

## **CY-120 ANALYTICAL CHEMISTRY I**

**Introduction:** Introduction and scope of analytical chemistry, Major steps in total chemical analysis, a general survey of all analytical methods.

**Errors in Chemical Analysis:** Evaluation of reliability of analytical data, Significant figures, Selection of central best value from a set of data, Precision and accuracy, Methods to measure precision, Classification of errors, Distribution of data from replicate measurements, Comparison of results, Student 't' test, Modern trends in quality control.

**Gravimetric Methods of Analysis:** combustion analysis, Precipitation process: solubility, filterability, purity, composition of the product, scope of gravimetric analysis, calculation of gravimetric analysis.

**Acid Bases and Buffers:** Acid Base strength, pH and pOH, buffer solution and buffer capacity.

**Volumetric Methods of Analysis:** Titration calculations, precipitation titration, acid base titration, acid base indicators, Primary standards for acids and bases, acid base titrations in non-aqueous solutions, redox titration, end point location in acid base titrations, oxidation-reduction titrants, non-aqueous redox titrations, complexation titrations, titrations for complexation titrations, complexation titration curves, end point location in complexation titrations.

**Spectroscopic Methods of Analysis:** Overview of spectroscopy, basic components of spectroscopic instrumentation, Absorbance of electromagnetic Radiation, Transmittance and absorbance, Beer's Law, Limitations to Beer's Law, Ultraviolet-Visible Spectrophotometry: instrumentation, Quantitative and qualitative applications. Atomic Absorption spectrophotometry: instrumentation, Quantitative and qualitative applications.

**Calibrations and Standardizations:** Reagents used as standards, Single point vs multiple point standardizations, External standards, Standard Additions, Internal Standards, Linear regressions and calibration curves.

**Analysis of Real Samples:** Sampling, Digestion of samples by dry and wet ashing with special reference to Kjeldahl's method for nitrogen determination, Fluxes.