The University of Jordan

Faculty: Agriculture Department: Land, Water and Environment

Program: Bachelor Academic Year: Spring 2013/2014

Course Name: Soils and Environmental Quality (644430)

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| Credit hours: 2 | Level: Senior Students | Pre-requisite: Soil Physics and Soil Chemistry |
| Lecturer: Prof. T.M. Abu-Sharar | Office number: 121 | Office phone: 2454 |
| Course website: All relevant websites | E-mail: t.m.abu-sharar@ ju.edu.jo | Place: Lecture Room 131 |

Office Hours

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sunday | Monday | Tuesday | Wednesday | Thursday |
| 11-12 |  | 11-12 |  |  |

Course Description

Soil and Environment is an upper division course that intends to enable senior students of the Department of Land, Water and Environment to integrate academic knowledge into an overall know-how skills of preventing soil contamination, managing contaminated soils, reducing contaminant emission from polluted soils and remediation of contaminated or degraded soils. Nature of soil-contaminants and soil-contaminating chemicals and biological materials are essential components of this course. Because of the interdisciplinary nature of this course, students are requested to participate in data generation in the form of term papers. Grades will be distributed on exams, term papers and other forms of active participation.

Learning Objectives

1. To enable senior students integrating previous knowledge of soil science in a web of environment management skills.
2. Build capacity of self-learning in interdisciplinary scientific fields.

Intended Learning Outcomes (ILOs):

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

A. Knowledge and Understanding: Student is expected to

A1- Learn the relation between different fields of basic soil sciences.

A2- Understand the relation between soil science and environmental sciences.

A3- Differentiate between ecology and environment.

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

B1- Students acquire analytical skills of predecting possible environmental impacts of soil management activities on related environment fields.

B2- Students acquire technical skill sufficient to serve as environment consultant.

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

C1- Use knowledge of soil science as entry data to another subject of environmental science.

C2- Expand the domain of soil science from agronomy to environment.

D. Transferable Key Skills: Students is expected to:

D1- Transfer soil science data to colleagues working in different fields, especially civil engineering, biology (ecology) and environment.

D2- Workers of audiovisual fields (e-journalism, press media, radio and TV).

# ILOs: Learning and Evaluation Methods

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| --- | --- | --- |
| ILO/s | Learning Methods | Evaluation Methods |
| 1-Build integrated knowledge of soil science fields2-Acquire historic knowledge of soil conservation and water management projects which affected human well being and safecty of environemnt | Lectures and Discussions | Exams and data collection using e-library and other means |
| Enhance lectures material | Literature Review (hard and soft material)  | Check on collected materials |
| Handouts to be read | Reading Assignment | Ask students specific questions from the handouts |
| Enhance background on subject of student choice | Term Paper | Evaluation of the Term Paper |
| Build capacity on data collection and presentation | Presentation of Term paper Findings | Give grade to each presentation  |
| Learn extra skills by solving analytical problems | Exams (First, Second and Final) | Give grades to each student |

Course Contents

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| --- | --- | --- | --- |
| Content | Reference  | Week | ILO/s |
| Definitions of soil (pedological, edaphological and environmental perspectives), ecology and environment. | Lectures and handouts | 1st week | Use knowledge of soil science as entry data to another subject of environmental science.Expand the domain of soil science from agronomy to environment. |
| Microbiological processes: Decomposition of organic substances. Nitrogen transformations. Oxidation reduction reactions of sulfur and other multivalent ions. | Lectures and handouts | 2nd and 3rd week | Build integrated knowledge of soil science fields |
| Chemical processes: Precipitation and dissolution reactions. Adsorption-desorption processes. Ion exchange. | Lectures and handouts | 4th and 5th week | Build integrated knowledge of soil science fields |
| Physical processes: Infiltration of water. Transportation of water under saturated and unsaturated conditions. Solute transportation. Heat absorption, radiation and diffusion. | Lectures and handouts | 6th and 7th week | Build integrated knowledge of soil science fields |
| Sources of soil pollution (anthropogenic, agricultural and industrial wastes) | Lectures and handouts | 8th and 9th week | Use knowledge of soil science as entry data to another subject of environmental science.Expand the domain of soil science from agronomy to environment. |
| Nature of pollutant emission from soil to adjacent atmosphere, lithosphere and hydrosphere: Chemicals and radiochemical materials and energy. | Lectures and handouts | 10th week | Use knowledge of soil science as entry data to another subject of environmental science.Expand the domain of soil science from agronomy to environment. |
| Remediation of contaminated soils. | Lectures and handouts | 11th week | Transfer soil science data to colleagues working in different fields, especially civil engineering, biology (ecology) and environment. |
| Bioremediation of contaminated soils. | Lectures and handouts | 12th week | Transfer soil science data to colleagues working in different fields, especially civil engineering, biology (ecology) and environment. |
| Term papers presentations |  | 13th to 16th week | Students acquire analytical skills of predecting possible environmental impacts of soil management activities on related environment fields.Students acquire technical skill sufficient to serve as environment consultant.  |

Learning Methodology: Lectures, Handouts, Literature Review, Term Paper, Slide Show

## Projects and Assignments: Term papers.Data collectin from e-library and internet.

# Evaluation

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| --- | --- | --- |
| Evaluation | Point % | Date |
| First Exam   | 15 | 6th to 7th week |
| Second Exam | 15 | 12th to 13th week |
| Term Paper | 20 | 15th week |
| Final Exam  | 50 | As scheduled |

Main References: All available data sources e.g. books of interest to a given topic, handouts of hard copy articles, web site, news papers

# References: This subject has no available text book.

Intended Grading Scale (Optional)

0-39 F

40-49 D-

50-54 D

55-59 D+

60-64 C-

65-69 C

70-73 C+

74-76 B-

77-80 B

81-84 B+

85-89 A-

90-100 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>