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| EXC-01-02-02A | **Form Number** | **Form:**  **Course Syllabus** |
| 2/3/24/2022/2963  05/12/2022 | **Issue Number and Date** |
|  | **Number and Date of Revision or Modification** |
| 2/3/24/2023 | **Deans Council Approval Decision Number** |
| 23/01/2023 | **The Date of the Deans Council Approval Decision** |
| 06 | **Number of Pages** |

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| **1.** | **Course Title** | Field Training in Land, Water & Environment |
| **2.** | **Course Number** | 0654499 |
| **3.** | **Credit Hours (Theory, Practical)** | 2 |
| **Contact Hours (Theory, Practical)** | 8 hours practical |
| **4.** | **Prerequisites/ Corequisites** | Successful completion of the study of 110 credit hours |
| **5.** | **Program Title** | Land, Water and Environment |
| **6.** | **Program Code** | 4 |
| **7.** | **School/ Center** | Agriculture |
| **8.** | **Department** | Land, Water and Environment |
| **9.** | **Course Level** | Fourth year |
| **10.** | **Year of Study and Semester (s)** | 2023-2024/ second semester |
| **11.** | **Other Department(s) Involved in Teaching the Course** | No other departments are involved |
| **12.** | **Main Learning Language** | English |
| **13.** | **Learning Types** | √ Face to face learning ☐Blended ☐Fully online |
| **14.** | **Online Platforms(s)** | ☐Moodle √Microsoft Teams |
| **15.** | **Issuing Date** | 22/1/2023 |
| **16.** | **Revision Date** |  |

**17. Course Coordinator:**

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| Name: Hala Abdur Rauf Rawabdeh Contact hours: upon request  Office number: 058 Phone number: 22452  Email: [hl.rawabdeh@ju.edu.jo](mailto:hl.rawabdeh@ju.edu.jo) |

**18. Other Instructors:**

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**19. Course Description:**

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| The course exposes the students to the practical training in land, water and environment and builds on the theoretical background gained by the students during the first years of their study. The course includes different topics of irrigation system evaluation, survey, soil sampling and analysis, soil moisture instruments and land survey. |

**20. Program Intended Learning Outcomes:** (To be used in designing the matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program)

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| **Knowledge**  Kp1. Demonstrate comprehensive understanding of the scientific and theoretical knowledge of land, water and environment.  Kp2. Demonstrate problem solving skills and well developed linguistic and communication skills while upholding professional ethics  **Skills**  Sp1. Access land characteristics and their suitability for different agricultural uses.  Sp2. Tackle basic problems of water, land and agricultural environment.  Sp3. Develop​ innovative solution for tackling the adverse effects of water scarcity caused by climate change and desertification​  Sp4. Contribute to agricultural development, as well as food and water security.  **Competencies**  Cp1. Analyze and interpret soil and water quality parameters.  Cp2. Use sound scientific principles for the determination of crop water requirement, and design of irrigation systems for the proper management of agricultural water.  Cp3. Determine the optimal use of water and land to ensure the sustainability of resources and the environment. |

**21. Course Intended Learning Outcomes:** (Upon completion of the course, the student will be able to achieve the following intended learning outcomes)

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| **A. Knowledge:**  **K1.** Understand soil and water resources of the Jordan Valley and their problems.  **K2.** Gain knowledge on, soil salinity, water quality, chemical fertilizers and fertigation.  **K3.** Distinguish the main irrigation systems and the methods for their evaluation. |
| **B. Skills:**  **S1.** Using surveying and surveying instruments to measure the distance and slope for the land and to perform land leveling  **S2.** Measure soil salinity in the field and determine crop yield reduction at specific salinity levels.  **S3.** Learn about methods for soil moisture content, crop water requirements calculation, and irrigation scheduling and salinity mitigation.  **S4.**Measure the injection rate for NPK fertilizers and the cost for fertilizers  **S5.**Calibrate main instruments for soil moisture sampling and flow measurements |
| **C. Competences:**  **C1.**Identify soils and water in terms of quality and agricultural use.  **C2.**Assess irrigation systems performance  **C3.** Identify the required fertilizer mixture for the farm. |
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| Course ILOs | The learning levels to be achieved | | | | | |
| Remembering | Understanding | Applying | Analysing | evaluating | Creating |
| K1 | √ | √ |  |  |  |  |
| K2 | √ | √ | √ | √ |  |  |
| K3 |  |  | √ | √ | √ |  |
| S1 | √ | √ |  |  |  |  |
| S2 | √ | √ | √ | √ | √ |  |
| S3 |  |  | √ | √ | √ |  |
| S4 |  |  | √ | √ |  | √ |
| S5 |  | √ | √ | √ | √ |  |
| C1 |  |  | √ | √ |  |  |
| C2 |  |  | √ | √ | √ |  |
| C3 |  |  | √ | √ |  | √ |

