

CH 257 INSTRUMENTAL METHODS OF ANALYSIS

CREDITS= 6 (L = 4, T=0, P = 2)

1	Fundamentals analytical Instruments: Types of analytical and instrumental methods and their selection, Role of computers in analytical methods, Performance requirements of analytical instruments, Instrument calibration techniques.	5 Hours
2	Atomic spectroscopy: Introduction to spectrometric methods, Principle and applications of atomic absorption spectrometry, atomic emission spectrometry, atomic mass spectrometry, atomic x-ray spectrometry.	5 Hours
3	Molecular spectroscopy: Basic principles and applications of UV-Visible spectrometry, Infrared spectrometry, Nuclear magnetic resonance spectrometry, molecular mass spectrometry.	6 Hours
4	Electron and ion spectrometers: Surface spectroscopic techniques, electron spectroscopy and ion spectroscopy.	5 Hours
5	Electroanalytical methods: Electrochemical methods for analysis, electrochemical cells, types of electrodes, electrode potentials. Applications of potentiometry, conductometry, voltametry, and coulometry.	5 Hours
6	Separation methods: Introduction to chromatographic separations. Basic principles and applications of Gas chromatography and liquid chromatography techniques.	5 Hours
7	Thermoanalytical methods: Principles and applications of Thermo-gravimetric analysis (TGA), Differential thermal analysis (DTA), Differential scanning calorimetry (DSC).	4 Hours
8	Environmental pollution monitoring instruments: Types and concentration of various gas pollutants, Instrumental techniques and measurement range; Determination of carbon dioxide, sulfur dioxide, nitrogen oxides, hydrocarbons and ozone. Types of water pollutants and detection techniques.	5 Hours

REFERENCE BOOKS:

Title: Handbook of analytical instruments
Author: R. S. Khandpur
Publisher: Tata McGraw-Hill Publishing company Ltd

Title: Principles of Instrumental analysis
Author: Douglas A. Skoog, F. James Holler and Timothy A. Nieman
Publisher: Harcourt Brace College Publishers

Title: Instrumental methods of chemical analysis
Author: Galen W. Ewing
Publisher: McGraw-Hill international edition

Title: Organic spectroscopy
Author: Kemp. W.
Publisher: Macmillan press

LIST OF EXPERIMENTS:

- 1 To determine the concentration of the given acid using potentiometer.
- 2 To determine the concentration of the given acid using pH-meter
- 3 To determine the dissociation constant of acetic acid using pH-meter.
- 4 To determine the cell constant and to determine the dissociation constant of acetic acid using conductometer.
- 5 To determine the concentration of the given acid using conductometer.
- 6 To determine the specific rotation and to find the concentration of the given optically active compound using polarimeter.
- 7 To determine the specific and molar refraction index of the given organic liquid using refractometer.
- 8 To determine the concentration of the given solution using refractometer.
- 9 To determine the metal ion concentration using colorimeter.
- 10 To determine the relative viscosity coefficient using viscometer.