

**Course Title:** Advanced Separation Techniques

**Semester:** VIII

**Course Code:** CH-414

**Credit Hours:** 3-0

**Pre-requisite:** Nil

### **Course Objectives**

1. Students will acquire knowledge about the principles and instrumentation of advanced chromatographic techniques namely GLC, HPLC and capillary electrophoresis along with their applications in different fields such as food, pharmaceuticals, petroleum, environmental and other industrial sectors.

### 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. 9<sup>th</sup> 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. Analytical Chemistry by Gary D. Christian, Wiley Publisher, 6th Ed. 2014.
- d. Grob, R. L., Eugene, F. Barry, Modern Practice of Gas Chromatography, 4th ed., John-Wiley & Sons, USA, (2004).
- e. Miller, J. M., Chromatography: Concepts and Contrasts, 2nd ed., John-Wiley & Sons, Inc., (2005).

### **Detailed Contents**

#### Principle and Theories of Chromatography

3. Gas Liquid Chromatography. General principle, sample preparation/derivatization, separation process, and instrumental aspects and its applications.

4. HPLC. General principle, sample preparation, separation process (normal phase and reverse phase separation), instrumentation, method development and applications.

5. Capillary electrophoresis. Theory and principle of CE, mobility, electro-osmotic flow separation by CE, instrumentation, modes of operation, applications.

### **Course Outcomes**

6. Students will acquire knowledge about the theoretical and instrumental aspects of UV/Visible Spectroscopy, FTIR Spectroscopy and Mass Spectrometry.

### **Detail of Lab Work, workshop practice**