**22. The matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Program ILOs  Course ILOs | ILO  (1) | ILO (2) | ILO (3) | ILO (4) | ILO  (5) | ILO  (6) | ILO  (7) | ILO  (8) | ILO  (9) |
| **A. Knowledge:**  **K1.** Understand soil and water resources of the Jordan Valley and their problems. | √ |  |  |  |  |  |  | √ |  |
| **K2.** Gain knowledge on, soil salinity, water quality, chemical fertilizers and fertigation. |  | √ |  | √ | √ | √ |  | √ |  |
| **K3.** Distinguish the main irrigation systems and the methods for their evaluation. |  |  |  |  | √ |  | √ |  |  |
| **B. Skills:**  **S1.** Using surveying and surveying instruments to measure the distance and slope for the land and to perform land leveling | √ |  |  | √ |  |  |  |  |  |
| **S2.** Measure soil salinity in the field and determine crop yield reduction at specific salinity levels. |  | √ | √ |  |  | √ |  |  |  |
| **S3.** Learn about methods for soil moisture content, crop water requirements calculation, and irrigation scheduling and salinity mitigation. |  |  |  |  |  |  | √ | √ |  |
| **S4.**Measure the injection rate for NPK fertilizers and the cost for fertilizers |  |  |  |  | √ |  |  |  |  |
| **S5.**Calibrate main instruments for soil moisture sampling and flow measurements | √ |  |  | √ |  |  |  |  |  |
| **C. Competences:**  **C1.**Identify soils and water in terms of quality and agricultural use. | √ |  |  | √ |  | √ |  |  |  |
| **C2.**Assess irrigation systems performance |  |  |  |  |  |  |  | √ |  |
| **C3.** Identify the required fertilizer mixture for the farm. |  |  |  |  | √ |  |  |  |  |

**23. Topic Outline and Schedule:**

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| **Week** | **Lecture** | **Topic** | **ILO/s Linked to the Topic** | **Learning Types**  **(Face to Face/ Blended/ Fully Online)** | **Platform Used** | **Synchronous / Asynchronous Lecturing** | | **Evaluation Methods** | **Learning Resources** |
| 2nd | 1 | **Soils and water resources of Jordan**: sources of surface water, major dams on the side wadis of Jordan Valley, water quality for irrigation, problems and management issues in water use, soil genesis of Jordan Valley and implications for agricultural management. | K1,C1 | Face to Face | Teams |  | | In field  Reports  Exam | Web resources,  Reports of MWI |
| 4th | 2 | **Soil moisture measurements:** concepts of soil water content and bulk density, calibration of soil moisture instruments, sampling of soil bulk density and moisture. Results and their use in irrigation scheduling (Variable amount- fixed interval method). | S3,S5,  C1 | Face to Face | Teams |  | | In field  Reports  Exam | 9-2  9-4  9-5 |
| 6th | 3 | **Management of soil and water salinity**: concept of soil and water salinity, problems associated with salinity, management of soil and water salinity, concepts of leaching requirements and fraction. | K2,S2,  S3 | Face to Face | Teams |  | | In field  Reports  Exam | 9-7 |
| 8th | 4 | **Drip Irrigation:** Components of drip irrigation, advantages and disadvantages of drip irrigation, Fertigation using drip irrigation. components of drip irrigation design, calculation of friction losses and measurement of head at inlet of lateral, evaluation of distribution Uniformity, measurement of pressure, measurement of pressure and discharge,  **Sprinkler Irrigation:** Components of the system, suitable crops and lands for sprinkler irrigation, evaluation of sprinkler irrigation system using the catch cans and coefficient of uniformity  **Surface Irrigation:** systems of surface irrigation, requirements for efficient surface irrigation, preparation of land for surface irrigation (basin and furrow), use of leveling for measuring slope of furrow at different sections. Evaluation of basins, measurements of flow by Parshall flume, assessment of slope and discharge for furrow, advance- recession curves for furrow uniformity, inflow-outflow for efficiency assessment, identification of optimum discharge and area for basins. | K3,C2 | Face to Face | Teams |  | | In field  Reports  Exam | 9-2  9-6 |
| 10th | 5 | **Survey:** The concepts of surveying, instruments used for surveying, slope and distance measurements using the automatic level.  **Survey:** Concepts of topographic mapping and differential leveling. Sketch of field dimensions, back-sight and foresight measurements, and calculation of slope and identification of direction. | S1 | Face to Face | Teams | |  | In field  Reports  Exam | 9-2  9-6 |
| 12th | 6 | **Fertilizers and plant nutrients management**: Chemical Fertilizers, Plant Nutrition and deficiency symptoms, management of fertilization, Calculation of fertilizer injection rate, calculate the cost of mono fertilizer, calculate the cost of mixed fertilizer, calculate the cost of soluble fertilizer and make a compound Fertilizer. | K2,S4,  C3 | Face to Face | Teams | |  | In field  Reports  Exam | 9-7 |

