

Analytical Chemistry Courses

Course Title: Analytical Techniques-I

Semester: VII

Course Code: CH-410

Credit Hours: 3-0

Pre-requisite: Nil

Course Objectives:

1. To improve comprehension of students about various spectroscopic and spectrometric analytical techniques.

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. Analytical Chemistry by Gary D. Christian, Wiley Publisher, 6th Ed. 2014.
- d. Fundamentals of Molecular Spectroscopy by Colin N Banwell, Elaine M McCash and Hiranya K Choudhury, McGraw Hill Education Publisher, 5th Ed. 2013.

Detailed Contents

3. UV/Visible Spectroscopy. The Nature of Electromagnetic Radiation, The Electromagnetic Spectrum, Atomic Energy Levels, Molecular Electronic Energy Levels, Vibrational Energy Levels, Measurement of Transmittance and Absorbance, Beer's Law, Raman Effect, Lasers, Radiation Sources, Wavelength Selection, Cells and sampling devices, Detectors, Readout Modules, Instruments for Absorption Photometry.

4. FTIR Spectroscopy. Principle of Infrared Spectroscopy, Different Vibrational modes, Normal Coordinate and normal vibrations, Symmetry of normal vibrations and selection rule, Instrumentation details of FTIR and their function, Interpretation of FTIR Spectra.

5. Mass Spectrometry Principles of Mass Spectrometry, Instrumentation details of Mass Spectrometers and their function, Atomic Mass Spectrometry, Molecular Mass Spectrometry, Interpretation of Mass Spectra.

Course Outcomes

6. Students will acquire knowledge about the theoretical and instrumental aspects of UV/Visible Spectroscopy, FTIR Spectroscopy and Mass Spectrometry.¹

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Detail of Lab Work, workshop practice: Nil