**The University of Jordan**

**Faculty of Agriculture Department of Land, Water and Environment**

**Program: 2015-2016/First Semester**

**Course title: Soil Genesis and Classification (0634320)**

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| **Credit hours** | **3** | **Level** | **Bsc** | **Pre-requisite** | **Soil Chemistry**  **Applied Hydraulics** |
| **Coordinator/ Lecturer** | **Prof. Awni Taimeh** | **Office number** | **114** | **Office phone** | **22445** |
| **Course website** | **On UJ E Learning portal** | **E-mail** | **ataimeh@ju.edu.jo** | **Place** | **LWE Seminar Room** |

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| **Office hours** | | | | | |
| **Day/Time** | **Sunday** | **Monday** | **Tuesday** | **Wednesday** | **Thursday** |
| **Day** | **\*** |  | **\*** |  | **\*** |
| **Time** | **9-10** |  | **9-10** |  | **9-10** |

**Course Description**

Understanding how soils are formed and formed, soil forming factors including parent material, Living organisms, climate, relief, and time. Soil forming processes, concepts of soil classification diagnostic horizons and features used to classify soil, soil moisture and temperature regime, Soil taxonomy, classification of soils in Jordan.

**Learning Objectives**

Students will:

**Course Objectives:** Students will:

* Understanding how the soil area formed under different soil forming factors
* Understand how the different soil forming factors control soil forming processes under different condition.
* Understand why soils are different and the role of soil forming process.
* Be provided with the background to understand the concept used to classify soils.
* Understand soil variation in the field and principle behind soil sampling.
* Be able to conduct soil survey and land use planning.

**Intended Learning Outcomes (ILOs):**

Successful completion of the course should lead to the following outcomes:

**A. Knowledge and Understanding:** Student is expected to

A1- Student should be able to understand how the soils area formed under different conditions

A2- Knowledge about the geographic distribution of different soils in Jordan, their properties, classification and their potential use.

A3: Ability to understand factor behind some important phenomena such as climatic change and desertification.

**B. Intellectual Analytical and Cognitive Skills:** Student is expected to

B1- Demonstrate the ability to analyze soil maps and extract soil information.

B2- Be able to correctly identify soil properties of any soil using modern soil classification

B3- Demonstrate the ability to use analyse different soil maps and extract information needed for different land utilization.

**C. Subject- Specific Skills:** Students is expected to

C1- Investigate soil in the field

C2- Understand the role of soil forming factors on the variation of soil.

C3- Be able to design a framework for sampling schemes

C4- Ability to conduct soil survey as a first step for determining land use.

**D. Transferable Key Skills:** Students is expected to

D1- Understand the use of properties and behavior of different soil using soil taxonomy.

D2- Use modern soil taxonomy as a tool in technology transfer

D3-Read soil maps of different purposes and their use in land use.

# ILOs: Learning and Evaluation Methods

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| **ILO/s** | **Learning Methods** | **Evaluation Methods** |
| **A. Knowledge and Understanding** | Lectures and Discussions | Exam |
| **B. Intellectual Analytical and Cognitive Skills** | Lectures ,Discussions, and Homeworks | Exam |
| **C. Subject- Specific Skills** | Lectures, and Discussions | Exam |
| **D. Transferable Key Skills** | Homework and Assignments | Evaluation |