**24. Evaluation Methods:**

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

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| --- | --- | --- | --- | --- | --- |
| **Evaluation Activity** | **Mark** | **Topic(s)** | **ILO/s Linked to the Evaluation activity** | **Period (Week)** | **Platform** |
| Practical and field applications | 30 | All topics | All | 8 | Face to Face |
| Reports | 30 | after each practical session | All | Each week | Face to Face |
| Final Exam | 40 | All topics | All | announced by the Vice-Dean | Face to Face |

**25. Course Requirements:**

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| (e.g.: students should have a computer, internet connection, webcam, account on a specific software/platform…etc.):  computer, internet connection, account on Microsoft Teams |

**26. Course Policies:**

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| **A- Attendance policies:** Regular and timely attendances are expected from all students. University regulations concerning class attendance will apply.  **B- Absences from exams and handing in assignments on time:**   * The students are expected to submit homeworks in due time, a late submission will result in 20% deduction of the homework grade and will not be accepted once the key answers are provided * Exams absentees are allowed to write makeup exams only if an acceptable and documented excuse is provided; for example, a medical report. Makeup exams are usually more difficult than regular exams   **C- Health and safety procedures:** According to global health guidelines and instructions **)**Laws, regulations and instructions of the University of Jordan(  **D- Honesty policy regarding cheating, plagiarism, misbehavior:**   * Zero tolerance for cheating and plagiarism * Use of cell phone is prohibited   **E- Grading policy:** Laws, regulations and instructions of the University of Jordan  **F- Available university services that support achievement in the course:** |

**27. References:**

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| A- Required book(s), assigned reading and audio-visuals:   * Conklin, A. 2004. Field Sampling. Principles and Practices in Environmental Analysis. Marcel Dekker, Inc, New York. * James, L., 1993, Principles of farm irrigation system design, 2nd ed., John Wiley and Sons. * Anderson, J.M. & E.M. Mikhail 1998, Surveying Theory and Practice, 7th ed., McGraw-Hill. * Irrigation Water Management: Training Manual No. 1 - Introduction to Irrigation, by C. Brouwer, A. Goffeau, M. Heibloem, http://www.fao.org/docrep/R4082E/R4082E00.htm#Contents * Irrigation Water Management: Irrigation Scheduling, Training manual no. 4, by C. Brouwer, K. Prins and M. Heibloem. http://www.fao.org/docrep/T7202E/t7202e00.htm#Contents * Irrigation Water Management: Irrigation Methods, Training manual no 5, by C. Brouwer, K. Prins, M. Kay and M. Heibloem. http://www.fao.org/docrep/S8684E/s8684e00.htm#Contents * Water quality for agriculture, by Ayers and Westcot, FAO Irrigation and Drainage Paper 29, http://www.fao.org/docrep/003/t0234e/t0234e00.HTM   B- Recommended books, materials, and media: |

**28. Additional information:**

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| Important Roles (Students shall read carefully)  1- Attendance is obligatory to pass the course; practical reports will be accepted for the sessions attended by the student.  2- Entering the class room after the start of lecture is not accepted as it disturbs the lecturers and the students.  3- During practical sessions, students shall come with all necessary safety measures including proper clothes and shoes as the work will include direct contact with soil and water that might be polluted.  4- Any disturbance to class lectures and practical sessions will result in expulsion of the student without considering his session report for in the overall grading. Repetition of this behavior will result in reporting to the Faculty Deanship for further actions according to UOJ regulations. |

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| Name of the Instructor or the Course Coordinator:  ………………………………………………… | Signature:  …………...……………… | Date:  ……..………… |
| Name of the Head of Quality Assurance Committee/ Department  …………………………………………………. | Signature:  …………...……………… | Date:  ……..………… |
| Name of the Head of Department  …………………………………………………. | Signature:  …………...……………… | Date:  ……..………… |
| Name of the Head of Quality Assurance Committee/ School or Center  …………………………………………………. | Signature:  …………...……………… | Date:  ……..………… |
| Name of the Dean or the Director  …………………………………………………. | Signature:  …………...……………… | Date:  ……..………… |