and its contents**	**2 hours**
12	**Algae- their species, their presence, their location among organisms, their growth and their reproduction.**	**2 hours**
13	**Microbiology Nutrition - Microbiology Reproduction**	**2 hours**
14	**Virus**	**2 hours**

Topics: (Practical Part):

Weeks	Topics	Hours
1	**Learn about microbiology laboratory - safety guidelines and methods**	**3 hours**
2	**Equipment, tools used and chemicals for study**	**3 hours**
3	**Sterilization methods - components and use of a microscope - how to prepare a glass slide**	**3 hours**
4	**Microbiology sampling methods - microbiology isolation**	**3 hours**
5	**Microbiology Purification Methods - Biology Counting Methods**	**3 hours**
6	**Diagnosis of bacteria - forms of bacteria - bacterial groupings**	**3 hours**
7	**Fungi - Diagnosis of fungi - form of their populations - methods of measuring the colony**	**3 hours**
8	**Simple bacteria.**	**3 hours**
9	**Differential bacteria**	**3 hours**
10	**The bacteria's whips are poured.**	**3 hours**
11	**The spurs and capsules are in bacteria.**	**3 hours**
12	**Inhibition of bacteria**	**3 hours**

13	**Antibiotics and methods of measuring them**	**3 hours**
14	**Impact of environmental factors on the growth of organisms**	**3 hours**

Systematic book:

- Al-Ani, Faez Aziz and Badawi, Amin Suleiman. (1990), Principles of Microbiology. Dar al-Hikma Printing and Publishing. Mosul. Iraq

Auditions:

Theoretical part (lectures)

A. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

B. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10 degrees (25%)

Practical part (laboratories)

C. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily field and laboratory performance (student activity).

10% commitment and discipline in the laboratory and field.

D. The final exam (20%) is distributed to:

70% field practical test.

30% oral or editorial examination in scientific subject.

The name	**Principles of soil science**	**Class:**	**Second**
Decision code:	**TMZ 115**	**Planned teaching hours :**	**75**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Autumnal**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

The curriculum tries to cover the general foundations and concepts of major soil disciplines (soil surveying and classification and soil classification, soil physics, soil chemistry, soil fertility and soil revival) and linking them to field and laboratory applications.

The purpose of teaching the curriculum is:

The vocabulary of the curriculum aims to introduce the student to the basics of soil science in the disciplines of surveying and classifying soils and classification of soils, soil physics, soil chemistry, soil fertility and soil revival. and to understand it more comprehensively in the later stages theoretically and practically

Learning results:

Understanding and applying some ideas and methods of work to study the properties of physiochemical, fertility and vital soils as well as general knowledge of

the factors and processes of soil formation and soil and water management and sustainability with an explanation of the most important problems and their treatment.

Teaching and learning methods:

- Examinations

- Opinions of students, opinions of faculty members and opinions of graduates

Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.

Books.

Agricultural scientific journals and websites in general.

Presentation of electronic precursors to focus knowledge and science in the mind.

Topics: (theoretical part):

Weeks	Topics	Hours
1-2	Soil development and composition	4 hours
3-4	Physical properties	4 hours
5	Soil water	2 hours
6	Urban exam.	2 hours
7-8	Colloids and chemical soil properties	4 hours
9-10	Salinity and alkali in the soil and reclamation of salt-affected soils	4 hours
11	The biological and chemical properties of the soil	2 hours
12	Soil fertility and plant nutrition	2 hours
13	Urban exam.	2 hours
14	Organic soil material	2 hours
15	Classification and management of soils in Iraq	2 hours

Topics: (Practical Part):

Weeks	Topics	Hours

1	**Collect soil samples**	3 hours
2	**Measuring moisture** content	3 hours
3-4	**Measuring the virtual and real density of soil and porous**	6 hours
5-6	**Estimate the percentages of sand, mud and greenery and determine soil tissue**	6 hours
7	**PH** measurement **of soil and soil salinity**	3 hours
8	**Urban exam.**	3 hours
9	**Estimate some positive dissolved ions in soil solution (Ca2+, Mg2+, Na+ andk+)**	3 hours
10	**Estimate some negative dissolved ions in soil solution (Cl-,CO32-and HCO3-)**	3 hours
11	**Estimate soil content of carbonate minerals**	3 hours
12	**Assessment of organic soil material**	3 hours
13	**Estimate ready nitrogen in soil**	3 hours
14	**Estimate some vital characteristics of the soil, such as estimating the total numbers of fungi and bacteria in the soil**	3 hours
15	**Digging and describing soil**	3 hours

Systematic book:

1. Sumner, M. E. 2000. Handbook of soil science. CRC press
2. Abdullah al-Ani, 1981. Principles of soil science
3. Daniel Hall. The entrance to soil physics. Translated by Dr. Mehdi Ibrahim Odeh
4. Ahmed Zubeidi. Soil salinity.
5. Walid Al-Akidi and Shaker al-Issawi.1989.

Auditions:

Theoretical part (lectures)

A. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

B. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10 degrees (25%)

Practical part (laboratories)

C. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily field and laboratory performance (student activity).

10% commitment and discipline in the laboratory and field.

D. The final exam (20%) is distributed to:

70% field practical test.

30% oral or editorial examination in scientific subject.

The name	**agricultural machinery**	**Class :**	**Second**
Decision code:	**TMZ 223**	**Planned teaching hours :**	**75**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Spring**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

The concept of machinery is to introduce the student to all agricultural machinery and machinery of all kinds, from agricultural tugs and engines to tillage and softening equipment and developing crop service equipment to end with harvest and post-harvest equipment and how to optimize them to increase productivity and reduce physical effort and known time for agricultural operations by selecting and testing agricultural machinery suitable for each crop and increasing plant and animal production.

The purpose of teaching the curriculum is:

1. Preparing graduate students of the Faculty of Agriculture trained to use and manage tugs and agricultural equipment
2. Reducing the costs of agriculture, production and distribution
3. Introducing modern technologies for the optimal use of agricultural women and equipment

Learning results:

1. Increase sufficient expertise to use and manage agricultural machinery and machinery
2. Increase crop service to increase the area of cultivated fields

3. Meeting food needs with increased population associated with increased demand for agricultural production

Teaching and learning methods:

- Examinations

- Opinions of students, opinions of faculty members and opinions of graduates

Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.

Books.

Agricultural scientific journals and websites in general.

Presentation of electronic precursors to focus knowledge and science in the mind.

Topics: (theoretical part):

Weeks	Topics	Hours
1	Types of tugs and engines and their functions	2 hours
2	Methods used to transport and convert movement in agricultural engines and machinery	2 hours
3	Types of internal combustion engines and their parts	2 hours
4	Engine action theory and types of thermal cycles	2 hours
5	Calculating engine capabilities and competencies	2 hours
6	Internal combustion engine assistive devices	2 hours
7	Transmissions in the agricultural tug	2 hours
8	Tug-of-war devices	2 hours
9	Earth contact devices	2 hours

10	Soil preparation equipment (types, functions and work)	2 hours
11	Fertilization equipment (types, functions and work)	2 hours
12	Control equipment and sticks (types, functions and work)	2 hours
13	Seeding and agriculture equipment (types, functions and work)	2 hours
14	Harvest equipment	2 hours
15	Post-harvest equipment	2 hours

Topics: (Practical Part):

Weeks	Topics	Hours
1	See the types of tugs and engines	3 hours
2	Identify engine parts	3 hours
3	Watch movies about the work of tugs and engines	3 hours
4	Identify the transmissions in the tug	3 hours
5	Identify tug-of-war devices	3 hours
6	Tug driving exercises and networking methods with agricultural machinery	3 hours
7	Identify the types of contact devices with the ground	3 hours
8	Identification of soil preparation equipment (work and maintenance)	3 hours
9	Identification and maintenance of fertilization equipment	3 hours
10	Identification and maintenance of control and ad dilemma equipment	3 hours
11	Watch and calibrate the atoms	3 hours
12	Learn about the types of harvesting equipment and its work	3 hours

13	**Watch movies on how harvest and post-harvest equipment works**	**3 hours**
14	**Field exercises on the application of the work of some agricultural machinery**	**3 hours**
15	**Watch movies about the work, operation and maintenance of agricultural machinery**	**3 hours**

Systematic book:

- Agricultural machinery and machinery. Dr. Yasin Hashim Al-Tahan and Dr. Mohammed Jassim Al-Nema.2000

Auditions:

Theoretical part (lectures)

A. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

B. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10 degrees (25%)

The practical**part (field, laboratory and workshop)**

C. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily performance in the field, laboratory and workshop (student activity).

10% commitment and discipline in the laboratory and field.

D. The final exam (20%) is distributed to:

70% practical test.

30% oral or editorial examination in scientific subject.

