Separation Techniques in Chemical Analysis

Course Coordinator: Dr Divya N Shetty

Objectives : Separation techniques in chemical analysis is a 30 hours online course aims at exploring the different separation processes applied in chemical analysis.

Eligibility : All B.Sc./ M. Sc students who have studied chemistry at PUC level.

Contents: Introduction, history, classification, principle & basic theory of chromatography, Column adsorption chromatography, Partition chromatography, Band broadening & column efficiency, factors affecting, Plate theory, Rate theory of chromatography. Column Chromatography - High pressure liquid chromatography (HPLC): Principle, instrumentation Apparatus, pumps, types of columns, packing and characteristics of liquid chromatographic detectors-UV, IR detectors. Advantages and applications of liquid chromatography.

Solvent Extraction: Definition, types, principle and efficiency of extraction. Sequence of extraction process. Factors affecting extraction - pH, oxidation state, modifiers, synergistic, masking and salting out agents. Techniques-batch and continuous extraction, applications.

Ion-exchange Chromatography (IEC): Synthesis and types of ion-exchange resins. Principle, factors affecting ion-exchange equilibria. Resin properties- ion-exchange capacity, applications of IEC in preparative, purification and recovery processes.

Gas Chromatography (GC): Principle, comparison of GSC and GLC. Instrumentation, Columns - packed and tubular. Study of detectors - thermal conductivity, flame ionization, electron capture, GC-MS. Factors affecting separation, applications.

TLC and HPLC: Introduction, preparation of TLC plate, Basic principles, instrumentation of HPTLC, application of HPTLC.

Learning outcomes: - After successful completion of this course candidate will be able to account for the application of chromatographic methods in component analysis.

Timings: 5.00 to 6.30 pm (Once in a week