Course Description/ The relationship of soil, water and plant

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| 1. Course Title: |
| The relationship of soil, water and plant |
| 2. :Course Code |
| SWPR451 |
| 3. Semester / Year: |
| first semester –fall- fourth stage -2023-2024 |
| 4. The history of preparation of this description |
| 1/9/2023 |
| 5. Available Forms of Attendance: |
| Compulsory |
| 6. Number of Credit Hours (Total) / Number of Units (Total): |
| 2 theoretical + 3 practical / ٣.٥ units |
| 7. Course administrator's name (if more than one name) |
| Name: Assist. Prof. Fatih Abid Hassan<br>Name: Assist. Lecturer Reem Waleed Abdalgabbar |
| 8. Course Objectives |
| - Enabling the student to understand the nature of the relationship between characteristics chemical and physical of soil, water and plant growth.<br>-Enabling the student to recognize the properties of water and potential water and its relationships with soil and Plants.<br>-Increasing the student's ability to know the importance of organic matter and its relationship with soil, water and plants.<br>-Enabling the student to know how to deal with the problems of calcareous , salt, and sand soils.<br>- Enable the student to learn about methods for measuring the water potential of soil and plants.<br>- Introducing the student to the most important methods of measuring transpiration and leaf area.<br>- Introducing the student to the most important methods of measuring soil salinity. |

## 9. Teaching and Learning Strategies

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

## 10. Course Structure

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

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| Exam, Report | and discussion, self-learning | Soil) and their relationship with water and plants | soil air on growth<br>Plant and their relationship<br>With soil water | cal | |
| ,Practical quiz 2 | Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning | Complete the pot experiment in the green house | B5 : The student gets to know how to carry out the experiment | 3<br>Practical | |
| Semester Exam1, Final Exam, Report | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Soil temperature and relationship with water and plar | A4:The student identifies the factors Influencing soil temperature- how does soil temperature affect soil temperature in plant growth | 2<br>Theoreti cal | 5 |
| Homework | Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning | Conduct some routine analyzes of the experimen, field capacity, soil texture, bulk density | B6:The student is familiar with assessment methods both field capacity ,Soil texture, bulk density . | 3<br>Practical | |
| Quiz 1, Final Quiz | Interactive lecture, brainstorming, dialogue and discussion, self-learning | The exchange capacity of soil its relationship with water plants | C1;The student learns about effect soil Cation exchange capa in plant growth and the fac affecting it | 2<br>Theoreti cal | 6 |
| Homework | Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning | Measurement of the cation exchange capacity of Soil and root and their effect on plant growth | B7:Familiarizes the student with assessment methods Exchange capacity of each soil and the roots | 3<br>Practical | |
| Semester Exam2, Final Exam, Report | Interactive lecture, brainstorming, dialogue and discussion, self-learning | The soil reaction and its relationship with water and plants | B2:The student learns the effect of soil reaction on plant growth and the factors affecting it | 2<br>Theoreti cal | 7 |
| Homework | Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, field project, self-learning | Measuring the actual soil reaction and potential soil reaction and its relationship to both EC and CEC | B8:Familiarizes the student with assessment methods of the actual and potential soil reaction | 3<br>Practical | |
| Semester Exam 2, Final Exam | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Soil salinity and its relations with water and plants | A5:The student identifies factors influencing soil salini how does soil salinity affect in p growth | 2<br>Theoreti cal | 8 |
| Homework | Interactive lecture, brainstorming, dialogue and discussion, field training, practical | Preparing saline soil | B9:The student can prepare Soils with different salt concentrations. | 3<br>Practical | |

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| | exercises, self-learning | | | | |
| Semester Exam 2, Final Exam | Interactive lecture, brainstorming, dialogue and discussion, self-learning | industrial culture | A6:The student learns about the types industrial culture and their benefits , the advantages and disadvantages of each. | 2 Theoretical | 9 |
| Homework | Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning | nutrient solutions | B10:The student can prepare different concentrated nutrient solutions | 3 Practical | |
| Semester Exam2 | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Water composition and its physical and chemical properties | A7:The student is familiar with the nature of structure water and its most important properties Physical and chemical | 2 Theoretical | 10 |
| Homework | Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning | transpiration measuring Methods in plants | B11:The student is familiar with the most important measurement methods of transpiration | 3 Practical | |
| Final Exam | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Water and its relationships in the soil | A8:The student gets to know the types Soil water and types Its movement in the soil and its relationship to plant growth | 2 Theoretical | 11 |
| Homework | Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning | Methods for measuring soil and plant water potential | B12:Enable the student to recognize on methods of measuring water potential for soil and leaves | 3 Practical | |
| Final Exam | Interactive lecture, brainstorming, dialogue and discussion, self-learning | The movement of water from soil to plants and atmosphere | C2:The student learns about the theory of catenary which explains movement water from soil to plant | 2 Theoretical | 12 |
| Homework | Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning | Estimating the relative moisture content in leaves | B13:The student can measure the relative moisture content of leaves | 3 Practical | |
| Final Exam | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Water stress and plant growth | C3:The student is familiar with the effects of drought on the plant and bearing methods And avoid drought . | 2 Theoretical | 13 |
| Homework | Interactive lecture, brainstorming, dialogue | Effect of water tension on leaf area. Measure the leaf area | B14:The student learns methods of Measure leaf area . | 3 Practical | |

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| | and discussion, field training, practical exercises, self-learning | | | | |
| Quiz2, Final Quiz, Report | Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning | Organic matter in soil and its relationship with water and the plant | B3:The student understands the importance of the Organic matter and its sources and the steps to analyze it and specifications of acids Organic matter resulting from decomposition | 2 Theoretical | 14 |
| Practical quiz3 | Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning | Measurement of free proline concentration in leaves | B15:Enable the student to measure Proline acid concentrationt in leaves. | 3 Practical | |
| Quiz3, Final Quiz | Interactive lecture, brainstorming, dialogue and discussion, self-learning | Microorganisms and t relationship with soil and water And the plant | A9:The student recognizes the importance of soil microorganisms and its relationship with water and plants | 2 Theoretical | 15 |
| Homework | Interactive lecture, brainstorming, dialogue and discussion, field training, practical exercises, self-learning | Discussing the results of the pots experiment in the green house | A12:Introducing the student to the steps write a report on the results Plastic house experiment and discuss the results | 3 Practical | |

## 11. Course Evaluation

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

## 12. Learning and Teaching Resources

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

Theoretical subject lecturer
Assist. Pro. Fatih Abid Hassan

Practical subject lecturer
Assist. Lecturer Reem Waleed Abdalgabbar

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

Head of the Department of Soil Sciences:
Dr. Ammar Younis Kashmoula