

**School of Chemistry
Faculty of Science
University of the Punjab, Lahore
Course Outline**



BS Chemistry Semester-V					
Programme	BS Chemistry	Course Code	Chem-361	Credit Hours	2
Course Title	Unit Operations and basic Chemical industries		Course Type	Major (Elective)	
Course Introduction					
<p>This course will help the students in assessing the Unit Operations in the Chemical Industry, Basic Chemical Industries and Cement Industries. The students will learn about the basic concepts of chemical industries.</p> <p>Unit operations in chemical industry: Introduction to chemical industry with reference to Pakistan, Chemistry vs Chemical Engineering, Flow sheet Diagrams, Brief Introduction of different unit operations used in chemical industry. Heat Flow, Convection, Conduction, Heat Exchangers, Distillation, Evaporation, Size Reduction and Size Separation and Filtration.</p> <p>Basic Chemical Industries: Raw materials; Chemical processes involved; flow sheet diagrams with all the important parameters concerned with the manufacturing of Phosphoric acid; caustic Soda; Calcium oxychloride; Phenol, Phthalic anhydride, Oxalic acid, Paracetamol, and Aspirin, Applications of these chemicals in industry.</p>					
Learning Outcomes					
<p>On the completion of the course:</p> <ul style="list-style-type: none"> • Students are expected to become familiarized with the concepts of general chemistry • This will enable them qualify for basic to moderate level jobs involving general knowledge of chemistry • The obtained knowledge shall also enable the students to enter into various entrepreneurial activities involving general introduction to chemistry • Students are able to understand the concept of GLP and GMP 					
Course Content				Assignments/Readings	
Week 1	Introduction to the chemical industry with reference to Pakistan			Class Based learning/tests	
Week 2	Chemistry vs Chemical Engineering, Flow sheet Diagrams			Class Based learning/tests	
Week 3	Brief introduction of different unit operations used in the chemical industry			Class Based learning/tests	
Week 4	Heat Flow, Conduction			Class Based learning/tests	
Week 5	Heat Flow, Convection			Class Based learning/tests	

Week 6	Heat Exchangers	Class Based learning/tests
Week 7	Distillation	Written Assignment
Week 8	Evaporation	Class Based learning/tests
Week 9	Midterm Assessment	Class Based learning/tests
Week 10	Size Reduction and Size Separation	Class Based learning/tests
Week 11	Filtration	Class Based learning/tests
Week 12	Raw materials; chemical processes involved; flow sheet diagrams with all the important parameters concerned with the manufacturing of Phosphoric acid	Class Based learning/tests
Week 13	Raw materials; Chemical processes involved; flow sheet diagrams with all the important parameters concerned with the manufacturing of Caustic Soda	Class Based learning/tests
Week 14	Raw materials; Chemical processes involved; flow sheet diagrams with all the important parameters concerned with the manufacturing of Phthalic Anhydride and Oxalic Acid	Class Based learning/tests
Week 15	Raw materials; Chemical processes involved; flow sheet diagrams with all the important parameters concerned with the manufacturing of Phenol	Quiz
Week 16	Raw materials; Chemical processes involved; flow sheet diagrams with all the important parameters concerned with the manufacturing of paracetamol and Aspirin	Class Based learning/tests

Textbooks and Reading Material

1. Applied Chemistry, Haq Nawaz Bhatti and Muhammad Salman, 2017, Caravan Book Publisher, Pakistan.
2. Water Supply and Sewerage, T.J.McGhee, McGraw Hill Book Co. New York.(1991)
3. Hand Book of Industrial Chemicals, By SIRI Board of Consultants and Engineers,
4. Shereve's Chemical Process Industries, 5th Ed.1975 by G.T.Austin McGraw Hill Book Co. New York.
5. Industrial chemistry, B. K. Sharma Krishna Prakashan Media (P) Ltd., Ed-15 (2006)

Teaching Learning Strategies

1. Lectures
2. Group Discussion
3. Laboratory work
4. Seminar/ Workshop

Assignments: Types and Number with Calendar

1. Written 7th week
2. Quiz 15th week

Assessment

Sr. No.	Elements	Weightage	Details
1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2.	Formative Assessment	25%	Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.

BS Chemistry Semester-V					
Programme	BS Chemistry	Course Code	Chem-362	Credit Hours	1
Course Title	Applied Chemistry Lab	Course Type		Major (Elective)	
Course Introduction					
<p>This course content will increase the working skills of students regarding water testing labs and Polymer industries.</p> <p>Preparations: Dentifrice, Thermo and Thermosetting polymers Titrimetry: Estimation of Residual and Available Chlorine, Acidity of Vinegar, Acidity of Sulphuric acid Flamephotometry: Determination of the Sodium in water, Determination of Potassium in water, Simultaneous determination of sodium and potassium in water</p>					
Learning Outcomes					
<p>On the completion of the course:</p> <ul style="list-style-type: none"> • Students are expected to become familiarized with the concepts of general chemistry • This will enable them qualify for basic to moderate level jobs involving general knowledge of chemistry • The obtained knowledge shall also enable the students to enter into various entrepreneurial activities involving general introduction to chemistry • Students are able to understand the concept of GLP and GMP 					
Course Content				Assignments/Readings	
Week 1	Preparation of Thermo and Thermosetting plastics			Lab work / Notebook	
Week 2	Preparation of Dentifrice			Lab work / Notebook	
Week 3	Estimation of Residual Chlorine			Lab work / Notebook	
Week 4	Estimation of Available Chlorine			Lab work / Notebook	
Week 5	Acidity of Vinegar			Lab work / Notebook	
Week 6	Acidity of Vinegar			Lab work / Notebook	
Week 7	Acidity of Sulphuric acid			Written Assignment	
Week 8	Acidity of Sulphuric acid			Lab work / Notebook	

Week 9	Mid Term Examination	Lab work / Notebook
Week 10	Determination of Sodium in water	Lab work / Notebook
Week 11	Determination of Sodium in water	Lab work / Notebook
Week 12	Determination of Potassium in water	Lab work / Notebook
Week 13	Determination of Potassium in water	Lab work / Notebook
Week 14	Simultaneous determination of sodium and potassium in water	Lab work / Notebook
Week 15	Simultaneous determination of sodium and potassium in water	Quiz
Week 16	Review and Viva Voce	Lab work / Notebook

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2. Water Supply and Sewerage, T.J.McGhee, McGraw Hill Book Co. New York.(1991)
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6. Applied.....?

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