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| **1** | **Course title** | Preservation of Soil Environment | |
| **2** | **Course number** | 0644421 | |
| **3** | **Credit hours** | 2 |  |
| **Contact hours (theory, practical)** | 2 | |
| **4** | **Prerequisites/corequisites** | 0604221, 0604222, 0604223 | |
| **5** | **Program title** | Land, Water and Environment | |
| **6** | **Program code** | 04 | |
| **7** | **Awarding institution** | The University of Jordan | |
| **8** | **School** | Agriculture | |
| **9** | **Department** | Land, Water and Environment | |
| **10** | **Course level** | BSc | |
| **11** | **Year of study and semester (s)** | 2023/2024, Sem 1 | |
| **12** | **Other department (s) involved in teaching the course** |  | |
| **13** | **Main teaching language** | English | |
| **14** | **Delivery method** | ☐Face to face learning ⌧Blended ☐Fully online | |
| **15** | **Online platforms(s)** | ☐Moodle 🞎Microsoft Teams ☐Skype ☐Zoom  ☐Others………… | |
| **16** | **Issuing/Revision Date** |  | |

**17 Course Coordinator:**

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| --- |
| Name: Prof. Jawad Al-Bakri  Office number: 052  Phone number: 22449  Contact hours: 10:00-11:30 Sun, Tue  Email: [jbakri@ju.edu.jo](mailto:jbakri@ju.edu.jo) |

**18 Other instructors: Same as coordinator**

**19 Course Description:**

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| Functions of soil and land and their roles in earth’s system. Causes and aspects of soil and land degradation. Soil erosion by water and factors that contribute to the process and rate of soil erosion. Quantification of soil erosion by water using the Universal Soil Loss Equation (USLE), Revised USLE and Modified USLE. Techniques to control soil erosion by water. Process and factors contributing to soil erosion by wind. Quantification and control of soil erosion by wind. Desertification, its impacts and assessment. |

**20. Program Intended Learning Outcomes:** Land, Water and Environment BSc Program ILOS

1. Demonstrate comprehensive understanding of the scientific and theoretical knowledge of land, water and environment.
2. Contribute to agricultural development, as well as food and water security.
3. Demonstrate problem solving skills and well developed linguistic and communication skills while upholding professional ethics
4. Assess land characteristics and their suitability for different agricultural uses.
5. Tackle basic problems of water, land and agricultural environment.
6. Analyse and interpret soil and water quality parameters.
7. Use sound scientific principles for the determination of crop water requirement, and design of irrigation systems for the proper management of agricultural water.
8. Determine the optimal use of water and land to ensure the sustainability of resources and the environment.
9. Develop​ innovative solution for tackling the adverse effects of water scarcity caused by climate change and desertification​

**21. Course Intended Learning Outcomes:**

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| A- Aims:  1. To enable the student to understand processes and factors related to land degradation.  2. To provide the student with mathematical approaches for quantification of soil erosion.  3. To stimulate the student’s thinking and analytical skills in finding solutions for land degradation.  4. To enable the student to identify the best conservation measures needed to preserve  soil and to combat desertification  B- Students Learning Outcomes (SLOs):   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Course ILOs | The learning levels to be achieved | | | | | | | Remembering | Understanding | Applying | Analysing | evaluating | Creating | | 1.A1 | √ | √ |  | √ |  |  | | 2.A2 | √ | √ |  |  | √ | √ | | 3.A3 | √ | √ |  |  | √ | √ | | 4.B1 | √ |  |  | √ |  |  | | 5.B2 |  |  |  |  |  | √ | | 6.C1 |  |  |  | √ | √ |  | | 7.C2 |  |  |  | √ | √ |  | | 8.D1 | √ | √ | √ |  |  | √ | | 9.D2 | √ | √ | √ |  |  |  | |

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

Upon successful completion of this course, students will be able to:

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Program  ILOs  ILOs of the course | ILO  (1) | ILO (2) | ILO (3) | ILO (4) | ILO  (5) | ILO  (6) | ILO  (7) | ILO  (8) | ILO  (9) |
| **A. Knowledge and Understanding:**  A1. Land and soil degradation processes.  A2. Factors controlling soil erosion  A3. Desertification and its threats | X |  |  | X  X | X  X | X |  |  | X |
| **B. Intellectual Analytical and Cognitive Skills:**  B1. Universal soil loss equation (USLE) to estimate soil erosion by water.  B2. Process and Models for wind erosion estimation |  | X |  |  |  | X |  |  |  |
| **C. Subject- Specific Skills:**  C1. Methods to control soil erosion by water.  C2. Gully erosion and structures to control its expansion. |  | X | X |  | X  X |  |  | X | X |
| **D. Transferable Key Skills:**  D1. Identification of data needed for assessment of soil erosion and desertification.  D2. Measures and interventions needed for soil conservation and preservation for sustainable land management |  | X | X | X |  |  | X | X | X  X |

