Course Title: Advanced Analytical Techniques

Course Code: CHE-823

Credit Hours: 3-0

Prerequisite: Nil

Course Objectives

- The objective is to strengthen experimental experience along with advanced theoretical training in analytical chemistry.
- It is designed to stimulate the interest needed to approach research projects and to become familiar with the tools available.
- Students will acquire the training to join R&D work groups in the public or private sectors in fields related to analytical chemistry.

Course Outcomes

- Understand the basic principles of chromatography.
- Choose appropriate experimental strategy for research. Understand the instrumentation of modern chromatographic techniques, e.g. GC and HPLC.
- Develop a strong diversified background in modern chromatographic techniques.
- Develop critical-thinking, and problem based learning skills.
- Understand the basic principles of spectroscopy.
- Understand the nature of electromagnetic radiations. Understand basic theories of UV, IR, Mass, NMR spectroscopic techniques.

Able to analyze and interpret spectra of UV, IR, Mass, NMR spectroscopic techniques.

Course Contents

Separation Techniques: Chromatography, Gas Chromatography, HPLC, Ion Exchange, Electrophoresis

Spectroscopic Techniques: Atomic absorption spectrophotometry , FT IR and Near Infrared Reflectance Spectrometry, UV/Vis Spectrophotometry, Mass Spectrometry, NMR Spectrometry, Emission Spectrometry by Induced Coupled Plasma (ICP) and Flame Photometry, Polarimetry, Basics of Selective Sensors and Biosensors, Special Topics in Analytical Chemistry

Recommended Books

1. Fundamentals of Analytical Chemistry, D. A. Skoog, D. M. West, F. J. Holler and S. Crouch, 9th Ed., 2013

2. Spectrometric Identification of Organic Compounds, R.M. Silverstein, F.X. Webster, and D.J. Kiemle *7th Edition 2005*
3. Analytical Chemistry, G.D. Christian. 6th Ed
4. Chemical Analysis: *Modern Instrumentation Methods and Techniques*, Francis Rouessac and Annick Rouessac, 2nd Ed, 2007
5. Modern Analytical Chemistry, D. Harvey 1st Ed., 2000