CML 387: INSTRUMENTAL ANALYTICAL TECHNIQUES

Course No. : CML 387  
Course Title: Instrumental Analytical Techniques  
Course Type: Elective  
Course Credits : 3

Course description:

This course mainly deals with basics and application of various analytical equipments like gas chromatography, liquid chromatography, gas chromatography-mass spectroscopy, liquid chromatography-mass spectroscopy, UV visible Spectrophotometer, and infrared spectrophotometer etc.

Pre-requisites: Basic courses in Fluid mechanics, Heat Transfer, and Mass Transfer

Objectives:

To understand the fundamental analytical chemistry for instrumentation
To understand the basic processes used in Instrumental Analytical Techniques
To understand the basic working principle of some important analytical instruments like GC, GCMS, LC, LCMS, FTIT, UV-Vis etc

Outcomes:

The students will understand bathe sic fundamental and operating principle for different analytical instruments like GC, GCMS, LC, LCMS, FTIT, UV-Vis etc.

Expanded Course description:

An introduction to analytical chemistry: choice of analytical methodology, sampling, sample preparation, chemical analysis, tools for quantitative chemical analysis, quality assurance.
Extraction methods such as liquid-liquid extraction, solid phase extraction, super-critical fluid extraction and accelerated solvent extraction. Cleanup and fractionation methods. Introduction to Chromatography, high-pressure liquid chromatography (HPLC), gas chromatography (GC) and other chromatographic methods. Detector types with a focus on mass spectrometry and hyphenated techniques such as GC-MS and LC-MS.

Introduction to spectroscopic methods (UV-VIS, IR, X-ray, atomic absorption spectroscopy (AAS) and inductive coupled plasma mass spectrometry).

Introduction to data processing, errors in chemical analyses, statistical analyses (including chemometrics) and data presentation. Method development, evaluation, validation, and QA/QC measures. Uncertainty analysis.

**Textbooks:**


**Class Schedule:** Three class a week, each of 55 minutes