The name	**Soil environment**	**Class :**	**Second**
Decision code:	**T.M.Z. 317**	**Planned teaching hours :**	**75**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Autumnal**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

The article includes various environmental concepts (environment, ecology, ecosystem, surrounding factors, biological relationships, self-feeding organisms" products, feeding-certified organisms, "consumables", biodegradation of organic compounds and the rotation of elements by analysts, as well as the material includes factors surrounding outside the soil environment, which is related to atmospheric nuances .

The purpose of teaching the curriculum is:

This course aims to introduce the student to the concept of soil environment, which means organism "living factors" and factors surrounding "non-living factors" and recognizes the organisms found in the soil, including the roots of plants, the extent of diversity and differences between soil revival and different biological relationships, as well as recognizes the factors surrounding physic, chemical and fertility that affect and affect organisms present in the soil environment, Also through this article, the student learns how to maintain a clean environment, environmental balance and the use of bioprocessors to rid the soil of pollutants.

The student is also introduced to the factors surrounding outside the soil environment, which relates to the weather.

Learning results:

After receiving this material, the learner is able to deal with various organic wastes and use them usefully in plant production and maintain a clean environment.

Teaching and learning methods:

- Exams
- The opinions of students and the opinions of faculty members and the opinions of graduates
- Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.
- Textbooks.
- Agricultural scientific journals and websites in general.
- View electronic syds to focus knowledge and science in the mind.

Topics: (theoretical part):

Weeks	Topics	Hours
1	The environment, its concept and its relationship with man	2 hours
2	The environment, its concept and its relationship with man	2 hours
3	Departments of Ecology, Ecosystem	2 hours
4	Climate, climate cycle, soil climate	2 hours
5	Energy, radiation, heat, wind, atmospheric pressure	2 hours
6	Water, water relationship with plant, precipitation,	2 hours

	atmospheric humidity, clouds	
7	Snow and ice, cold, fog, evaporation	2 hours
8	Environmental qualities of soil	2 hours
9	Soil moisture content	2 hours
10	Soil air and ventilation, heat	2 hours
11	factors influencing, key characteristics, soil construction,	2 hours
12	Porosity, soil tissue	2 hours
13	Study of vegetation characteristics	2 hours
14	Environmental pollution, population explosion	2 hours
15	The role of man in the environment	2 hours

Topics: (Practical Part):

Weeks	Topics	Hours
1	Ecology and surrounding factors	3 hours
2	Temperatures and temperature gauges in the air and soil	3 hours
3	Solar radiation and measuring devices	3 hours
4	Humidity and measuring devices in the air and soil	3 hours
5	Precipitation, rain and dew measuring devices	3 hours
6	Wind, wind speed and direction measurement devices	3 hours
7	Atmospheric pressure and measuring devices	3 hours
8	Evaporation and evaporation metering devices	3 hours

9	**Soil, soil characteristics, salinity, reaction degree, soil components and minutes**	**3 hours**
10	**Natural plant environments in the world and Iraq, alpine environments, steppes, savannahs, grasses, tundra**	**3 hours**
11	**Desert cover in the world and Iraq**	**3 hours**
12	**The aquatic ecosystem on earth, aquatic and salt plants**	**3 hours**
13	**Forest vegetation in the world and Iraq**	**3 hours**
14	**Climate charts and vocabulary, field experience**	**3 hours**
15	**Visit to Anwa Air Station**	**3 hours**

Systematic book:

Plant Ecology. Dr. Majid Rashid Al-Hilli and Dr. Hikmat Abbas Al-Ani. Mosul University

Auditions:

Theoretical part (lectures)

E. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

F. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10

degrees (25%)

Practical part (laboratories)

G. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily field and laboratory performance (student activity).

10% commitment and discipline in the laboratory and field.

H. The final exam (20%) is distributed to:

70% field practical test.

30% oral or editorial examination in scientific subject.

The name	**Analysis of soil, water and plant**	**Class:**	**Second**
Decision code:	**TMZ 215**	**Planned teaching hours :**	**64**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Spring**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

Introduction to soil, water and plant analysis, obtaining samples, reviewing some basic concepts in quantitative and qualitative analysis of the most important compounds and elements in soil, water and plant.

The purpose of teaching the curriculum is:

The purpose of the article is to introduce the students of the second stage in the Department of Soil Sciences and Water Resources to the methods of analysing soil, water and plant samples as an entry point for the study of different disciplines and soil sciences in advanced stages, which include practical lessons and laboratories requiring scientific background in different methods of analysis.

Learning results:

The student learned about the methods, chemicals and devices used to estimate different elements and ions in the soil, water and plant.

Teaching and learning methods:

- Exams
- The opinions of students and the opinions of faculty members and the opinions of graduates
- Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.
- Textbooks.
- Agricultural scientific journals and websites in general.
- View electronic syds to focus knowledge and science in the mind.

Topics: (theoretical part):

Weeks	Topics	Hours
1	**Introduction to soil, water and plant analysis**	**2 hours**
2	**Get samples**	**2 hours**
3	**Review some key concepts in quantitative analysis**	**2 hours**

4	Processing results and verifying the accuracy of analyses	2 hours
5	Methods of weight analysis	2 hours
6	Volumetric analysis methods	2 hours
7-8	Electrical analysis methods	4 hours
9	Spectrometer-based analysis methods	2 hours
10	Analysis methods based on atomic absorption spectrum measurement	2 hours
11	Analysis methods based on atomic emission spectrum measurement	2 hours
12	Use of X-rays in metal and quantitative analysis	2 hours
13-14	Use of radioactive and stable isotopes in the field of quantitative analysis of elements	4 hours

Topics: (Practical Part):

Weeks	Topics	Hours
1	Take soil samples and prepare them for analysis	3 hours
2	Plant sampling and water samples	3 hours
3	Calculate and configure standard solutions	3 hours
4	Preparation of extracts and measurement of pH and EC	3 hours
5	Estimate of mutual images and the interoperability of CEC positive ions	3 hours
6	Estimate the level of organic carbon	3 hours
7	Estimate ready nitrogen and ready-made potassium	3 hours
8	Estimate ready-made phosphorus	3 hours

9	**Estimate the total soil content of the elements**	**3 hours**
10	**X-Ray** metal analysis	**3 hours**
11	**Set oxidation and reduction effort for soil**	**3 hours**
12	**Digest plant samples and set their content of elements**	**3 hours**

Systematic book:

Chemical Analysis of Soil by Dr. Hamdallah Suleiman Rahi, Dr. Ismail Ibrahim Khudhair, Mohammed Ali Jamal Al Obaidi

Auditions:

Theoretical part (lectures)

E. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

F. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10 degrees (25%)

Practical part (laboratories)

G. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily field and laboratory performance (student activity).

10% commitment and discipline in the laboratory and field.

H. The final exam (20%) is distributed to:

70% field practical test.

30% oral or editorial examination in scientific subject.

The name	**Land settlement and modification**	**Row:**	**Second**
Decision code:	**---**	**Planned teaching hours :**	**70**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Spring**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

A settlement, settlement devices, settlement methods, contours, contouring, spaces and stones, calculation of volumes

The purpose of teaching the curriculum is:

The settlement is a branch of the area that specializes in measuring the vertical dimension between two or more points on the earth's surface directly or indirectly based on a fixed level called the comparison level (average sea level) and therefore vertical dimensions are positive if they are above the comparison level and negative if they are below the comparison level and use vertical dimensions in tracking equal-height lines (contour lines), drawing terrain sections and identifying points at certain

altitudes for construction purposes, so the settlement process is important. Very for data and use for applied purposes.

Learning results:

After receiving this article, the learner will be able to learn and apply to the settlement, use the settlement devices, know and apply the methods of settlement, prepare the contours, and calculate the spaces and stones.

Teaching and learning methods:

- **Exams**
- **The opinions of students and the opinions of faculty members and the opinions of graduates**
- **Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.**
- **Textbooks.**
- **Agricultural scientific journals and websites in general.**
- **View electronic syds to focus knowledge and science in the mind.**

Topics: (theoretical part):

Weeks	Topics	Hours
1	Definition and objectives of settlement and land adjustment	2 hours
2	Methods of calculating placements (direct methods)	2 hours
3	Placement calculation methods (indirect methods)	2 hours

4	Definitions and terms of settlement and adjustment processes	2 hours
5	Calculating longitudinal sections	2 hours
6	Cross-section account	2 hours
7	Urban exam.	2 hours
8	Sources of errors in the settlement work	2 hours
9	Identify the contours, their purposes and specifications	2 hours
10	Contour maps	2 hours
11	Al-Hijum's account	2 hours
12	Account data sources	2 hours
13	Account of volumes from contour maps	2 hours
14	Urban exam.	2 hours

Topics: (Practical Part):

Weeks	Topics	Hours
1	Different ways to find the relationship between different heights	3 hours
2	Identification and use of land modification settlement devices	3 hours
3	How to verify the accuracy of settlement devices	3 hours
4	Planning and mathematical applications in calculating placements in indirect ways	3 hours
5	Planning and mathematical applications in calculating placements in indirect ways	3 hours
6	Sources of errors in the settlement work	3 hours
7	Urban exam.	3 hours

8	Drilling and filling calculations of longitudinal and transverse sections	3 hours
9	Planning and mathematical applications in contour mapping	3 hours
10	Contour mapping and inking	3 hours
11	Applications in regular volume account	3 hours
12	Applications in irregular volume account	3 hours
13	Applications in the calculation of volumes of contour maps	3 hours
14	Urban exam.	3 hours

Systematic book:

3. In1975, Riad Saleh al-Khafaf was wiped out in the public area.

4. The foundations of the flat and topographic area / Riad Saleh Al-Khaf / 2000.

Auditions:

Theoretical part (lectures)

E. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

F. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum

2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10 degrees (25%)

Practical part (laboratories)

G. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily field and laboratory performance (student activity).

