

**Department of Science Education
Institute of Education & Research
University of the Punjab, Lahore
Course Outline**



Programme	BS Science Education	Course Code	SE-312L	Credit Hours	1
Course Title	CHEMISTRY LAB-IV (APPLIED CHEMISTRY LAB)				
Course Introduction					
This laboratory course provides practical experience in applied and industrial chemistry through the preparation and analysis of industrial and commercial chemical products. Students develop hands-on skills in volumetric analysis, flame photometry, spectrophotometry, and chromatographic techniques. The course emphasizes laboratory safety, analytical accuracy, and the interpretation of experimental data. It also familiarizes students with quality control procedures and chemical analyses commonly used in industrial laboratories.					
Learning Outcomes					
On the completion of the course, the students will:					
1. Prepare and standardize solutions for laboratory experiments. 2. Prepare selected industrial and commercial chemical products using standard laboratory procedures. 3. Perform quantitative chemical analyses using titrimetric, flame photometric, spectrophotometric, and chromatographic techniques. 4. Analyze and interpret experimental results to assess the quality and composition of industrial materials. 5. Apply laboratory safety practices and good analytical techniques while conducting industrial chemistry experiments.					
Course Content				Assignments/Readings	
Week 1	Orientation Laboratory safety protocols, chemical handling, Experimentation protocols				
Week 2	<u>Preparations:</u> 1.Detergent and cosmetics (Cold cream, shampoo and vanishing cream), Dentrifrice, 2.Thermosetting and thermoplastic resins (alkyd and urea formaldehyde)			Reading: Perfumes Cosmetics and Soaps, W.A. Poucher, chapmann and Hall 7th Ed. (1974).	
Week 3	<u>Preparations:</u> 1.Detergent and cosmetics : Dentrifrice, 2.Thermosetting and thermoplastic resins (alkyd and urea formaldehyde)			Readings: Perfumes Cosmetics and Soaps, W.A. Poucher, chapmann and Hall 7th Ed. (1974).	
Week 4	<u>Titrimetry:</u> 1.Estimation of water hardness by complexometry 2.Estimation of acetic acid contents in the vinegar sample			Readings: Applied Chemistry Theory and Practice, O.P. Vermani & A.K. Narula, Wiley Eastern Limited (1989).	

Week 5	<u>Titrimetry:</u> 1.Determine the acidity of the sulphuric acid and its normality. 2.Determination of acidity, alkalinity, Free CO ₂ in water.	Reading Applied Chemistry Theory and Practice, O.P. Vermani & A.K. Narula, Wiley Eastern Limited (1989).
Week 6	<u>Titrimetry:</u> 1.Assay of bleaching powder by free chlorine method. 2.Determine the %age purity of the Commercial sample of sodium chloride.	Reading Applied Chemistry Theory and Practice, O.P. Vermani & A.K. Narula, Wiley Eastern Limited (1989).
Week 7	<u>Titrimetry:</u> 1.Determination of Residual Chlorine in water. 2.%age of reducing sugars.	Reading Applied Chemistry Theory and Practice, O.P. Vermani & A.K. Narula, Wiley Eastern Limited (1989).
Week 8	<u>Titrimetry:</u> 1.Soap analysis for free and combined alkali. 2.Determining the %age purity of sodium bicarbonate and sodium carbonate.	Reading Applied Chemistry Theory and Practice, O.P. Vermani & A.K. Narula, Wiley Eastern Limited (1989).
Week 9	<u>Flamephotometry:</u> 1.Estimation of Potassium in the tap water. 2.Estimation of Sodium in the Commercial Sodium Chloride. 3.Estimation of Calcium in milk.	Reading: T. B. of Quantitative Inorganic Analysis, Vogel's Ed-4th, Longman Group Limited (1978).
Week 10	<u>Spectrophotometry:</u> 1.Determination of the of KMnO ₄ , K ₂ Cr ₂ O ₇ and CoCl ₄ 2.Estimation of nickel in vanaspati ghee.	Reading: T. B. of Quantitative Inorganic Analysis, Vogel's Ed-4th, Longman Group Limited (1978).
Week 11	<u>Spectrophotometry:</u> 1.Estimation of chloride in the tannery effluent. 2.Estimation of Iron in Pharmaceutical Products	Reading: T. B. of Quantitative Inorganic Analysis, Vogel's Ed-4th, Longman Group Limited (1978).
Week 12	<u>Spectrophotometry:</u> Estimation of Phosphates in fertilizers.	Readings: James A. Moore, "Experimental methods in Organic Chemistry", Holt-Saunders Int., 1983.
Week 13	<u>Chromatography:</u> Separation of mixture of ink by circular paper chromatography	Readings: T. B. of Quantitative Inorganic Analysis, Vogel's Ed-4th, Longman Group Limited (1978).
Week 14	<u>Chromatography:</u> Separation of mixture of metal ions by paper chromatography.	Readings: Practical Statistics for the Analytical Scientist, A Bench Guide, RSC Publishing LGC Ltd 2009.
Week 15	<u>Chromatography:</u> Coating of TLC plates and separation of mixture of dyes.	Readings: Practical Statistics for the Analytical Scientist, A Bench Guide, RSC Publishing LGC Ltd 2009.
Week 16	<u>Chromatography:</u> Separation of different pigments of plant extract by TLC chromatography.	Readings: Practical Statistics for the Analytical Scientist, A Bench Guide, RSC Publishing LGC Ltd 2009.

Textbooks and Reading Material	
1. Textbooks. 1. Perfumes Cosmetics and Soaps, W.A. Poucher, Chapman and Hall 7th Ed. (1974). 2. Applied Chemistry Theory and Practice, O.P. Verma & A.K. Narula, Wiley Eastern Limited (1989). 3. T. B. of Quantitative Inorganic Analysis, Vogel's Ed-4th, Longman Group Limited (1978). 4. Practical Statistics for the Analytical Scientist, A Bench Guide, RSC Publishing LGC Ltd 2009. 2. Suggested Readings (Students can explore by themselves) 3. Journal Articles/ Reports Note: 1. It is preferable to use latest available editions of books. Mention the publisher & year of publication. 2. The References/ bibliography may be in accordance with the typing manual of the concerned faculty/subject. Preferably follow APA 7th Edition publication manual.	
Teaching Learning Strategies	
1. Hands-On Laboratory Experiments 2. Demonstration-Based Learning 3. Problem-Solving Sessions 4. Collaborative Group Work	
Assignments: Types and Number with Calendar	
Updating Practical books Two assignments taken before mid-term and remaining two will be the part of final term.	