

**20CY115 PHYSICAL CHEMISTRY LAB - 1**

Hours Per Week :

L	T	P	C
-	-	4	2

**COURSE DESCRIPTION AND OBJECTIVES:**

This lab course attempts to demonstrate fundamental concepts in Physical Chemistry through various experiments. This course will allow the students to utilize the concepts learned in their Physical Chemistry theory class to calculate/determine several important properties of chemical systems. These labs are also designed to be in-sync with the topics covered in the theory classes.

**COURSE OUTCOMES:**

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes
1	Apply the concept of thermodynamics to determine the heat of neutralization and distribution co-efficient
2	Calculate various kinetic parameters of reactions such as decomposition of peroxide, acid-catalyzed hydrolysis of methyl acetate etc.
3	Determine the equilibrium constant of weak acid using Ostwald's dilution law.
4	Asses various types of titration methods to find out the different solution properties (equivalence point, solubility product etc.)
5	Analyze various properties of solutions using different instrumentations techniques.

1. Determination of heat of neutralization of a strong acid by a strong base
2. Determination of distribution coefficient of iodine in carbon tetra chloride and water
3. Study of kinetics of decomposition of  $H_2O_2$
4. Study of kinetics of acid-catalyzed hydrolysis of methyl acetate
5. Verification of Ostwald's dilution law and determination of  $K_a$  of weak acid
6. Calibration of pH meter and determination of pKa value of benzoic acid by half neutralization method
7. Potentiometric titration of Mohr's salt solution against standard  $K_2Cr_2O_7$  and  $KMnO_4$  solution
8. Determination of  $K_{sp}$  for AgCl by potentiometric titration of  $AgNO_3$  solution against standard KCl solution
9. pH-metric titration of acid (mono- and di-basic) against strong base
10. Conductometric titration of an acid (strong, weak/ monobasic, dibasic, and acid mixture) against strong base
11. Study of saponification reaction by conductometry
12. Determination of solubility of sparingly soluble salt in water, in electrolyte with common ions and in neutral electrolyte (using common indicator)

**Text Books:**

1. Palit, S.R., De, S. K. Practical Physical Chemistry Science Book Agency
2. Gurtu, J. N., Kapoor, R., Advanced Experimental Chemistry S. Chand & Co. Ltd.