10% commitment and discipline in the laboratory and field.

H. The final exam (20%) is distributed to:

70% field practical test.

30% oral or editorial examination in scientific subject.

The name	**Principles of microscopic revival**	**Class**	**Second**
Decision code:	**T.M.G. 211**	**Planned teaching hours :**	**70**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Autumnal**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

Definition of microbiology, the development of microbiology, microbiology aggregates, morphological and anatomical bacteria properties and bacteria growth, fundamentals of fungi, algae, protozoa and viruses, the relationship of microbiology to diseases and agricultural production, the study of families and bacterial races.

The purpose of teaching the curriculum is:

Introducing the student to living organisms that are not seen with the naked eye (bacteria, aryanism, fungi, algae, protozoa and viruses) in terms of their spread in different environments and their reproduction, reproduction, grading, metabolism and inheritance.

The student is also introduced to the relationship between these organisms and other organisms - human, animal, plant - and their beneficial and harmful effects.

Learning results:

After receiving this course, the student learned how to deal with microbiology in terms of development, diagnosis, purification, examination, prevention and exploitation of beneficial events.

Teaching and learning methods:

- Examinations

- Opinions of students, opinions of faculty members and opinions of graduates

Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.

Books.

Agricultural scientific journals and websites in general.

Presentation of electronic precursors to focus knowledge and science in the mind.

Topics: (theoretical part):

Weeks	Topics	Hours
1	Definition and evolution of microbiology	2 hours
2	The classification site of microbiology in the world of biology	2 hours
3	Microbiology Designation - Biology Classification	2 hours
4	Bacteria - their presence - their forms	2 hours
5	Bacterial cell wall and its components - sitoblasmi membrane and its components	2 hours
6	Permeability and selectivity through cytoblasmic membranes	2 hours
7	Bacterial levels - capillaries - organelles outside the sito plasm	2 hours
8	Cytopslasm - Nucleic Acids - Nuclear Acid Synthesis	2 hours
9	Medial bodies - plasmids spurs – follicles	2 hours
10	Fungi - description of the body of mushrooms - their importance - economic importance and damage	2 hours
11	Fungal cell structure - cytoplasm and its contents	2 hours
12	Algae- their species, their presence, their location among organisms,	2 hours

	their growth and their reproduction.	
13	**Microbiology Nutrition - Microbiology Reproduction**	**2 hours**
14	**Virus**	**2 hours**

Topics: (Practical Part):

Weeks	Topics	Hours
1	**Learn about microbiology laboratory - safety guidelines and methods**	**3 hours**
2	**Equipment, tools used and chemicals for study**	**3 hours**
3	**Sterilization methods - components and use of a microscope - how to prepare a glass slide**	**3 hours**
4	**Microbiology sampling methods - microbiology isolation**	**3 hours**
5	**Microbiology Purification Methods - Biology Counting Methods**	**3 hours**
6	**Diagnosis of bacteria - forms of bacteria - bacterial groupings**	**3 hours**
7	**Fungi - Diagnosis of fungi - form of their populations - methods of measuring the colony**	**3 hours**
8	**Simple bacteria.**	**3 hours**
9	**Differential bacteria**	**3 hours**
10	**The bacteria's whips are poured.**	**3 hours**
11	**The spurs and capsules are in bacteria.**	**3 hours**
12	**Inhibition of bacteria**	**3 hours**
13	**Antibiotics and methods of measuring them**	**3 hours**
14	**Impact of environmental factors on the growth of organisms**	**3 hours**

Systematic book:

- Al-Ani, Faez Aziz and Badawi, Amin Suleiman. (1990), Principles of Microbiology. Dar al-Hikma Printing and Publishing. Mosul. Iraq

Auditions:

Theoretical part (lectures)

E. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

F. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10 degrees (25%)

Practical part (laboratories)

G. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily field and laboratory performance (student activity).

10% commitment and discipline in the laboratory and field.

H. The final exam (20%) is distributed to:

70% field practical test.

30% oral or editorial examination in scientific subject.

The name	**Principles of soil science**	**Class:**	**Second**
Decision code:	**TMZ 115**	**Planned teaching hours :**	**75**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Autumnal**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

The curriculum tries to cover the general foundations and concepts of major soil disciplines (soil surveying and classification and soil classification, soil physics, soil chemistry, soil fertility and soil revival) and linking them to field and laboratory applications.

The purpose of teaching the curriculum is:

The vocabulary of the curriculum aims to introduce the student to the basics of soil science in the disciplines of surveying and classifying soils and classification of soils, soil physics, soil chemistry, soil fertility and soil revival. and to understand it more comprehensively in the later stages theoretically and practically

Learning results:

Understanding and applying some ideas and methods of work to study the properties of physiochemical, fertility and vital soils as well as general knowledge of the factors and processes of soil formation and soil and water management and sustainability with an explanation of the most important problems and their treatment.

Teaching and learning methods:

- Examinations

- Opinions of students, opinions of faculty members and opinions of graduates

Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.

Books.

Agricultural scientific journals and websites in general.

Presentation of electronic precursors to focus knowledge and science in the mind.

Topics: (theoretical part):

Weeks	Topics	Hours
1-2	Soil development and composition	4 hours
3-4	Physical properties	4 hours
5	Soil water	2 hours
6	Urban exam.	2 hours
7-8	Colloids and chemical soil properties	4 hours
9-10	Salinity and alkali in the soil and reclamation of salt-affected soils	4 hours
11	The biological and chemical properties of the soil	2 hours
12	Soil fertility and plant nutrition	2 hours
13	Urban exam.	2 hours
14	Organic soil material	2 hours
15	Classification and management of soils in Iraq	2 hours

Topics: (Practical Part):

Weeks	Topics	Hours
1	Collect soil samples	3 hours
2	Measuring moisture content	3 hours
3-4	Measuring the virtual and real density of soil and porous	6 hours

5-6	**Estimate the percentages of sand, mud and greenery and determine soil tissue**	**6 hours**
7	**PH** measurement **of soil and soil salinity**	**3 hours**
8	**Urban exam.**	**3 hours**
9	**Estimate some positive dissolved ions in soil solution (Ca2+, Mg2+, Na+ andk+)**	**3 hours**
10	**Estimate some negative dissolved ions in soil solution (Cl-,CO32-and HCO3-)**	**3 hours**
11	**Estimate soil content of carbonate minerals**	**3 hours**
12	**Assessment of organic soil material**	**3 hours**
13	**Estimate ready nitrogen in soil**	**3 hours**
14	**Estimate some vital characteristics of the soil, such as estimating the total numbers of fungi and bacteria in the soil**	**3 hours**
15	**Digging and describing soil**	**3 hours**

Systematic book:

6. Sumner, M. E. 2000. Handbook of soil science. CRC press
7. Abdullah al-Ani, 1981. Principles of soil science
8. Daniel Hall. The entrance to soil physics. Translated by Dr. Mehdi Ibrahim Odeh
9. Ahmed Zubeidi. Soil salinity.
10. Walid Al-Akidi and Shaker al-Issawi.1989.

Auditions:

Theoretical part (lectures)

E. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

F. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10 degrees (25%)

Practical part (laboratories)

G. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily field and laboratory performance (student activity).

10% commitment and discipline in the laboratory and field.

H. The final exam (20%) is distributed to:

70% field practical test.

30% oral or editorial examination in scientific subject.

Decision code:	**TMZ 223**	**Planned teaching hours :**	**75**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Spring**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

The concept of machinery is to introduce the student to all agricultural machinery and machinery of all kinds, from agricultural tugs and engines to tillage and softening equipment and developing crop service equipment to end with harvest and post-harvest equipment and how to optimize them to increase productivity and reduce physical effort and known time for agricultural operations by selecting and testing agricultural machinery suitable for each crop and increasing plant and animal production.

The purpose of teaching the curriculum is:

4. Preparing graduate students of the Faculty of Agriculture trained to use and manage tugs and agricultural equipment
5. Reducing the costs of agriculture, production and distribution
6. Introducing modern technologies for the optimal use of agricultural women and equipment

Learning results:

4. Increase sufficient expertise to use and manage agricultural machinery and machinery
5. Increase crop service to increase the area of cultivated fields
6. Meeting food needs with increased population associated with increased demand for agricultural production

Teaching and learning methods:

- Examinations

- Opinions of students, opinions of faculty members and opinions of graduates

Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.