**23. Topic Outline and Schedule:**

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| | **Week** | **Lecture** | **Topic** |  | **Intended Learning Outcome** | **Learning Methods (Face to Face/Blended/ Fully Online)** | **Platform** | **Synchronous / Asynchronous Lecturing** | **Evaluation Methods\*** | **Resources** | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 1 | 1.1 | Soil and land and their functions |  | A1 | Face to Face |  | S | Qz01 | A1, B1 | |  | 1.2 | Degradation of soils and land |  | A1, B1,B2 | Online | Teams | A | Qz01 | A1, B1 | | 2 | 2.1 | Soil erosion by Water: Rainfall erosivity |  | A2 | Face to Face |  | S | Qz02 | A1, A2, B3 | |  | 2.2 | Soil erosion by Water: Soil factors |  | A2 | Online | Teams | A | Qz02 | A1, A2, B3 | | 3 | 3.1 | Types of soil erosion by water |  | A2, C1, D1 | Face to Face |  | S | Qz03 | A1, A2, B3 | |  | 3.2 | Modeling of soil erosion by water: USLE |  | B1, D1 | Online | Teams | A | Qz03 | A1, A2, B3 | | 4 | 4.1 | USLE factors: Rainfall erosivity |  | A2, B1, D1 | Face to Face |  | S | Assign.01 | A1, A2, B3 | |  | 4.2 | USLE factors: Rainfall erosivity |  | A2, B1, D1 | Online | Teams | A | Assign.01 | A1, A2, B3 | | 5 | 5.1 | USLE factors: Soil erodibility. |  | A2, B1, D1 | Face to Face |  | S | Qz03 | A1, A2, B2, B3 | |  | 5.2 | USLE factors: Soil erodibility. |  | A2, B1, D1 | Online | Teams | A | Qz03 | A1, A2, B2, B3 | | 6 | 6.1 | USLE factors: Slope, crop and management. |  | A2, B1, D1 | Face to Face |  | S | Qz04 | A1, A2, B2, B3 | |  | 6.2 | USLE factors: Slope, crop and management. |  | A2, B1, D1 | Online | Teams | A | Qz04 | A1, A2, B2, B3 | | 7 | 7.1 | USLE factors: Slope, crop and management. |  | A2, B1, D1 | Face to Face |  | S | Assign.02 | A1, A2, B2, B3 | |  | 7.2 | USLE factors: Slope, crop and management. |  | A2, B1, D1 | Online | Teams | A | Assign.02 | A1, A2, B2, B3 | | 8 | 8.1 | **Midterm Exam** |  |  | (Face to Face) |  |  |  |  | |  | 8.2 | Revised USLE |  | B1, D1 | Online | Teams | A | Assign.03 | B3, B4 | | 9 | 9.1 | Revised USLE |  | B1, D1 | Face to Face |  | S | Assign.03 | B3, B4 | |  | 9.2 | Revised USLE |  | B1, D1 | Online | Teams | A | Assign.03 | B3, B4 | | 10 | 10.1 | Modified USLE |  | B1, D1 | Face to Face |  | S | Assign.04 | B3, B4 | |  | 10.2 | Modified USLE |  | B1, D1 | Online | Teams | A | Assign.04 | B3, B4 | | 11 | 11.1 | Control of water erosion: agronomic methods |  | C1, C2, D2 | Face to Face |  | S | Qz05 | A1, A2, B3 | |  | 11.2 | Control of water erosion: terraces |  | C1, C2, D2 | Online | Teams | A | Qz05 | A1, A2, B3 | | 12 | 12.1 | Control of gullies |  | C2, D2 | Face to Face |  | S | Qz05 | A1, A2, B3 | |  | 12.2 | Soil erosion by wind: mechanism |  | A3, B2, C3 | Online | Teams | A | Qz06 | A1, A2, B3 | | 13 | 13.1 | Soil erosion by wind: mechanism |  | A1, A3, B2, D1 | Face to Face |  | S | Qz06 | A1, A2, B3 | |  | 13.2 | Soil erosion by wind: control |  | A1, A3, B2, D2 | Online | Teams | A | Assign.05 | A1, A2, B3 | | 14 | 14.1 | Soil erosion by wind: modeling |  | A1, A3, B2, D1 | Face to Face |  | S | Assign.05 | A1, A2, B3 | |  | 14.2 | Soil erosion by wind: modeling |  | A1, A3, B2, D1 | Online | Teams | A | Assign.05 | A1, A2, B3 | | 15 | 15.1 | Desertification: Processes |  | A3, D1, D2 | Face to Face |  | S | Qz07 | A2, B5 | |  | 15.2 | Desertification: Assessment |  | A3, D1, D2 | Online | Teams | A | Qz07 | A2, B5 | | 16 |  | **Final Hour Exam** |  |  | (Face to Face) |  |  |  |  | |

