Course Title: Analytical Chemistry-II
Course Code: CH-311
Credit Hours: 3-1
Pre-requisite: Nil

Course Objectives

1. To improve comprehension of students about various analytical separation techniques andthermal analysis

2. Recommended Books
   a. Fundamentals of Analytical Chemistry by Douglas A. Skoog, Donald M. West, F. James Holler and Stanley R. Crouch, Mary Finch Publications USA. 9th Ed. 2014, ISBN-13: 978-0-495-55828-6.
   b. Principles of Instrumental Analysis by Douglas A. Skoog, F. James Holler and Stanley R. Crouch, Thomson Books/Cole Publications USA. 6th Ed. 2007, ISBN-13: 978-0-495-01201-6.
   c. Instrumental Methods of Chemical Analysis by Galen W. Ewing, McGraw Hill Education Publisher 5th Ed. 2013.
   d. Instrumental Methods of Analysis by Willard M D Settle CBS Publisher, 7th Ed. 2007.

Detailed Contents

3. Introduction to Analytical Separations. Separation by Precipitation, Separation of Species by Distillation, Separation by Extraction and its derivation of equation, Separating Ionsby Ion Exchange and Home Water Softener, Chromatographic Separations and its derivation ofequation, TLC and Column Chromatography

4. Thermal Analysis. General Principle of thermal analysis, Instrumentation of thermal analysis, Types of measurements, Thermogravimetric Analysis (TGA), Derivative Thermogravimetric Analysis (DTG), Differential Thermal analysis (DTA), Differential ScanningCalorimetry (DSC), Thermometric titrations (TT), Evolved Gas Detection (EGD), Thermomechanical analysis, Microthermal Analysis, Thermometric Titrimetry, Direct-Injection Enthalpimetry, Applications of these techniques

5. Course Outcomes. After studying this course, students will acquaint with basicsprinciples, instrumental aspects and applications of separation and t analytical methods.

6. Detail of Lab Work
   a. Separation of metal ions by paper chromatography and their identification with thehelp of locating agents and comparison of Rf values.
   b. Separation of anions by paper chromatography and their identification with the helpof locating agents and comparison of Rf values.
   c. Separation of ink components by paper chromatography.
   d. Three experiments involving separation techniques used in chemistry like filtration, simple and fractional distillation, solvent extraction, sublimation and re-crystallization.

e. Separation of different pigments of plant extract by TLC chromatography
f. Separation of amino acids by thin layer chromatography.
g. Packing of chromatographic column and separation of a mixture of dyes.
h. Separation of β-carotene from the pulp of tomato and carrot by columnchromatography.
i. Two experiments for quantitative determination of analytes of interest byspectrophotometry
j. Two experiments for quantitative determination of analytes of interest by atomicabsorption spectrometry.