Books.

Agricultural scientific journals and websites in general.

Presentation of electronic precursors to focus knowledge and science in the mind.

Topics: (theoretical part):

Weeks	Topics	Hours
1	Types of tugs and engines and their functions	2 hours
2	Methods used to transport and convert movement in agricultural engines and machinery	2 hours
3	Types of internal combustion engines and their parts	2 hours
4	Engine action theory and types of thermal cycles	2 hours
5	Calculating engine capabilities and competencies	2 hours
6	Internal combustion engine assistive devices	2 hours
7	Transmissions in the agricultural tug	2 hours
8	Tug-of-war devices	2 hours
9	Earth contact devices	2 hours
10	Soil preparation equipment (types, functions and work)	2 hours
11	Fertilization equipment (types, functions and work)	2 hours
12	Control equipment and sticks (types, functions and work)	2 hours

13	Seeding and agriculture equipment (types, functions and work)	2 hours
14	Harvest equipment	2 hours
15	Post-harvest equipment	2 hours

Topics: (Practical Part):

Weeks	Topics	Hours
1	See the types of tugs and engines	3 hours
2	Identify engine parts	3 hours
3	Watch movies about the work of tugs and engines	3 hours
4	Identify the transmissions in the tug	3 hours
5	Identify tug-of-war devices	3 hours
6	Tug driving exercises and networking methods with agricultural machinery	3 hours
7	Identify the types of contact devices with the ground	3 hours
8	Identification of soil preparation equipment (work and maintenance)	3 hours
9	Identification and maintenance of fertilization equipment	3 hours
10	Identification and maintenance of control and ad dilemma equipment	3 hours
11	Watch and calibrate the atoms	3 hours
12	Learn about the types of harvesting equipment and its work	3 hours
13	Watch movies on how harvest and post-harvest equipment works	3 hours
14	Field exercises on the application of the work of some agricultural machinery	3 hours
15	Watch movies about the work, operation and maintenance of	3 hours

agricultural machinery

Systematic book:

- Agricultural machinery and machinery. Dr. Yasin Hashim Al-Tahan and Dr. Mohammed Jassim Al-Nema.2000

Auditions:

Theoretical part (lectures)

E. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

F. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10 degrees (25%)

The practical**part (field, laboratory and workshop)**

G. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily performance in the field, laboratory and workshop (student activity).

10% commitment and discipline in the laboratory and field.

H. The final exam (20%) is distributed to:

70% practical test.

30% oral or editorial examination in scientific subject.

The name	**Soil organisms**	**Class:**	**Fourth**
Decision code:	**TMZ 424**	**Planned teaching hours :**	**75**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Autumnal**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

The material includes: division of soil biology, important soil revival groups and their relationships to agricultural production, microbiology of the root area, the most important vital activities of soil biology, organic matter transformations, bear formation, nitrogen, phosphorus, sulfur and iron transformations, and modern applications of soil biology (biosafety, bioconference, biological therapy).

The purpose of teaching the curriculum is:

Introducing the student to the totals of the revival of the soil accurate in terms of its preparation, sizes, forms, nutrition, reproduction and harmful and beneficial effects, and the impact of physical, chemical and fertility soil factors in these groups, also aims to introduce students to biological relations in the area around the roots, as well as vital activities of soil neighborhoods and their importance in recycling nutrients, increasing agricultural production and obtaining a healthy product and maintaining a clean and sustainable environment.

Learning results:

After receiving this course, the student was able to learn about the activities of reviving beneficial and harmful soils and can use them in the fields of bio-fertilization, bio-control, compost production, biotherapy and sustainable agriculture.

Teaching and learning methods:

- Examinations

- Opinions of students, opinions of faculty members and opinions of graduates

Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.

Books.

Agricultural scientific journals and websites in general.

Presentation of electronic precursors to focus knowledge and science in the mind.

Topics: (theoretical part):

Weeks	Topics	Hours
1	**Soil as home to microbiology**	**2 hours**
2	**Vital components of soil**	**2 hours**
3	**Presence and distribution of microbiology in the soil**	**2 hours**
4	**Factors affecting microbiology**	**2 hours**
5	**Metabolic processes of microbiology**	**2 hours**
6	**Soil enzymes**	**2 hours**
7	**Carbon and organic matter transformations**	**2 hours**
8	**Developments of Al-Naitrojin al-Bayulujiya**	**2 hours**
9	**Bio-installing atmospheric nitrogen**	**2 hours**
10	**Biomorphic shifts of sulfur in the soil**	**2 hours**

11	**Biophosphorus transformations**	**2 hours**
12	**Biochemical transformations of exotic chemical compounds in the soil**	**2 hours**
13	**Soil pollution and vital reclamation**	**2 hours**
14	**Biological transformations of other elements**	**2 hours**
15	**Greenhouse gases**	**2 hours**

Topics: (Practical Part):

Weeks	Topics	Hours
1	**Introduction/Hardware and Materials**	**3 hours**
2	**Safety requirements in the microbiology laboratory andways to take soil models to study their biology**	**3 hours**
3	**Conditions affecting the growth of microbiology** **pH, heat, carbon source, aw** **Conditions affecting the growth of microbiology**	**3 hours**
4	**Conditions affecting the growth of microbiology**	**3 hours**
5	**Estimate the number of bacteria and radiological fungi**	**3 hours**
6	**Calculating the preparation of bacteria and radial fungi and studying their characteristics.**	**3 hours**
7	**Soil respiration (carbon dioxide estimate)**	**3 hours**
8	**Soil respiration (carbon dioxide estimate)**	**3 hours**
9	**Bio-stabilization of atmospheric nitrogen**	**3 hours**
10	**Soil enzymes**	**3 hours**

11	**The ynds**	**3 hours**
12	**The nitrite**	**3 hours**
13	**Soil Nematod**	**3 hours**
14	**Solvent living of phosphorus**	**3 hours**
15	**Rizosphere effect (R/S ratio)**	**3 hours**

Systematic book:

- Qasim, Ghaban Mohammed and Madir Abdul Sattar Ali.1989. Microscopic soil biology. Book House for Printing and Publishing. Mosul University

Auditions:

Theoretical part (lectures)

A. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

B. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum

2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees

(25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10 degrees (25%)

Practical part (laboratories)

C. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily field and laboratory performance (student activity).

10% commitment and discipline in the laboratory and field.

D. The final exam (20%) is distributed to:

70% field practical test.

30% oral or editorial examination in scientific subject.

The name	**Soil Management**	**Class :**	**Fourth**
Decision code:	**T.M.G. 422**	**Planned teaching hours :**	**70**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Spring**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

To be the reference and guide in the implementation of agricultural projects and the optimal exploitation of land with the highest productivity and the best management.

The purpose of teaching the curriculum is:

The possibility of maintaining soil fertility and raising its productivity in order to increase agricultural production, which depends on the extent to which the nature of

the soil is understood, as well as the nature of the application of technological and scientific progress in the process of exploiting these soils and studying the nature of the soils in terms of their physical, chemical and vital characteristics and classification in order to choose the best appropriate methods for the best exploitation of them and the transfer and analysis of scientific experiments.

Learning results:

The best exploitation of all arable land in the country and the provision of appropriate technical staff that carry out such a huge task.

Teaching and learning methods:

- Examinations

- Opinions of students, opinions of faculty members and opinions of graduates

Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.

Books.

Agricultural scientific journals and websites in general.

Presentation of electronic precursors to focus knowledge and science in the mind.

Topics: (theoretical part):

Weeks	Topics	Hours
1	**Introduction to concept and objectives**	**2 hours**
2	**The importance of classifying soils in their management, classification and how to benefit from it at the chain level**	**2 hours**
3	**Tasks of surveying soils in their management**	**2 hours**
4	**Sample and inspection for management and scientific research purposes**	**2 hours**
5	**The legitimate description of the farm site locally and internationally**	**2 hours**
6	**Classification of land for agriculture, engineering and others**	**2 hours**

7	**Land use assessment**	**2 hours**
8	**Land quality and its relationship to agricultural production**	**2 hours**
9	**General conditions of plant production and its relationship to soil management and the production of appropriate maps**	**2 hours**
10	**Agricultural courses and how to take advantage of them**	**2 hours**
11	**The conditions of the territories and soil of Iraq and the quality of the problems and how to manage them**	**2 hours**
12	**The conditions of the territories and soil of Iraq and the quality of the problems and how to manage them**	**2 hours**
13	**Diagnosis of soil and land problems at the farm level**	**2 hours**
14	**Planning the administrative program that the specialist must submit to the employer**	**2 hours**

Topics: (Practical Part):

Weeks	Topics	Hours
1	**Methods of measuring areas on land and on the map, testing important drawing standards**	**3 hours**
2	**Forensic characterization of the location of the land and the farm: the methods of characterization, the use ofGPS in the location of the land and the farm**	**3 hours**
3	**Rules for the receipt of samples and all agricultural purposes**	**3 hours**
4	**Use of space and aerial images and topographic maps to locate sampling**	**3 hours**
5	**Tasks of classifying soils in their management**	**3 hours**
6	**How to use soil survey reports and maps in soil management**	**3 hours**
7	**How to use soil survey reports and maps in soil management**	**3 hours**
8	**Linking the map unit with the classification unit and the management unit in the formation of farm fields**	**3 hours**

9	**Linking the map unit with the classification unit and the management unit in the formation of farm fields**	**3 hours**
10	**Practical applications on land assessment methods**	**3 hours**
11	**Practical applications on land assessment methods**	**3 hours**
12	**Drawing a map of biological and ideological problems**	**3 hours**
13	**Structured diagnosis of soil problems on the farm**	**3 hours**
14	**Set up the administrative** map **(try in application)**	**3 hours**

Systematic book:

1- Department of Soil and Land Use, 1990, Dr. Walid Khaled Hassan Al-Akidi.