**Course Contents**

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| --- | --- | --- | --- |
| **Content** | **Reference** | **Week** | **ILO/s** |
| **Syllabus Review/**-Introduction: about soil and non-soil, and the relationship between Pedology as an independent science and other branches of soil sciences, | Chapter 1: Nature and properties of Soils, Nyle Brady | 1st week | A1 |
| Physical and chemical weathering: Processes of weathering, weathering of rock, Mineral stability, application to local conditions. | Chapter 11. Nature and properties of Soils, Nyle Brady  Chapter 4:. Peter Birkland. | 1-2st week | A2, D2 |
| -Soil forming factors differences between soils and parent material. parent materials of different soils in Jordan | Chapter 6: Peter Birkland.. | 3rd week | A2,C2,D1 |
| Parent materials The effect of composition of different parent material on soil development and the impact of climate on the variation of soil properties, with specific reference to local conditions. | Chapter 7. Peter Birkland. | 4th week | A2,C2,D1 |
| Impact of climate on soil formation and on living organisms. Soil climate classification, including soil moisture regime and soil temperature regimes., | Chapter 7: Peter Birkland | 5th week | A2,C2,D1 |
| Living organisms Role of living organism I soil formation and soil development | Chapter:10: Peter Birkland | 6th week | A2,,A3,C2,D1 |
| Soil time and its role in soil formation , methods to assess soil age | Chapter 8: Peter Birkland: | 7th week | A1,C1 |
| Relief: Role of elevation, topography in soil formation and development of specific soil geomorphologic features. | Relief 9: Peter Birkland | 8th week | A1,C1 |
| Soil properties and features: Field investigation including soil profile description and proper sampling and interpretation of morphological properties and their use**.** | Chapter3: Soil Survey Manual | 9th week | A2, C2,C3, |
| Soil forming processes**:** Soil forming processes responsible for soil formation, their intensity, variation, and magnitudes, and why we have infinite number of different soils and effects of soil forming factors on different processes | Chapter 6: S.W, Bowel | 10th week | A3, B3,C2 |
| Soil horizons development**:** Horizons development (Differentiation), effects of soil forming processes on the development of different types of horizons | Chapter 6: Bowel : Soil horizons development | 11th week | A2,C1,D3 |
| Applications: Catena concepts, soil description, and-Sampling | Chapter 2: Soil Survey Manual: | 11th week | B3,C4 |
| Paleosols, and paleopedology**:** definition, recognition of paleosols, criteria used in studying paleosols, paleosols in Jordan their properties and distribution | Chapter 12: Peter Birkland = | 12th week | A1,C2 |
| Soil classification: modern soil taxonomy, :concept of soil classification, modern classification: soil taxonomy, concept, objectives features, comparison with other systems, soil orders, the central concepts of the soil order, differentiating characteristics, diagnostic horizons: formation of different diagnostic horizons, Epipedons, Subsurface horizons, sub-surface features c | Chapters 1-4,6,21: Soil Taxonomy: | 12-14th week | B2,B3,D2,D3 |
| Soils of Jordan: -Important soils in Jordan, factors responsible for formation of important soils, classification, distribution, -utilization | Chapters 11,12,15,20,1-4,6: Soil Taxonomy: | 15-16th week | A2,B2,C2, D1 |
| Soil mapping: field mapping of soils,, soil interpretation | Chapter 2:Soil Survey Manual | 16th week | A2,B1,D3 |

**Learning Methodology**

## The course will be structures mainly in lectures; and discussions, homework, drop quizzes, and applications.

# Evaluation

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| **Evaluation** | **Point %** | **Date** |
| **Midterm Exam** | 15 | 11 / 11 / 2015 |
| **2nd Exam** | 15 | 9 / 12 /2015 |
| **Homework an Quizzes** | 20 |  |
| **Final Exam** | 50 | 6 / 1 / 2016 |

**Main Reference/s:**

* Peter W, Kirkland, 1974, Pedology, Weathering, and Geomorphologic Research.

# References:

## McCracken, R.J. Soil Genesis and Classification (Text Book)

* Soil Survey Staff, 1975. Soil Survey Manual.
* Selected Papers in Soil Formation.
* Charles, B. Hunt, 1972. Geology of Soils; Their Evolution, Classification and Uses.
* Nile C. Brady, 1974. The Nature and Properties of Soils.
* Soil Survey Staff Soil Taxonomy, 2003, USDA. USA
* Handouts

**Intended Grading Scale (Optional)**

0-35 **F**

36-39 **D**-

40-47 **D**

48-51 **D+**

52-55 **C**-

56-63 **C**

64-67 **C+**

68-71 **B**-

72-79 **B**

80-83 **B+**

84-87 **A**-

88-100 **A**

**Notes:**

* Concerns or complaints should be expressed in the first instance to the module lecturer; if no resolution is forthcoming, then the issue should be brought to the attention of the module coordinator (for multiple sections) who will take the concerns to the module representative meeting. Thereafter, problems are dealt with by the Department Chair and if still unresolved the Dean and then ultimately the Vice President. For final complaints, there will be a committee to review grading the final exam.
* For more details on University regulations please visit:

<http://www.ju.edu.jo/rules/index.htm>