

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

**SS-302                      Introduction to Agricultural Chemistry                      3(2-1)**

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**Class:** B. Sc. (Hons.) Agriculture,  
2<sup>nd</sup> Semester,

**Instructor:** Dr. Ghulam Hassan Abbasi

**Class days and timings:** As per time table

**Contact No.** 03006724172

**Course Objective:** The course will cover the introduction to agricultural chemistry with special reference to the history, contribution and scope of it, chemical properties of soil, soil buffering, essential plant nutrients and their importance, enzymes and proteins, water; types and importance etc.

**Teaching Methodology:**

1. The class will be conducted in a lecture and discussion environment, where the class teacher will lead discussion and students will be encouraged to participate and ask question at the end of each class session. The theory part will be well supported by practical accordingly.
2. Students will be expected to read assignments in advance and these will be tested through quizzes and presentations in the class.
3. Teacher will be available for meeting class students immediately

**Books Prescribed**

1. Havlin, J., S. Tisdale, W. L. Nelson and J. D. Beaton. 2004. Soil Fertility and Fertilizers: An introduction to Nutrient Management. 7<sup>th</sup> Edn. New Delhi
2. David, H. 2000. Modern Analytical Chemistry. International ed. McGraw Hill Co. Inc. New York.
3. Brady, N.C. and R.R. Weil. 2002. The nature and properties of soils. 13<sup>th</sup> ed., Prentice-Hall, Inc., Upper Saddle River. NJ, USA.
4. Jain, J.L., S. Jain and N. Jain. 2006. Fundamentals of Biochemistry. S.Chand company Ltd. Ram Nagar, New Delhi.
5. Khalil, I. A. and H. Shah. 2003. Basic Biochemistry. National Book Foundation Islamabad, Pakistan.
6. Lehninger, A.L. 2000. Principles of Biochemistry. 3<sup>rd</sup> ed. Worth Publisher, New York. USA.
7. Rupm, H. and H. Krist, 1992. Laboratory Manual for the Examination of Water, Wastewater and Soil. 2<sup>nd</sup> ed. Weinheim, Fed. Rep. Germany.

**COURSE CONTENTS (Theory):**

Session 1	Agricultural Chemistry; introduction and history
Session 2	Scope and contribution of Agricultural Chemistry
Session 3	Chemical properties of soil and sources of negative charge
Session 4	Soil CEC, EC and its significance
Session 5	Soil pH, acids and bases, soil buffering capacity
Session 6	Water; structure and importance
Sessions 7 & 8	Soil water quality and management
Session 9	<b>Mid term Examination</b>
Session 10	Essential plant nutrients; classification and criteria
Session 11	Role of macronutrients in plant growth

Session 12	Role of micronutrients in plant growth
Session 13	Deficiency symptoms of macronutrients in plants
Session 14	Deficiency symptoms of micronutrients in plants
Session 15	Carbohydrates; importance and classification
Session 16	Proteins and Lipids; importance and classification
Sessions 17-18	Enzymes; nomenclature, classification and factors affecting activity
Session 19	<b><i>Final term examination</i></b>

#### **Practical:**

Session 1	General lab instructions
Session 2	Identification and physical characteristics of commercial fertilizers
Session 3	Organic fertilizers or manures, their types and significance
Sessions 4 & 5	Nutrient percentage and conversion factor in fertilizer calculation
Session 6	Analysis of different N containing fertilizers
Session 7	Analysis of different P containing fertilizers
Session 8	Analysis of different K containing fertilizers
Session 9	<b><i>Mid term Examination</i></b>
Session 10	Standard solutions and preparation of % and ppm solutions
Sessions 11 & 12	Determination of moisture and ash contents
Sessions 13 - 15	Qualitative analysis of carbohydrates and proteins
Sessions 16 - 17	Determination of reducing and non-reducing sugar
Session 18	Determination of proteins by Kjeldahl's methods
Session 19	<b><i>Final term examination</i></b>

#### **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.