2- Department of Soils in Land Planning and Use, 1999, Dr. Mohammed Khader Abbas.

Auditions:

Theoretical part (lectures)

A. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

B. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10

degrees (25%)

Practical part (laboratories)

C. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily field and laboratory performance (student activity).

10% commitment and discipline in the laboratory and field.

D. The final exam (20%) is distributed to:

70% field practical test.

30% oral or editorial examination in scientific subject.

The name	**Land reclamation**	**Class:**	**Fourth**
Decision code:	**T.M.G. 421**	**Planned teaching hours :**	**75**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Spring**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

Study the concept of reclamation and its role in agricultural production

Expansion of the issue of reclamation of soils affected by salts and stages of implementation of reclamation and management of reclaimed soils

- Discuss different soil problems and learn about the best ways to treat and reclaim

The purpose of teaching the curriculum is:

Learn about the concept of land reclamation and its role in agricultural production

- Study of various soil problems that hinder production (salinity, soda, gypsum, desert, calcareous)

- Learn about the best ways to address soil problems and bring them back to production

Learning results:

After the end of this course, the student is able to know the various soil problems and be able to identify treatments for soil problems and bring them back to production.

Teaching and learning methods:

- Examinations

- Opinions of students, opinions of faculty members and opinions of graduates

Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.

Books.

Agricultural scientific journals and websites in general.

Presentation of electronic precursors to focus knowledge and science in the mind.

Topics: (theoretical part):

Weeks	Topics	Hours
1	**The concept of land reclamation and its role in agricultural production**	**2 hours**

2	**Salt-affected soil reclamation methods**	**2 hours**
3	**Stages of implementation** of **saline reclamation** project	**2 hours**
4	**Phase 1/ Surveys and Field Investigations**	**2 hours**
5	**Phase II / Calculations, designs and decisions**	**2 hours**
6	**Phase 3/ Implementation**	**2 hours**
7	**Phase 4 / Culture**	**2 hours**
8	**Urban exam.**	**2 hours**
9	**Management of reclaimed soils and results of saline land reclamation experiments in Iraq**	**2 hours**
10	**Reclaiming the essaoui soil**	**2 hours**
11	**Gypsum soil** reclamation	**2 hours**
12	**Reclamation of desert and sand soils**	**2 hours**
13	**Limestone soil** reclamation	**2 hours**
14	**Urban exam.**	**2 hours**
15	**Soil** reclamation	**2 hours**

Topics: (Practical Part):

Weeks	Topics	Hours
1	**Saline soil test/cultivation**	**3 hours**
2	**Laboratory experiment washing saline soil**	**3 hours**
3	**EC ,pH**	**3 hours**
4	**Analysis of dissolved washing/ion scarves**	**3 hours**

5	**Soil analysis after EC** washing	**3 hours**
6	**Soil shills after washing/dissolved ions**	**3 hours**
7	**Draw soil washing curves and calculate the washing codified**	**3 hours**
8	**Calculating soil resistance to slavery salinity**	**3 hours**
9	**Sand soil reclamation** experience	**3 hours**
10	**Gypsum soil reclamation** experience	**3 hours**
11	**Discussion of test results**	**3 hours**
12	= = =	**3 hours**
13	= = =	**3 hours**
14	**Try**	**3 hours**
15	**Field trip to reclamation** project	**3 hours**

Systematic book:

- Zubeidi, Ahmed Haidar. 1989. Land Reclamation . Ministry of Higher Education. Baghdad University.

Auditions:

Theoretical part (lectures)

A. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

B. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10 degrees (25%)

Practical part (laboratories)

C. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily field and laboratory performance (student activity).

10% commitment and discipline in the laboratory and field.

D. The final exam (20%) is distributed to:

70% field practical test.

30% oral or editorial examination in scientific subject.

The name	**desertification**	**Class:**	**Fourth**
Decision code:	**---**	**Planned teaching hours :**	**28**
Units:	**2**	**Available attendance:**	**Required**
Chapter:	**Spring**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

The concept of desertification and desertification-related terminology, the problem of desertification, describe the forms and causes of desertification. The harms, risks and losses of desertification, desertification globally, Arably and locally, combating desertification.

The purpose of teaching the curriculum is:

Introducing the student to the meaning of desertification, its causes and consequences, and how to monitor the problem and find ways and ways to prevent it.

Learning results:

1. Identify and understand the phenomenon of desertification in order to preserve natural resources and the ecosystem of which we are part
2. Introducing the student to how to preserve the land and not to overuse it and take responsibility in educating the community.

Teaching and learning methods:

- Examinations

- Opinions of students, opinions of faculty members and opinions of graduates

Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.

Books.

Agricultural scientific journals and websites in general.

Presentation of electronic precursors to focus knowledge and science in the mind.

Topics: (theoretical part):

Weeks	Topics	Hours
1	**Introduction to the concept of desertification and desertification-related terminology**	**2 hours**
2	**The problem of desertification, describing the forms and causes of desertification. The harms, risks and losses of desertification, desertification globally, Arably and locally**	**2 hours**
3	**The origin of desertification. Vegetation, salinity, drought**	**2 hours**
4 - 5	**Combating desertification. Agriculture and permanent agriculture. Water sources and combating desertification, administrative positions in civilized and civil behavior, land reclamation**	**4 hours**
6 - 7	**Sand dunes as a manifestation of desertification. Local distribution and spread of dune area. The origin of the dune problem. Sand dunes and sand dune. Methods and means of installing and combating sand dunes**	**4 hours**
8	**Means and methods of measuring desertification and sand dunes. Measure erosion. Measure soil susceptibility to removal. Measuring loss and addition**	**2 hours**
9 - 10	**Drought and dehydration. Definition of drought, dehydration and the factors causing them. The consequences of drought and dehydration. Methods of living with drought**	**4 hours**
11 - 12	**Global warming. The concept of global warming. Causes of global warming. Some methods of addressing global warming**	**4 hours**
13 - 14	**Harvesting water. The concept of water harvesting. Water harvesting methods. Factors that determine the choice of harvest methods**	**4 hours**

Systematic book:

- **Desertification. Land degradation in dry areas. Written by Dr. Mohamed Abdel Fattah al-Qassas. Dar al-Knowledge Publications. 1999.**
- **Desertification in the Arab world. Ibrahim Nahal. Arab Development Institute. 1987.**
- **FAO. 1994. Water Harvesting for improved Agricultural production.**

Auditions:

Only theoretical part (lectures)

A. Continuous evaluation during the school year (40%) and distributed to:

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

B. The final exam (60%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×15 = 30 degrees (25%)

The name	**Feeding a plant**	**Class:**	**Fourth**
Decision code:	**TMZ 415**	**Planned teaching hours :**	**75**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Spring**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

Learn about the concepts of soil fertility and fertility, the impact of soil components on their fertility, the importance of plant nutrients, their soil transformations, the symptoms of plant deficiency, fertility, nature, sources and the importance of OM for soil and plant fertility, and study the subject of fertile soil calendar

The purpose of teaching the curriculum is:

The student's knowledge of the basic concepts of plant nutrition and the relationship of the plant to the natural and artificial growth circles and how to transmit and absorb nutrients and the vesal functions of each element

Learning results:

The student acquires the skills that enable him to diagnose the symptoms of the deficiency of each nutrient and address its deficiency and how to prepare and added nutritious solutions to the natural or artificial growth circles.

Teaching and learning methods:

- Examinations

- Opinions of students, opinions of faculty members and opinions of graduates

Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.

Books.

Agricultural scientific journals and websites in general.

Presentation of electronic precursors to focus knowledge and science in the mind.

