

ANALYTICAL INSTRUMENTATION

Unit-I

INTRODUCTION TO OPTICAL METHODS (SPECTROSCOPY)

The Nature of Radiant Energy, Spectral Regions, Interaction with Matter, Atomic Spectra, Molecular Spectra, Practical Sources of Radiation, Lasers, Wavelength selection, Monochromators, Dispersion by Prisms, Dispersion by Gratings.

ULTRAVIOLET AND VISIBLE SPECTROSCOPY

Mathematical Theory (Beer-Lambert Law), Instrumentation, Filter Photometers, Single-Beam Spectrophotometers Double-Beam Spectrophotometers, Sources of radiation, Cells, Detectors, Spectrophotometric Operation

Unit-II:

ATOMIC ABSORPTION SPECTROSCOPY

Theory and Instrumentation, Atomization, Flame Atomization, Volatile Hydrides, Sources of Radiation (Hollow Cathode Lamp), Operation of Atomic Absorption Spectrophotometer

INFRARED SPECTROSCOPY

Theory and Instrumentation, Optical materials, Sources of radiation. Detectors

Unit-III:

CHROMATOGRAPHIC TECHNIQUES

Theory of Chromatographic Separation, Retention Time, Retention Volume. Classification of Chromatographic Techniques.

GAS CHROMATOGRAPHY

Gas Chromatographic Columns, The Stationary Phase, The Stationary Liquid Phase, Bonded Phases, Carrier Gas, Detectors.

Unit-IV:

LIQUID CHROMATOGRAPHY

Classification of Liquid Chromatography, Liquid-Solid Chromatography, Liquid-Liquid Chromatography, Bonded Phase Liquid Chromatography Size exclusion chromatography, Ion Exchange Chromatography, High Performance Liquid Chromatography, Columns and Detectors.

BOOKS RECOMMENDED

1. Analytical Chemistry by Gary D. Christian
2. Instrumental Methods of Chemical Analysis by Galen W. Ewing
3. Principles of Instrumental Analysis by Skoog and Leary
4. Handbook of Analytical Instruments by R.S. Khandpur