ENGINEERING CHEMISTRY LABORATORY

I Semester: CSE | IT | EEE II Semester: AE | ECE | ME | CE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
AHSB09	Foundation	-	-	3	1.5	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 45				Total Classes: 45		

OBJECTIVES:

The **course should enable the students to:**

I. The course intends to provide an overview of the working principles and mechanism of reactions.
II. This course relies on elementary treatment and qualitative analysis and makes use of simple models and equation to illustrate the concepts involved.
III. To provide an overview of preparation and identification of organic compounds.
IV. To gain the knowledge on existing future upcoming devices, materials and methodology

COURSE OUTCOMES (COs):

CO 1 Understand the basic principles of chemistry and correlate with experiments.
CO 2 Explore the working principles of conductometric and potentiometric titrations.
CO 3 Summarize various methods of volumetric analysis like Complexometry and Argentometry.
CO 4 Analyze the reaction mechanism of organic compounds.
CO 5 Explain the physical properties, separation techniques of TLC

COURSE LEARNING OUTCOMES (CLOs):

The students should enable to:

1. Extrapolate the knowledge of preparation of acetyl salycilic acid.
2. Use innovative methods to improve the quality of soft water for industrial purpose at cheaper cost.
3. Evaluate conductometry and conductometric titrations.
4. Estimate potentiometry and potantiometric titrations.
5. Compare the results of experiments with potentiometry.
6. Describe potentiometry and potantiometric titrations.
7. Identify the formula for viscosity, and explain each variable.
8. Explain certain properties of water using the concepts of cohesive forces and surface tension.
9. Develop theoretical aquatic chemistry basis and use the principles for the evaluation of water quality.
10. Describe the rate constant for a reaction and elementary steps in the reaction mechanism.
11. Explore the basic knowledge of adsorption.
12. Understand principles and their practical application chromatographic separation.

LIST OF EXPERIMENTS

Week-1	PREPARATIONS OF ORGANIC COMPOUNDS

Synthesis of Aspirin.

Week-2	**VOLUMETRIC ANALYSIS**
Determination of total hardness of water by complex metric method using EDTA.	
Week-3	**CONDUCTOMETRIC TITRATIONS**
Estimation of an HCl by conduct metric titrations.	
Week-4	**POTENTIOMETRIC TITRATIONS**
Estimation of HCl by potentiometric titrations.	
Week-5	**CONDUCTOMETRIC TITRATIONS**
Estimation of Acetic acid by Conduct metric titrations.	
Week-6	**POTENTIOMETRIC TITRATIONS**
Estimation of Fe^{2+} by Potentiometry using $KMnO_4$ titrations.	
Week-7	**PHYSICAL PROPERTIES**
Determination of surface tension of a given liquid using stalagmometer.	
Week-8	**PHYSICAL PROPERTIES**
Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.	
Week-9	**VOLUMETRIC ANALYSIS OF ARGENTOMETRY**
Determination of chloride content of water by Argentometry.	
Week-10	**CHEMICAL KINETICS**
Determination of rate constant of acid catalyzed hydrolysis of methyl acetate.	
WeeK-11	**ADSORPTION TECHNIQUES**
Verification of freundlich adsorption isotherm-adsorption of acetic acid on charcoal.	
Week-12	**CHROMATOGRAPHY TECHNIQUES**
Thin layer chromatography calculation of R_f values.	

Text Books:

1. Vogel's, "Quantitative Chemical Analysis", Prentice Hall, 6th Edition, 2000.
2. Gary D.Christian, "Analytical Chemistry", Wiley India, 6th Edition, 2007.

Reference Books:

1. A text book on experiments and calculation Engg. S.S. Dara.
2. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

Web References:
1. http://www.iare.ac.in 2. https://en.wikipedia.org/wiki/Chemistry 3. https://www.academia.edu/35819111/Btechlab