Topics: (theoretical part):

Weeks	Topics	Hours
1	**Definition, division and importance of nutrients**	**2 hours**
2	**Factors affecting nutrient readiness**	**2 hours**
3	**Causes of nutrient deficiency** **Inorganic mineral composition of the plant**	**2 hours**
4	**Mineral nutrition and quality of the product**	**2 hours**
5	**Plant growth circles**	**2 hours**
6	**Quantitative relations (specific worker law and decreasing yield law)**	**2 hours**
7	**First monthly exam**	**2 hours**
8	**Paper feeding**	**2 hours**
9	**Nutrient bioabsorption machines**	**2 hours**
10	**The importance of Mikael's constant and derivation**	**2 hours**
11	**Theories of passive absorption of nutrients**	**2 hours**
12	**Follow theories of passive absorption of nutrients**	**2 hours**
13	**Bioabsorption theories of nutrients**	**2 hours**
14	**Follow theories of bioabsorption of nutrients**	**2 hours**
15	**Second monthly exam**	**2 hours**

Topics: (Practical Part):

Weeks	Topics	Hours
1	**Preparing nutritious solutions**	**3 hours**
2	**Experience sandy, water and air farms**	**3 hours**
3	**Symptoms of nutrient deficiency, diagnosis and treatment** **Nitrogen: physiological functions and diagnosis and treatment of symptoms of deficiency**	**3 hours**
4	**Phosphorus: physiological functions and diagnosis and treatment of symptoms of deficiency**	**3 hours**
5	**Potassium: physiological functions and diagnosis and treatment of symptoms of deficiency**	**3 hours**
6	**Nutritious solutions**	**3 hours**
7	**First monthly exam**	**3 hours**
8	**Sulfur: physiological functions and diagnosis and treatment of symptoms of deficiency**	**3 hours**
9	**Iron: physiological functions and diagnosis and treatment of symptoms of deficiency**	**3 hours**
10	**Types of artificial food farms**	**3 hours**
11	**Zinc: physiological functions and diagnosis and treatment of symptoms of deficiency**	**3 hours**
12	**Copper: physiological functions and diagnosis and treatment of symptoms of deficiency**	**3 hours**
13	**Boron: Physiological functions and diagnosis and treatment of symptoms of deficiency**	**3 hours**
14	**Mulbdenem: Physiological functions and diagnosis and treatment of**	**3 hours**

	symptoms of deficiency	
15	**Second monthly exam**	**3 hours**

Systematic book:

1 - Principles of Plant Nutrition, Saadallah Najm al-Nuaimi. Translated book by Mengel, K. and E.A.Kirkby.1984

2 - Plant Nutrition Guide, 1988 . Yusuf Mohammed Abu Dahi and Moayad Ahmed Al-Younis. Ministry of Higher Education and Scientific Research. Baghdad University. Directorate of Dar al-Kutub for Printing and Publishing. Mosul.

3- feeding the practical plant. Yusuf Mohammed Abu Dahi. 1989 . Ministry of Higher Education and Scientific Research. Baghdad University. House of Wisdom

Auditions:

Theoretical part (lectures)

A. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

B. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10 degrees (25%)

Practical part (laboratories)

C. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily field and laboratory performance (student activity).

10% commitment and discipline in the laboratory and field.

D. The final exam (20%) is distributed to:

70% field practical test.

30% oral or editorial examination in scientific subject.

The name of the rapporteur:	**Fertilizer technologies**	**Clas:**	**Fourth**
Decision code:	**---**	**Planned teaching hours :**	**75**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Spring**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

Organic and vital fertilizers: types and methods of preparation, compound fertilizers and preparation, liquid fertilizers and preparation methods, fertilizers and environmental pollution

The purpose of teaching the curriculum is:

Introducing the student to fertilizers and their types (mineral- organic- vital) and the characteristics of each type and methods of manufacturing it.

Learning results:

The student acquires skills in calculating the amount of each of the major and small elements in simple fertilizer or vehicle and how to manufacture composite fertilizer from simple fertilizer and know the quantities, methods and dates added whether metal, organic or vital.

Teaching and learning methods:

- Examinations

- Opinions of students, opinions of faculty members and opinions of graduates

Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.

Books.

Agricultural scientific journals and websites in general.

Presentation of electronic precursors to focus knowledge and science in the mind.

Topics: (theoretical part):

Weeks	Topics	Hours
1-2	**Modern concepts related to fertilizers and their uses and fertilizer classification**	**4 hours**
3-4	**Organic and vital fertilizers: types and methods of preparation**	**4 hours**

5	**Mineral fertilizers: nitrogen fertilizer, soil behavior and degradation, classification, manufacture and management**	**2 hours**
6	**Phosphorus fertilizer, soil behavior, degradation, classification, manufacture and management.**	**2 hours**
7	**Urban Exam (2015)**	**2 hours**
8	**Potassium fertilizer, soil behavior, degradation, classification, manufacture and management.**	**2 hours**
9	**Calcium, magnesium and sulfur fertilizer: soil behavior and degradation, classification, manufacture and management**	**2 hours**
10	**Micronutrient fertilizer: soil behavior and degradation, classification, manufacture and management**	**2 hours**
11	**Compound fertilizers and preparation**	**2 hours**
12	**Liquid fertilizers and methods of preparation**	**2 hours**
13	**Methods of adding various fertilizers: mineral, organic, solid vitality and with irrigation water**	**2 hours**
14	**Fertilizers and environmental pollution**	**2 hours**
15	**Urban Exam (2015)**	**2 hours**

Topics: (Practical Part):

Weeks	Topics	Hours
1-2	**Start preparing for an ecological experiment (field or voyeuristic experiment) (preferably prepared before the start of the semester to buy time) in order to study the response of a particular crop to fertilize different fertilizer** sources **and different addition dates and methods (and continue and follow up along the semester)**	**6 hours**

3-4	**To calculate the quantities of various mineral, organic and vital fertilizers to be added on the basis of the nutrient of the hectare and fertilizer per hectare or for the kg soil.**	**6 hours**
5	**Identify some different fertilizer properties such as saline guide and degree of interaction.**	**3 hours**
6	**Estimating the concentration of nitrogen in different nitrogen fertilizers (digestion procedure for organic fertilizers)**	**3 hours**
7	**Detection of borite in urea fertilizer**	**3 hours**
8	**Estimating the amount of ammonia volatile from ammonia fertilizers**	**3 hours**
9	**Estimating the concentration of phosphorus in different phosphate fertilizers (digestion procedure for organic fertilizers)**	**3 hours**
10	**Study of phosphorus movement in the soil in practice**	**3 hours**
11	**How to prepare organic fertilizer (aerodynamic decomposition and influencing factors) and prepare bio fertilizers (use of ready-made insulation or commercial biosalm)**	**3 hours**
12	**Total nitrogen and total carbon measurement in organic fertilizer and C/N** calculation	**3 hours**
13	**How to prepare compound and liquid fertilizer in the laboratory**	**3 hours**
14-15	**Discussion of student reports on the results of analysis and biological experiment**	**6 hours**

Systematic book:

- **Fertilizer technologies and uses.**
- **Guide in plant nutrition.2012. Written by Alan Parker and David Bilbem. Translated by Dr. Noureddine Shawky Ali.**

- **Havlin,et al.2005.Soil fertility & fertilizers**

Auditions:

Theoretical part (lectures)

A. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

B. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10 degrees (25%)

Practical part (laboratories)

C. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily field and laboratory performance (student activity).

10% commitment and discipline in the laboratory and field.

D. The final exam (20%) is distributed to:

70% field practical test.

30% oral or editorial examination in scientific subject.

The name	**Irrigation systems technologies**	**Class :**	**Fourth**
Decision code:	**TMZ 313**	**Planned teaching hours :**	**75**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Autumnal**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

Survey of irrigation methods in terms of their design, efficiency, energy to operate them and factors influencing their design. In addition to knowing the technical basis enough to select the required system and develop its operations and monitor its sustainability and gain the necessary expertise to manage irrigation operations

The purpose of teaching the curriculum is:

Students are informed of the basic principles of different irrigation methods, both traditionaland modern.

Learning results:

The student acquires scientific knowledge and practical experience in the field systems of irrigation, especially irrigation by spraying and drip, in terms of its components, components, management, calculations, efficiency and relationship to the plant and thus its management in addition to the development that has taken place in the world.

Teaching and learning methods:

- Examinations

- Opinions of students, opinions of faculty members and opinions of graduates

Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.

Books.

Agricultural scientific journals and websites in general.

Presentation of electronic precursors to focus knowledge and science in the mind.

