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

**Course specifications**

**Programs on which the course is given:** Agricultural Biotechnology& Agri-Business.

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

**Department offering the programme:** General

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

**Academic Level/semester:** 4th level/2nd semester

**Date of specification approval: May 2014**

**A- Basic Information**

**Title:** Desert and Saline Soil Bio-reclamation.

**Code: SO 0501**

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

**B- Professional Information**

**1 – Overall aims of course**

Gives knowledge and skills of reclaiming soils unsuitable for agriculture, particularly desert sandy soils and saline soils. Reclamation means, including chemical, physical, phyto-biological are covered. Behavior of plant nutrients in reclaimed soils, soil conditioners and other topics are involved. Negative effects of salinity conditions and the biological response to media of high salinity are covered.

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

**a- Knowledge and understanding**:

a1- reviewing soils needing reclamation..

a2- define and categorize reclamation soils.

a3.relate soil conditions to soil fertility.

a.4.illustrate response to reclamation operations.

**b- Intellectual skills.**

b1-Compare soil chemical, biological and physical reclamation.

b2-Contrast different categories of reclamation amendments.

b3-Classify Soil Salinity Categories.

**c- Professional and practical skills**

c1- Assess ,judge, evaluate and recognize soil hazards..

c2-Conclude advantages regarding soil reclamation.

c3- Select criteria for evaluating Reclamation techniques.

c4- Assess reports on land reclamation.

**d- General and transferable skills**

d1- Participation in work with land problem-solving groups.

d2- Use computer soft-ware in analysis operations.

d3- Access to the Web-site on land reclamation.

d4- Solving problems of soil mal-fertility.

**3- Contents:**

**Theoretical part :**

|  |  |  |
| --- | --- | --- |
| Lectures | Hours | Topic |
| 1 | 2 | Soils needing bio-reclamation. |
| 1 | 2 | Desert sandy soils and their low fertility. |
| 1 | 2 | Saline and saline-sodic soils and their hazards. |
| 1 | 2 | Classification of crops in relation to salinity and solidity hazards. |
| 1 | 2 | Calcium carbonate (calcareous soils) and their hazards |
| 1 | 2 | Calcareous soils (Ca-carbonate soils) and their hazards. |
| 1 | 2 | Crop selection for land reclamation stages. |
| 1 | 2 | Physical, chemical and biological methods of reclamation. |
| 1 | 2 | Fertilizer and amendment comparative assessment for reclaimed soils |
| 1 | 2 | Water resources and water-quality for irrigating reclaimed soils |
| 1 | 2 | Rational management of reclaimed soils. |
| 1 | 2 | Crop rotation for reclaimed soils. |
| 1 | 2 | Early warning systems. |
| 1 | 2 | Overall revision on land bio- reclamation |

**Practical part :**

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| **Sessions** | Hours | **Topic** |
| 1 | 2 | Examples of soils needing reclamation. |
| 1 | 2 | Practical Demonstration on hazardous soils. |
| 1 | 2 | Sampling of reclamation soils. |
| 1 | 2 | Determination of soil salinity in paste extracts |
| 1 | 2 | Determination of different soluble salts and ions. |
| 1 | 2 | Physical assessment of problem soils . |
| 1 | 2 | Determination of Total contents of organic substances as manures. |
| 1 | 2 | Determination of calcium carbonate in soils. |
| 1 | 2 | Excursion to Compost-making Organic manure Institutes. |
| 1 | 2 | Assessment bio-fertilizers and organic substances as reclamation agents |
| 1 | 2 | Mathematical approach for balanced bio-organo fertilization. |
| 1 | 2 | Experimental practice on reclamation of problem soils. |
| 1 | 2 | Mathematical assessment on Balanced Desert & Saline soil reclamation. |
| 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-Excursions

4.5-Practical,Laboratory and field work

**5- Student assessment methods**

5.1:Semester performance to assess, understanding and skills

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

5.3: Oral exam to assess intellectual , and transferable skills

5.4 Final exam to assess comprehension 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: **Barnhisel,R.I., Daniels,W.L. and Darmody,R.G. 2000.** Reclamation of drastically disturbed lands. Agronomy Series:No 41, Amer. Soc. Agronomy, WI,USA.

