**University** Benha **Faculty** Agriculture

**Course specifications**

**Programs on which the course is given:** Agricultural Biotechnology, Food safety and Agribusiness

**Major or minor element of programmes:** Major

**Department offering the programme:** General

**Department offering the course:** Soil and water science.

**Academic Level/semester:** 2nd level/1st semester (Agric. Biotechnology & Agribusiness programs.);(2nd./1st. Food Safety Program).

**Date of specification approval: May 2014**

**A- Basic Information**

**Title: Soil and water science**  **Code: SO 0501**

**Weekly Teaching Lecture:** 28hours **Practical or** tutorial**:** 28hours **Total:** 56 hours

**B- Professional Information**

**1 – Overall aims of course**

Provide students with knowledge, understanding and skills on fundamentals of soil and water. Different concepts of soil are viewed . Soil properties (biological, physical, chemical) and modern classification of soil taxonomy are involved. Parameters such as soil organic matter , microbial biomass as fertility indicators are viewed. Thorough knowledge, understanding and skills related to water, factors affecting its use, and relations to environment.

**2 – Intended learning outcomes of course (ILOs)**

**a- Knowledge and understanding**:

a1- state soil classification and formation

a2- define and categorize soil physics , mineralogy and chemistry

a3.relate soil microbiology and microbial biomass to land use

a.4.illustrate water use and factors affecting water quality .

**b- Intellectual skills.**

b1-Compare soil forming factors with forming operations

b2- Contrast various moisture states

b3- Classify soil orders and fertility implications; waters and their suitability

**c- Professional and practical skills**

c1- Judge, evaluate and recognize soil formation and horizons.

c2-Conclude soil evaluation in view of relevant data.

c3- Select criteria for assessing soil, land use and water for different aspects.

c4- Assess reports on land and soil and water for specific purposes.

**d- General and transferable skills**

d1- Effective work as a part solve-problem groups.

d2- Use computer soft-ware in analysis processes

d3- Access to the Web-site on relevant topics.

d4- Solving problems using logic scientific approach.

**3- Contents:**

|  |  |  |
| --- | --- | --- |
| **Theoretical part of Soil and water Science Course:** | | |
| Lectures | Hours | Topic |
| 1 | 2 | Introduction to soil science |
| 1 | 2 | Soil formation: Factors and Processes |
| 1 | 2 | The Soil Profile and the Soil Pedon and nature of Horizons |
| 1 | 2 | Soil Physical Properties: Phases, Texture, Structure, soil/water relations |
| 1 | 2 | Soil Classification and Taxonomy. |
| 1 | 2 | Mineralogy and Chemistry of Soil , Exchangeable and water-soluble elements |
| 1 | 2 | Soil Colloids , Cation exchange. . |
| 1 | 2 | Soil pH and Soil Buffering Capacity and Soil Salinity. |
| 1 | 2 | Soil Organic Matter , Soil Microbial biomass ,Organic Soil Amendments |
| 1 | 2 | Overall Revision on Soil Science |
| 1 | 2 | Water Resources and use in Egypt and World. |
| 1 | 2 | Parameters for Water Quality |
| 1 | 2 | Options For the Future |
| 1 | 2 | Overall Revision on Water Science |

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| **Practical part of Soil and Water Science Course :** | | |
| **Sessions** | Hours | **Topic** |
| 1 | 2 | Particle–size Diameter Classes(international and others) |
| 1 | 2 | Practical Demonstration on Soil Profile Initiation |
| 1 | 2 | Soil Sample Collection. |
| 1 | 2 | Practical Determination of Soil Texture using Tex. Triangle |
| 1 | 2 | Experimentation on Soil Moisture Phases |
| 1 | 2 | Oven-drying , Muffling of soil samples and moisture states. |
| 1 | 2 | Determination of Available and Exchangeable Elements |
| 1 | 2 | Determination of Soil Salinity and Soluble Ions |
| 1 | 2 | Excursion for Organic soil Amendment of Compost-making and Biogas |
| 1 | 2 | Determination of soil colour using the Mansell Chart. |
| 1 | 2 | Components of water resource. |
| 1 | 2 | Assessment of water Quality on Basis of classification systems. |
| 1 | 2 | Water and soil Pollution. |
| 1 | 2 | General Revision |

**4– Teaching and learning methods**

4.1- Lectures

4.2-Assignments

4.3- Tutorials and written case-solving exercise.

4.4- Field visits and excursions

4.5- Practical and Laboratory work

**5- Student assessment methods**

5.1:Semester performance to assess knowledge, understanding and intellectual skills

5.2 :Follow-up and Practical exams to assess practical skills

5.3: Oral exam to assess intellectual , general and transferable skills

5.4 Final exam to assess knowledge, comprehending and intellectual skills **Assessment schedule**

Assessment 1 Semester performance exams Weeks 8th and 12th.

Assessment 2 Practical exam Week 15th.

Assessment 3 Oral exam Week 15th.

Assessment 4 Semester Terminal Week 16th.

