3rd Semester

MCYC 301 Analytical Techniques –I (3-0-0) (3 credits)

Module I (8 hours)

Tools and Data Handling: Balances, burettes, volumetric flasks, pipettes, calibration of tools, sampling. Errors and Statistics: significant figures, rounding off, accuracy and precision, determinate and indeterminate errors, standard deviation, propagation of errors, confidence limit, test of significance, rejection of a result.

Module II (8 hours)

Separation Techniques: Solvent Extraction: distribution Coefficient, distribution ratio, solvent extraction of metals, multiple batch extraction, counter current distribution. - Chromatographic Techniques: classification, theory of chromatographic separation, distribution coefficient, retention, sorption, efficiency and resolution. - Column, ion exchange, paper, TLC & HPTLC: techniques and application. - Gas Chromatography: retention time or volume, capacity ratio, partition coefficient, theoretical plate and number, separation efficiency and resolution, instrumentation and application.

Module III (10 hours)

Spectroscopic Techniques: Electromagnetic radiation, absorption, and emission of radiation – instrumentation: sources, monochromators, detectors. - Flame spectrometry: flame emission, AAS, ICP, instrumentation and application. - Absorption spectrometry: UV-VIS, IR, instrumentation, techniques and applications.

Textbook:

1. D. C. Harris, Quantitative Chemical Analysis, 4th Ed., W. H. Freeman, 1995

Further reading:

2. G. D.Christian & J. E. O'Reily, Instrumental Analysis, 2nd Ed., Allyn & Balon, 1986.
3. D. A. Skoog, F. J. Holler, S. R. Crouch, Instrumental Analysis, Cengage Learning, 11th edn., 2012.