\* Qz = Quiz; Assign. = Assignment.

**24. Evaluation Methods:**

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| Opportunities to demonstrate achievement of the SLOs are provided through the following assessment methods and requirements:   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Evaluation Activity** | **Mark** | **Topic(s)** | **SLOs** | **Period (Week)** | **Platform** | | Quiz 01 | 2 | 1.1, 1.2, 2.1, 2.2 | 1, 4-6 | 2 | Hardcopy | | Quiz 02 | 3 | 3.1, 3.2 | 2,3 | 3 | Hardcopy | | Quiz 03 | 2 | 5.1, 5.2 | 4-6 | 5 | Hardcopy | | Quiz 04 | 2 | 6.1, 6.2 | 7, 9 | 6 | Hardcopy | | Quiz 05 | 2 | 11.1, 11.2 ,12.1 | 5,6 | 11 | Hardcopy | | Quiz 06 | 2 | 12.2, 13.1 | 5,6 | 12 | Hardcopy | | Quiz 07 | 2 | 15.1, 15.2 | 8 | 15 | Hardcopy | | Assignment 01 | 3 | 4.1, 4.2 | 1-4, 6 | 4 | Hardcopy | | Assignment 02 | 3 | 7.1, 7.2 | 1-4, 6 | 7 | Hardcopy | | Assignment 03 | 3 | 8.2, 9.1, 9.2 | 5 | 9 | Hardcopy | | Assignment 04 | 3 | 10.1, 10.2 | 5, 7-9 | 10 | MS teams | | Assignment 05 | 3 | 13.2, 14.1, 14.2 | 5, 7-9 | 13, 14 | MS teams | | Midterm Exam | 30 | 1.x-7.x | 1-9 | 8 | Hardcopy | | Final Hour Exam | 40 | 1.x-15.x | 1-9 | 16 | Hardcopy | |

**25 Course Requirements**

Students should have internet access and an account on Microsoft team’s platform.

**24 Course Policies:**

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| A- Attendance policies: obligatory  B- Absences from exams and submitting assignments on time: make up for accepted excuses  C- Health and safety procedures: UOJ regulations applied  D- Honesty policy regarding cheating, plagiarism, misbehavior: UOJ regulations applied  E- Grading policy: using class average and standard deviations  F- Available university services that support achievement in the course: GIS lab facility including posters and maps. |

**25 References:**

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| A- Required book(s), assigned reading and audio-visuals:  A1- Morgan, R. 2005. **Soil Erosion and Conservation**. 3rd Edition, Blackwell Publishing Ltd.  A2- Colby et al. 2021. Soils Laboratory Manual: K-State Edition, Version 2.0, Kansas State University (<https://newprairiepress.org/ebooks/39/>).  B- Recommended books, materials, and media:  B1- Moorberg, C.J. 2019. Soil and Water Conservation: An Annotated Bibliography. NPP eBooks. 30. <https://newprairiepress.org/ebooks/30>  B2- Jones, A. J.; Walters, D.; Hance, W. G.; Dickey, Elbert C.; and Culver, J.R., "EC88-116 Universal Soil Loss Equation: A Handbook for Nebraska Producers" (1987). Historical Materials from University of Nebraska, Lincoln Extension. 1620. <https://digitalcommons.unl.edu/extensionhist/1620>  B3- <http://ecoursesonline.iasri.res.in/course/view.php?id=54>  B4- USDA, Revised Universal Soil Loss Equation. USDA-AH703. Available online at USDA-RSULE2 website.  B5- FAO/UNEP, 1984. Provisional methodology for assessment and mapping of desertification. Report, Food and Agriculture Organization of the United Nation/United Nation Environment Program, Rome. |

**26 Additional information:**

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| Name of the Instructor or the Course Coordinator:  **Prof. Jawad Al-Bakri** | Signature: | Date:  25/9/2024 |
| 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:  ……..………… |