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

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| **Matrix for Desert & Saline Soil Bio-reclamation 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 | Soils needing bio-reclamation. |
| x | x |  | x |  |  |  | x |  | | x |  |  | x |  | x | Desert sandy soils and their low fertility. |
|  |  | x |  | x |  |  | x | x | |  | x |  |  | x | x | Saline and saline-sodic soils and their hazards. |
| x |  | x | x |  |  | x |  | x | |  | x | x |  |  | x | Classification of crops in relation to salinity and solidity hazards. |
|  |  | x |  |  |  | x |  |  | |  | x |  |  | x | x | Calcium carbonate (calcareous soils) and their hazards |
| x | x | x |  | x |  |  | x |  | | x |  |  |  | x | x | Calcareous soils (Ca-carbonate soils) and their hazards. |
| x |  |  | x |  | x |  |  | x | |  |  |  |  | x |  | Crop selection for land reclamation stages. |
| x | x | x | x | x | x | x | x |  | | x | x | x | x |  |  | Physical, chemical and biological methods of reclamation. |
| x | x | x | x |  | x | x | x |  | | x | x | x | x |  | x | Fertilizer and amendment comparative assessment for reclaimed soils |
| x | x | x | x | x | x | x | x | x | | x | x |  | x | x | x | Water resources and water-quality for irrigating reclaimed soils |
| x | x |  |  | x | x |  | x |  | | x | x | x | x |  | x | Rational management of reclaimed soils. |
| x | x | x | x |  |  | x |  |  | |  | x | x |  |  |  | Crop rotation for reclaimed soils. |
|  | x | x | x | x |  | x |  | x | |  |  | x |  |  | x | Early warning g systems. |
| x | x | x | x | x | x | x | x | x | | x | x | x | x | x | x | General Revision |

Transport means for field visits and c 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 coordinators:** Prof Dr. Ihab Farid and Ass. Prof Dr.Mohamd A. Abdel-Salam.

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

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| **Matrix for Desert &Saline Soil Bio-reclamation 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 | Examples of soils needing reclamation. |
|  |  | x |  |  |  | x |  | x |  |  | x |  |  | x | Practical Demonstration on hazardous soils. |
| x | x |  |  |  | x |  |  |  |  |  |  | x |  |  | Sampling of reclamation soils. |
|  |  | x |  |  |  | x |  | x |  |  |  |  | x |  | Determination of soil salinity in paste extracts |
| x | x |  |  |  |  | x |  |  |  |  |  |  |  |  | Determination of different soluble salts and ions. |
|  | x |  |  |  |  |  |  |  | x |  |  |  |  |  | Physical assessment of problem soils . |
| x | x | x |  | x |  | x | x |  |  |  |  |  |  |  | Determination of Total contents of organic substances as manures. |
|  | x | x |  |  | x |  | x |  |  |  |  |  |  | x | Determination of calcium carbonate in soils. |
|  |  |  | x |  |  |  | x |  |  |  |  |  |  | x | Excursion to Compost-making Organic manure Institutes. |
| x | x |  | x | x |  |  | x | x |  |  |  |  |  | x | Assessment bio-fertilizers and organic substances as reclamation agents |
| x |  |  | x |  | x |  |  |  |  |  | x |  |  |  | Mathematical approach for balanced bio-organo fertilization. |
| x | x | x |  | x | x | x |  |  |  |  | x |  | x |  | Experimental practice on reclamation of problem soils. |
| x | x | x |  | x |  |  |  | x |  |  |  |  |  | x | Mathematical assessment on Balanced Desert & Saline soil reclamation. |
| x | x | x |  | x | x | x | x | x | x | x | x | x | x | x | General Revision |