Topics: (theoretical part):

Weeks	Topics	Hours
1	**Introduction, irrigation system, field irrigation, foundations for the design of a field irrigation system**	**2 hours**
2	**Design factors, water consumption, soil, irrigation comma and depth of irrigation**	**2 hours**
3	**Surface irrigation, surface irrigation mechanism, tip time and depth of irrigation, water balance in surface irrigation, water transport and processing system in the field**	**2 hours**
4	**Bar irrigation, design hypotheses, design determinants, rate and depth of flow, length and width of barboard**	**2 hours**

5	**Palmrose irrigation, design considerations, hypotheses and determinants, decreasing irrigation, pulse irrigation**	**2 hours**
6	**Pelvic irrigation, hypotheses, equations and design determinants, design method**	**2 hours**
7	**Sprinkler irrigation, basic parts of the sprinkler irrigation system, accessories and supplementary equipment, types of sprinkler irrigation systems**	**2 hours**
8	**The basics of spraying irrigation, the distribution of water around the rotary sprinkler, the scheme of a fixed spraying irrigation system, the factors affecting the scheme,**	**2 hours**
9-10	**Consistency of the distribution of spray water, overlapping spraying patterns, water distribution consistency factors under sprinklers, exchange of spray pipe sites, spray spray waste, irrigation efficiency**	**4 hours**
11-12	**Spray tubes, lengths and preparation of spray pipes, hydraulic bases flow in pipes, permitted change in pressure, calculation of tube diameter and calculation of pressure charge**	**4 hours**
13	**Drip irrigation, main parts of drip irrigation system, dotted, hydraulic dotted, wet area**	**2 hours**
14-15	**Designed water need for drip irrigation, depth of irrigation and irrigation comma, hydraulic drip irrigation system**	**4 hours**

Topics: (Practical Part):

Weeks	Topics	Hours
1	**Applications in irrigation comma and irrigation depth**	**3 hours**
2	**Efficiency, efficiency and consistency of the atmosphere**	**3 hours**
3	**Measuring the tip of the water in a double ring way**	**3 hours**
4	**Measuring the tip of the water in a maroze way**	**3 hours**
5	**Measuring the curves of progress and regression of surface irrigation (bar irrigation and maroz)**	**3 hours**
6	**Irrigation water transport facilities**	**3 hours**

7	**Irrigation water diversion facilities**	**3 hours**
8	**Irrigation water field distribution facilities**	**3 hours**
9-1010	**Checking and determining the pattern of water distribution under sprinklers - assessing the homogeneity of the distribution of spray water and water distribution consistency factors**	**6 hours**
11-12	**Inter-sprinklers and the shape of the order of sprinklers in the field**	**6 hours**
13	**Assessing the homogeneity of under-dotted water distribution and calculating distribution consistency factors**	**3 hours**
14-15	**Maintenance of irrigation systems - field visit to irrigation project and viewing various irrigation systems**	**6 hours**

Systematic book:

- Engineering field irrigation systems. 1992. Written by Dr. Ahmed Youssef Hajim and Hakki Ismail Yassin. Faculty of Engineering. Mosul University. Iraq

Auditions:

Theoretical part (lectures)

A. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

B. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10

degrees (25%)

Practical part (laboratories)

C. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily field and laboratory performance (student activity).

10% commitment and discipline in the laboratory and field.

D. The final exam (20%) is distributed to:

70% field practical test.

30% oral or editorial examination in scientific subject.

The name of the rapporteur:	**Soil maintenance**	**Row:**	**Fourth**
Decision code:	**T.M.G. 411**	**Planned teaching hours :**	**60**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Autumnal**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

Objectives and principles of soil maintenance, soil maintenance methods, good ways to use land and maintain soil and water

The purpose of teaching the curriculum is:

They are tools for the development of soil maintenance for the optimal exploitation of land and water and their relationship to nudity and then know the effects and methods of treatment for use and management.

Learning results:

Introducing students to soil and water maintenance its concept and importance, the relationship of soil maintenance to other topics, factors affecting soil formation, objectives and principles, soil maintenance, good ways to use land and maintain soil and water

Teaching and learning methods:

- Examinations

- Opinions of students, opinions of faculty members and opinions of graduates

Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.

Books.

Agricultural scientific journals and websites in general.

Presentation of electronic precursors to focus knowledge and science in the mind.

Topics: (theoretical part):

Weeks	Topics	Hours
1	**Introduction to soil and water maintenance concept and importance, the relationship of soil maintenance to other topics, factors affecting soil formation, objectives and principles, soil maintenance**	**2 hours**
2	**Clouds and water**	**2 hours**
3	**I clear**	**2 hours**
4	**Geological** erosion	**2 hours**
5	**Erosion of its types and mechanical occurrence and how to control it**	**2 hours**

6	**Soil maintenance methods, the general equation of soil loss**	**2 hours**
7	**Wind erosion**	**2 hours**
8	**Controlling wind erosion**	**2 hours**
9	**Contour agriculture , chip and terrace cultivation**	**2 hours**
10	**The nature of the use of land and its role in soil maintenance**	**2 hours**
11	**Good** ways **to use land and maintain soil and water**	**2 hours**
12	**Install sand dunes**	**2 hours**

Topics: (Practical Part):

Weeks	Topics	Hours
1	**Analysis of rain data**	**3 hours**
2	**Calculating the maximum rate of the christ and using the basic water relations device**	**3 hours**
3	**Applications adopting the general equation of soil missing**	**3 hours**
4	**Calculating the factors of the general equation of soil missing in the field and choosing the appropriate method of soil maintenance in the field**	**3 hours**
5	**See ways to explain water erosion and ways to control it by making a scientific trip or doing a movie show**	**3 hours**
6	**Estimate the amount of wind erosion in the field using the general equation of wind** erosion	**3 hours**
7	**Making terrace designs**	**3 hours**
8	**Field observations on soil and water management procedures**	**3 hours**
9	**Visit to one of the air station in Tikrit**	**3 hours**
10	**The concept of gabia and its applications**	**3 hours**

11	**Calculating the amount of christ in the field**	**3 hours**
12	**Views on wind erosion (scientific trip)**	**3 hours**

Systematic book:

- TheForSpectrum, Nabil Ibrahim1991 . Soil and water maintenance. Ministry of Higher Education and Scientific Research. Baghdad University
- Ismail, Laith Khalil, 1985. Soil maintenance. Ministry of Higher Education and Scientific Research. Mosul University. Nineveh. translator.
- Al-Ani, Abdul Fattah Abdullah, 1987. Soil maintenance. Ministry of Higher Education and Scientific Research. Institute of Technical Institutes. Baghdad
- Fahad, Ali Abd. 1984. Soil and Water Maintenance Engineering. Ministry of Higher Education and Scientific Research. Baghdad University. Baghdad Translator.

Auditions:

Theoretical part (lectures)

A. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

B. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10 degrees (25%)

Practical part (laboratories)

C. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily field and laboratory performance (student activity).

10% commitment and discipline in the laboratory and field.

D. The final exam (20%) is distributed to:

70% field practical test.

30% oral or editorial examination in scientific subject.

The name of the rapporteur:	**Towater and plant soil**	**Row:**	**Fourth**
Decision code:	**TMZ 423**	**Planned teaching hours :**	**75**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Autumnal**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

- Study of the physical, chemical, vital and fertile properties of soil and its impact on plant growth
- - Study of water properties, effort and movement in the soil during the soil/plant/atmosphere system
- - Study of the various stresses to which the plant is exposed
- - Study the role of soil organic matter in plant growth

The purpose of teaching the curriculum is:

- Know the different characteristics of the soil and its impact on plant growth

- Study of water effort, functions and movement in soil/plant/atmosphere

- Study the relationship of organic matter and soil biology to plant growth

Learning results:

The student will be able to know the different characteristics of the soil affecting the growth of the plant and know the water relationships of the plants and their impact on plant growth as well as know the stresses to which the plant is exposed and ways to overcome them

Teaching and learning methods:

- Examinations

- Opinions of students, opinions of faculty members and opinions of graduates

Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.

Books.

Agricultural scientific journals and websites in general.

Presentation of electronic precursors to focus knowledge and science in the mind.

Topics: (theoretical part):

Weeks	Topics	Hours
1	**Physical properties of soil and its effect on plant growth**	**2 hours**
2	= = =	**2 hours**
3	**The chemical properties of soil and its impact on plant growth**	**2 hours**

4	**= = =**	**2 hours**
5	**Soil biology and its relationship to plant growth**	**2 hours**
6	**Urban exam.**	**2 hours**
7	**Mineral nutrition and its relationship to plant growth**	**2 hours**
8	**Water has its properties and functions.**	**2 hours**
9	**Soil water - its effort and movement in the soil**	**2 hours**
10	**Roots - their functions and growth**	**2 hours**
11	**Movement of water through the soil system - plant - atmosphere**	**2 hours**
12	**Water efficiency and its relationship to plant growth**	**2 hours**
13	**Urban exam.**	**2 hours**
14	**Relationship of organic matter and soil biology to plant growth**	**2 hours**
15	**Various stresses to which the plant is exposed**	**2 hours**

Topics: (Practical Part):

Weeks	Topics	Hours
1	**Introduction to planned trials and preparation of their supplies**	**3 hours**
2	**Comparison of the development and growth of roots in different tissue soils**	**3 hours**
3	**Study of virtual density (stacking) and its effect on plant growth (roots)**	**3 hours**
4	**Salinity effect in root development**	**3 hours**
5	**Nutrient and plant behavior**	**3 hours**
6	**Evaporation and erosion measurements**	**3 hours**

7	**Calculating the water needs of the plant**	**3 hours**
8	**Follow-up experiments and take notes**	**3 hours**
9	= =	**3 hours**
10	= =	**3 hours**
11	= =	**3 hours**
12	**Discussion of relevant research and presentation of results and graphic shapes**	**3 hours**
13	**Analysis, presentation and reporting**	**3 hours**
14	**Try**	**3 hours**
15	**Discuss results with all totals**	**3 hours**

Systematic book:

- Al-Nuaimi, Saadallah Najm. 1990. The relationship of soil to water and plant. Mosul University.

