

The Islamia University of Bahawalpur
University College of Agriculture and Environmental Sciences

SES-502: Salt-Affected Soils and Water Quality 4(3-1)

Class: B. Sc. (Hons.) Agriculture,
6th Semester (Major: Soil Science)

Instructor: **Dr. Ghulam Hasan Abbasi**

Class days and timings: As per time table

Contact No. 062-9255531 Cell # 0300-6724172

Course Objective: The course will cover the introduction and classification of salt-affected soils: Properties of salt affected soil, Extent of salt affected soil in Pakistan and in the world, Systems of characterization of salt-affected soils, Chemistry of soil solution and root zone salinity, Gapon and pH_c equations for salination and sodication, Reclamation and management of salt-affected soils, Ground water: Characteristics and resources, Classification and criteria for Irrigation water quality, Salinity build up and prediction, Deleterious effects of poor-quality irrigation water, Management of poor-quality irrigation water, Waterlogged soils: Causes and effects, Management of waterlogged soils

Teaching Methodology:

Theory: The class will be conducted in a lecture & discussion environment where the class Instructor will lead discussions, and students will be encouraged to participate and ask question at the end of each class session. Students will be expected to read assignments in advance. This will be tested through a quiz which may proceed each class session.

Practical: Students will be familiarized with sampling of salt-affected soils, sampling of irrigation water, determination of EC, TSS, cations and anions of irrigation water and soil samples and gypsum requirement of soil and water samples.

Books Prescribed:

1. Ghafoor, A., M. Qadir and G. Murtaza. 2004. Salt-affected Soils: Principles of Management. Allied Book Centre, Lahore, Pakistan.
2. Singh, N.T. 2005. Irrigation and soil salinity in the Indian subcontinent: Past and Present. Leigh University Press, Bethlehem, USA.
3. Evangelou, V.P. 1998. Environmental Soil and Water Chemistry: Principles and Applications. John Wiley and Sons, Inc., NY, USA.
4. Gupta, I.C. 1990. Use of Saline Water in Agriculture. Oxford and IBh Pub. Co., Ltd., New Delhi, India.

COURSE CONTENTS

Theory:

Session 1	Salt-affected soils: Introduction & classification
Session 2	Properties of salt affected soil
Session 3	Extent of salt affected soil in Pakistan and in the world
Session 4	Systems of characterization of salt-affected soils
Session 5	Chemistry of soil solution and root zone salinity
Sessions 6	Gapon and pH_c equations for salination and sodication
Sessions 7& 8	Reclamation and management of salt-affected soils
Session 9	Mid term Examination
Session 10	Ground water: Characteristics and resources
Session 11	Classification and criteria for Irrigation water quality
Session 12	Salinity build up and prediction
Session 13	Deleterious effects of poor-quality irrigation water
Sessions 14 & 15	Management of poor-quality irrigation water
Session 16	Waterlogged soils: causes and effects
Session 17	Management of waterlogged soils
Sessions 18 & 19	Final term examination

Practical:

Sessions 1 & 2	Sampling of salt-affected soils
Session 3	Sampling of irrigation water
Session 4	Determination of EC of irrigation water sample
Session 5	Determination of total soluble salts in irrigation water sample
Session 6	Determination of cations in irrigation water sample
Session 7	Determination of anions in irrigation water sample
Sessions 8	Interpretation of results of water analysis
Session 9	Mid term Examination

Session 10	Collection of saturated soil extract
Session 11	Determination of total soluble salts in saturated soil extract
Session 12	Determination of Ca & Mg in saturated soil extract
Session 13	Determination of Na in saturated soil extract
Session 14	Determination of K in saturated soil extract
Session 15 & 16	Gypsum requirement of soil samples
Session 17	Gypsum requirement of water samples
Sessions 18 & 19	Final term examination

Testing and Grading:

1. Learning will be accomplished through lectures, class exercises, and student participation in classroom discussion and presentations.
2. Grading will tend to focus on your overall performance rather than one or two aspects. A midterm examination and a comprehensive final examination will be given.
3. Another portion of the course grade will include the discussion/attendance grade, quizzes, and/or other assignments.
4. The mid-term examination will be graded for 30% marks and final examination will have a weightage of 50% marks. 20% marks are allocated as sessional both in theory and practical separately. These will be awarded on the basis of attendance, class and practical participation, quizzes, presentations and conduct during the semester etc.
5. Attendance in classes is compulsory as per university rules. Students not meeting the required attendance will not be allowed to take the final examination.
6. Test questions may be taken from textbook readings, additional material discussed in class, questions/ answers covered in the class and practical and/or other assigned readings.

Please Note: In the unlikely event of an unplanned absence by the instructor, the material to have been covered during that class meeting will be shifted to the next meeting. If a test was scheduled for that class meeting, the test will be given during the next class meeting. In the event of any necessary planned absences, information on schedule changes will be provided in advance.

Appointment with Instructor: Instructor will be available for meeting class students immediately after each class, and/ or in the office by appointment made in advance.