

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					
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. 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. 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.					
Learning Outcomes					
On the completion of the course: • 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		