

Course Code	Course Name	Credits
26CH952	BASIC ANALYTICAL CHEMISTRY	02

Course Description

This course provides practical training in analytical chemistry techniques applied to environmental, industrial, and pharmaceutical samples. It introduces students to the calibration of volumetric apparatus and preparation of standard solutions, forming the basis for accurate quantitative analysis.

Course Objective

- To develop fundamental laboratory skills in the calibration of volumetric apparatus such as pipettes and standard flasks for accurate measurements.
- To train students in the preparation of standard solutions and their application in quantitative chemical analysis.
- To provide practical knowledge of classical analytical techniques including titration, chromatography, flame photometry, and spectrophotometry.
- To enable analysis of environmental and industrial samples such as water, soil, and gasoline for physicochemical parameters and nutrient estimation.
- To strengthen skills in instrumental analysis for the determination of metal ions and organic compounds in pharmaceutical and food samples.

Skill Enhancement Outcomes

On successful completion of this course, the learner will be able to:

- Develop precision and accuracy in laboratory measurements through calibration and standardization techniques.
- Acquire hands-on expertise in quantitative analytical methods such as complexometric titration and spectrophotometric estimation.
- Enhance sample analysis skills for environmental, industrial, and pharmaceutical applications.
- Gain proficiency in instrumental techniques including flame photometry, paper chromatography, and UV-visible spectrophotometry.
- Improve data interpretation, result validation, and reporting skills required for research, quality control, and industrial laboratories.

Course Content and Practical Training

- Calibration of volumetric apparatus: Pipette / Standard flask.
- Preparation of standard solution.
- Determination of pH, acidity and alkalinity of a water sample.
- Determination of dissolved oxygen (DO) of a water sample.
- Determination of pH of soil samples.
- Estimation of Calcium and Magnesium ions as Calcium carbonate by complexometric titration.
- Paper chromatographic separation of mixture of metal ion (Ni^{2+} and Co^{2+}).
- To carry out analysis of gasoline.
- Estimation of macro-nutrients: Potassium, calcium and magnesium in soil samples by flame photometry.
- Spectrophotometric determination of Iron in vitamin / dietary tablets.
- Spectrophotometric identification and determination of caffeine and benzoic acid in soft drink.

Learning Outcome

Upon successful completion of this course, students will be able to perform accurate quantitative and instrumental analysis of environmental, industrial, and pharmaceutical samples using titrimetric, chromatographic, flame photometric, and spectrophotometric techniques.