**Weighing of assessments**

Follow-up & Practical exams 30% (follow-up, Mid-term and practical)

Oral exam. 10 %

Semester Terminal Exam 60%

Total 100%

**Any formative-only assessment(s) to be described**

**6- List of references**

6.1- Course notes: Specialized notes and paragraphs by teaching staff.

6.2-Text books: **Brady, N.C.,Weil, R.R. 2001**. The nature and properties of soil. Prentice-Hall, London.UK.

**7- Facilities required for teaching and learning**

Transportation methods for site visits and scientific excursions,

white board and board ink-marker, data-show, laboratory specimens of studied subjects, pipettes glassware filter paper, chemicals**,** flame emission spectrometry, reference materials, refrigerators, gloves, masks, chemicals.

**Course coordinator:** Prof Dr. Ali Ahmed Abdel-Salam.

**Head of Department:** Prof Dr. Abo-El-Nasr Hashem Abdel-Hamid.

**Date: / /**

**Matrix for Soil and water Science course (Lecture Theoretical part)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| d | | | | c | | | | | b | | | a | | | | Lectures |
| D4 | d3 | d2 | d1 | c4 | c3 | c2 | c1 | b3 | | b2 | b1 | a4 | a3 | a2 | a1 |
|  |  |  | x |  |  |  | x |  | |  | x |  |  |  | x | Introduction to soil science |
| x |  | x |  |  |  |  | x |  | |  | x |  | x |  | x | Soil formation: Factors and Processes |
|  |  | x |  | x |  |  |  | x | |  |  |  |  | x | x | The Soil Profile and the Soil Pedon and nature of Horizons |
| x |  |  | x |  |  | x |  |  | |  | x |  |  |  | x | Soil Physical Properties: Phases, Texture, Structure, soil/water relations |
|  |  | x |  |  |  | x |  |  | |  | x |  |  | x | x | Soil Classification and Taxonomy. |
|  | x | x |  | x |  |  |  |  | | x |  |  |  |  |  | Mineralogy and Chemistry of Soil , Exchangeable and water-soluble elements |
| x |  |  | x |  | x |  |  | x | |  |  |  |  | x |  | Soil Colloids , Cation exchange. . |
| x | x | x | x |  |  | x |  |  | |  |  |  | x |  |  | Soil pH and Soil Buffering Capacity and Soil Salinity. |
| x | x | x | x |  | x | x |  |  | | x |  |  | x |  | x | Soil Organic Matter , Soil Microbial biomass ,Organic Soil Amendments |
| x | x | x | x | x | x | x | x | x | | x | x |  | x | x | x | Overall Revision on Soil Science |
| x | x |  |  |  | x |  | x |  | | x |  | x |  |  | x | Water Resources and use in Egypt and World. |
| x | x | x | x |  |  | x |  |  | |  | x | x |  |  |  | Parameters for Water Quality |
|  | x | x |  | x |  |  |  | x | |  |  | x |  |  |  | Options For the Future |
| x | x | x | x | x | x | x | x | x | | x | x | x | x | x | x | Overall Revision on Water Science |

**Matrix for Soil and water Science course (Practical part)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **d** | | | | | **c** | | | | | **b** | | | **a** | | | | **Practicals** |
| d 4 | d3 | D2 | d1 | c 4 | | c 3 | c 2 | c1 | b 3 | | b 2 | b1 | a 4 | a 3 | a 2 | a1 |
|  |  |  | x |  | |  |  | x |  | |  |  |  |  |  | x | Particle–size Diameter Classes(international and others) |
|  |  | x |  |  | |  | x |  | x | |  |  | x |  |  | x | Practical Demonstration on Soil Profile Initiation |
| x | x |  |  |  | | x |  |  |  | |  |  |  | x |  |  | Soil Sample Collection. |
|  |  | x |  |  | |  | x |  | x | |  |  |  |  | x |  | Practical Determination of Soil Texture using Tex. Triangle |
| x | x |  |  |  | |  | x |  |  | |  |  |  |  |  |  | Experimentation on Soil Moisture Phases |
|  | x |  |  |  | |  |  |  |  | | x |  |  |  |  |  | Oven-drying , Muffling of soil samples and moisture states. |
| x | x | x |  | x | |  | x | x |  | |  |  |  |  |  |  | Determination of Available and Exchangeable Elements |
|  | x | x |  |  | | x |  | x |  | |  |  |  |  |  | x | Determination of Soil Salinity and Soluble Ions |
|  |  |  | x |  | |  |  | x |  | |  |  |  |  |  | x | Excursion for Organic soil Amendment of Compost-making and Biogas |
| x | x |  | x | x | |  |  | x | x | |  |  |  |  |  | x | Determination of soil colour using the Mansell Chart. |
| x |  |  | x |  | | x |  |  |  | |  |  | x |  |  |  | Components of water resource. |
| x | x | x |  | x | | x |  |  |  | |  |  | x |  |  |  | Assessment of water Quality on Basis of classification systems. |
| x | x | x |  | x | |  |  |  | x | |  |  |  |  |  | x | Water and soil Pollution. |
| x | x | x |  | x | | x | x | x | x | | x | x | x | x | x | x | General Revision |