

PCH205 CHEMICAL ENGINEERING LAB II

L	T	P	Cr
0	0	3	1.5

Course Objective:

To learn analytical experimental methods using sophisticated instruments and interpretation of experimental data.

S. No.	Contents
1.	To estimate concentration of a component in liquid solution by UV-VIS spectrophotometer
2.	To identify functional groups on samples by Fourier Transform Infrared Spectroscopy (FTIR)
3.	To estimate concentration of a component in liquid solution by Gas Chromatography (GC)
4.	To estimate concentration of a component in liquid solution by High Performance Liquid Chromatography (HPLC)
5.	To estimate COD in a liquid sample
6.	To estimate surface area, pore size and pore volume distribution of a porous material
7.	To estimate Total Organic Carbon (TOC) in a liquid sample by TOC analyzer
8.	Analysis of sample by Thermo Gravimetric Analysis (TGA)
9.	Strength measurement of given sample by Universal Testing Machine (UTM)
10.	To estimate BOD in a wastewater sample
11.	To calibrate Brookfield viscometer, and estimation of viscosity of a given sample
12.	To calibrate Refractometer and determination of concentration of given sample
13.	Heat transfer and pressure drop characteristics of different fluids using shell and tube heat exchanger
14.	Heat transfer and pressure drop characteristics of different fluids using plate heat exchanger
15.	Demonstration of Scanning Electron Microscopy (SEM), X-ray Diffraction (XRD), Nuclear Magnetic Resonance (NMR) Spectroscopy, CHNS analyser
16.	Determination of molecular weight and molecular weight distribution by Gel Permeation Chromatography (GPC)

Course learning outcomes (CLOs):

The students will be able to

1. select suitable instrumental techniques for analysis
2. plan experiments and operate several specific instruments
3. analyze and interpret the experimental data

Recommended Books:

1. Willard H.H., Merritt J.L., Dean J.A., and Settle F.A., *Instrumental Methods of Analysis*, CBS Publisher (2009)
2. Skoog A.A., Holler J.F., and Crouch S.R., *Principles of Instrumental Analysis*, Brooks Cole, (2006).
3. Cleceri L.S., Greenberg A.E., and Eaton A.D., *Standard Methods for the Examination of Water and Wastewater*, American Public Health Association (1998).
4. Rouessac F., and Rouessac A., *Chemical Analysis: Modern Instrumentation Methods and Techniques*, Wiley(2007).

Evaluation Scheme:

S.No.	Evaluation Elements	Weightage (%)
1.	Continuous evaluation (Assignments/Micro Projects/Quizes)	50
2.	Lab Evaluation (Viva-voce/Lab record/Performance)	50