

V - SEMESTER

Course 13A :Chromatography and Instrumental methods of Analysis

Credits: 03

Learning Outcomes:

- 1) Students after successful completion of the course will be able to:
- 2) Identify the importance of chromatography in the separation and identification of compounds in a mixture
- 3) Acquire a critical knowledge on various chromatographic techniques.
- 4) Demonstrate skills related to analysis of water using different techniques.
- 5) Understand the principles of spectrochemistry in the determination of metal ions.
- 6) Comprehend the applications of atomic spectroscopy.

Syllabus:

Unit-1: Chromatography-Introduction and classification (9 hours)

Principle, Classification of chromatographic methods, Nature of adsorbents, eluents, R_f values, factors affecting R_f values.

UNIT-2: TLC and paper chromatography (9hours)

Thin layer chromatography: Principle, Experimental procedure, preparation of plates, adsorbents and solvents, development of chromatogram, detection of spots, applications and advantages.

Paper Chromatography: Principle, Experimental procedure, choice of paper and solvents, various modes of development- ascending, descending, radial and two dimensional, applications.

UNIT-3: Column chromatography (9 hours)

Column chromatography: Principle, classification, Experimental procedure, stationary and mobile phases, development of the Chromatogram, applications.

HPLC: Basic principles, instrumentation–block diagram and applications.

UNIT-4: Spectrophotometry (9 hours)

Principle, Instrumentation : Single beam and double beam spectrometer, Beer-Lambert's law- Derivation and deviations from Beer-Lambert's law, applications of Beer-Lambert's law- Quantitative determination of Fe^{+2} , Mn^{+2} and Pb^{+2} .

UNIT-5: Polarimetry and Refractometry (9 hours)

Polarimetry and Refractometry: Polarimetry: Nature of polarized light, polarimeter, sample cells, operation of the polarimeter, optical purity. Refractometry; The refractive index, Refractometer.

Suggested Co-Curricular Activities:

- 1) Training of students by related industrial experts.
- 2) Assignments, Seminars and Quiz(on related topics).
- 3) Visits to laboratories, firms, research organizations etc.
- 4) Invited lectures and presentations on related topics by field/industrial experts

List of Reference books:

- 1) Fundamental so Analytical Chemistry by F.James Holler, Stanley R Crouch, Donald M.West and Douglas A.Skoog, Ninth edition, Cengage.
- 2) Analytical Chemistry by Gary D.Christian, Purnendu K.Dasgupta and Kevin A.Schug, Seventh edition, Wiley.
- 3) Quantitative analysis by R.A.Day Jr .and A.L.Underwood, Sixth edition, Pearson.
- 4) Text book of Vogel's Quantitative Chemical Analysis, Sixth edition/Pearson.
- 5) Instrumental methods of Chemical Analysis by Dr.B.K.Sharma 1981

V - SEMESTER

Course 13 A: Chromatography and Instrumental methods of Analysis

Credits: 01

Learning Outcomes:

On successful completion of this practical course, student shall be able to:

- 1) Perform the separation of a given dye mixture using TLC
- 2) Learn the preparation of TLC plates
- 3) Demonstrate the separation of mixture of amino acids using paper chromatography
- 4) Acquire skills in using column chromatography for the separation of dye mixture.

Laboratory course Syllabus:

- 1) Separation of a given dye mixture (methyl orange and methylene blue) using TLC (using alumina as adsorbent).
- 2) Separation of mixture of methyl orange and methylene blue by column chromatography.
- 3) Separation of given mixture of amino acids (glycine and phenyl alanine) using ascending paper chromatography.
- 4) Separation of food dyes using Column Chromatography
- 5) Separation of triglycerides using TLC
- 6) Verification of Beer Lambert's law. (Using potassium permanganate solution) using colorimeter / spectrophotometer.

Co-Curricular Activities:

Mandatory: (*Lab /field training of students by teacher:(lab:10+field:05):*)