Auditions:

Theoretical part (lectures)

A. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

B. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10 degrees (25%)

Practical part (laboratories)

C. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily field and laboratory performance (student activity).

10% commitment and discipline in the laboratory and field.

D. The final exam (20%) is distributed to:

70% field practical test.

30% oral or editorial examination in scientific subject.

The name	**Hydrological and water resources**	**Class:**	**Fourth**
Decision code:	**T.M.G. 412**	**Planned teaching hours :**	**75**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Autumnal**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

The water equation includes all its components, well drilling, porous and permeable, Darcy Law, confined and uncultured reservoirs, runoff networks, geosurface water access, study of surface and subsurface water characteristics in terms of occurrence, distribution, movement and relationship to environmental conditions and the water cycle.

The purpose of teaching the curriculum is:

The foundations and processes that govern the movement of water during the water cycle and its relationship to the abundance of water from its various sources and its impact on the human and plant environment.

Learning results:

After receiving this article, the learner is able to know the different surface and subsurface water sources and their relationship with each other and the processes governing them and their calculation and the loss of their output and thus manage them in addition to dealing with the problems that occur and how to solve them by benefiting from the experiences of the developed world in this field.

Teaching and learning methods:

- Examinations

- Opinions of students, opinions of faculty members and opinions of graduates

Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.

Books.

Agricultural scientific journals and websites in general.

Presentation of electronic precursors to focus knowledge and science in the mind.

Topics: (theoretical part):

Weeks	Topics	Hours
1	**Hydrological cycle and water distribution on continents and oceans**	**2 hours**
2	**Falling, loss of precipitation**	**2 hours**
3	**Surface, tip and base runoff**	**2 hours**
4	**Factors affecting surface serface**	**2 hours**
5	**Types of waterways**	**2 hours**
6	**Floods and their negative effects on public property**	**2 hours**
7	**Storing water and reducing the effects of drought**	**2 hours**
8	**Water budget**	**2 hours**
9	**Hydrograph and hydrograph analysis**	**2 hours**
10	**Water reservoirs**	**2 hours**
11	**The importance of groundwater, groundwater feed sources**	**2 hours**
12	**Groundwater movement**	**2 hours**
13	**Drilling water wells and factors to consider when drilling**	**2 hours**
14	**Flow curves and water inbox calculation**	**2 hours**
15	**The importance of remote sensing in surface water monitoring**	**2 hours**

Topics: (Practical Part):

Weeks	Topics	Hours
1	**Methods of measuring precipitation**	**3 hours**
2	**Methods of expressing precipitation measurements**	**3 hours**

3	**Evaporation measurements from water bodies and how to reduce evaporation**	**3 hours**
4	**Measuring the tip of the water and its relation to the surface surface**	**3 hours**
5	**Evaporation estimate - we're using positive equations**	**3 hours**
6	**Measuring water level in waterways**	**3 hours**
7	**Measuring drainage in different rivers**	**3 hours**
8	**Hydrograph**	**3 hours**
9	**Standard hydrographic and hydrograph derivation**	**3 hours**
10	**Methods of separation of basal flow in hydrographic**	**3 hours**
11	**Methods of separation of basal flow in hydrographic**	**3 hours**
12	**Water budget calculation**	**3 hours**
13	**Groundwater movement in reservoirs**	**3 hours**
14	**Methods of drilling water wells**	**3 hours**
15	**Safe extraction of water from wells**	**3 hours**

Systematic book:

- Engineering hydrology. 1992. Mohammed Suleiman Hassan and others. Mosul University.
- Applied Hydrology. 1988. Ray K. Linsley et al. New York. USA.

Auditions:

Theoretical part (lectures)

A. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

B. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10 degrees (25%)

Practical part (laboratories)

C. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily field and laboratory performance (student activity).

10% commitment and discipline in the laboratory and field.

D. The final exam (20%) is distributed to:

70% field practical test.

30% oral or editorial examination in scientific subject.

The name	**Surveying and classifying soils**	**Class:**	**Fourth**
Decision code:	**TMZ 413**	**Planned teaching hours :**	**75**
Units:	**3**	**Available attendance:**	**Required**
Chapter:	**Autumnal**	**The date of the description :**	**22 /1 / 2025**

Description of the curriculum:

The relationship between pedagogical sciences and general classification objectives, surface and subsurface diagnostic horizons, soil maps and soil survey report, how soil maps are prepared and interpreted, land classification and use

The purpose of teaching the curriculum is:

The student's understanding of the concept of surveying and its importance and its pillars and degrees and types and how to implement it and its relationship to the management of soils as well as the concept of classification of soils and different classification systems.

Learning results:

After receiving this subject, the student can prepare a map of soils, interpret soil characteristics and write a survey report.

Teaching and learning methods:

- Examinations

- Opinions of students, opinions of faculty members and opinions of graduates

Opinions of employers and beneficiaries in accordance with scientific and technological development in the field of specialization.

Books.

Agricultural scientific journals and websites in general.

Presentation of electronic precursors to focus knowledge and science in the mind.

Topics: (theoretical part):

Weeks	Topics	Hours
1	**A brief history of the classification of soils in the world**	**2 hours**
2	**The relationship between pedagogial sciences and the objectives of the general classification**	**2 hours**
3	**Horizons: Genetic Prospects**	**2 hours**
4	**Surface and subsurface diagnostic horizons**	**2 hours**
5	**Genetic systems for soil classification: Russian systems**	**2 hours**
6	**Canadian systems andFAO, WRB**	**2 hours**
7	**The old American system.**	**2 hours**
8	**U.S. Quantitative System**	**2 hours**
9	**System structure and level-setting foundations**	**2 hours**
10	**Inheritance and characteristic qualities of the soil ranks**	**2 hours**
11	**Inheritance and characteristic qualities of the soil ranks**	**2 hours**
12	**Soil Survey: Concept and Goals**	**2 hours**
13	**Grades and survey work**	**2 hours**
14	**Soil maps and soil survey report**	**2 hours**
15	**Classification of land and its uses**	**2 hours**

Topics: (Practical Part):

Weeks	Topics	Hours
1	**Field applications to describe soil**	**3 hours**
2	**How to numbers and interpret soil maps**	**3 hours**
3	**Interpreting aerial images and using them as maps**	**3 hours**
4	**Step coefficient and drawing scale**	**3 hours**
5	**Soil scanning tools and how to write down information**	**3 hours**
6	**Comparing iraqi and international soil survey reports**	**3 hours**
7	**Carrying out ground sweep work**	**3 hours**
8	**Carrying out ground sweep work**	**3 hours**
9	**Carrying out ground sweep work**	**3 hours**
10	**Soil survey report numbers**	**3 hours**
11	**Interpreting the results of soil surveying and mapping**	**3 hours**
12	**Interpreting the results of soil surveying and mapping**	**3 hours**
13	**Characteristics of Iraqi soil units**	**3 hours**
14	**Numbers of iraqi soil units distribution**	**3 hours**
15	**Numbers of iraqi soil units distribution**	**3 hours**

Systematic book:

1. **Survey and classify the soil. Dr. Ahmed Saleh Mohimed 1994.**
2. **Pedology. Clear and classify the soils. Dr. Walid Khalid Hassan Al-Akidi. 1986.**
3. **Soil genesis and classification, Boul, et.al. 2005**

Auditions:

Theoretical part (lectures)

A. Continuous evaluation during the semester (30%) and distributed to: *(+ evaluation of the practical part of the semester 10%)

70% theoretical exam number / 2

20% home duties.

10% attendance and activity of my class.

B. The final exam (40%) is distributed to:

Part A: Questions with comprehensive short answers to curriculum 2×10 = 20 degrees (50%)

Part B: Questions for absorption and analysis 1×10 = 10 degrees (25%)

Part C: Objective questions (explanation and clarification) 2×5 = 10 degrees (25%)

Practical part (laboratories)

C. Continuous evaluation during the semester (10%) and distributed to: *(+ evaluation of the theoretical part of the semester 30%)

70% two practical tests.

20% daily field and laboratory performance (student activity).

10% commitment and discipline in the laboratory and field.

D. The final exam (20%) is distributed to:

70% field practical test.

30% oral or editorial examination in scientific subject.