

NIRMA UNIVERSITY
School of Engineering, Institute of Technology
B.Tech. in Chemical Engineering

Open Elective Course

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Course Code	2CHOE01
Course Title	Chemical Analytical Techniques

Course Outcomes (CO):

At the end of the course, student will be able to-

1. relate the essential theory and principle of analytical techniques in various streams of engineering
2. identify the importance of specific analytical technique for any application
3. select and apply the appropriate analytical method to evaluate a sample
4. interpret the qualitative and quantitative results of analysis

Syllabus:

	Teaching Hours
Unit I Overview of Analytical Techniques Introduction to various analytical methods, characterization techniques of engineering materials	04
Unit II Ultraviolet spectroscopy Origin and theory of ultraviolet spectra, types of transition of organic and inorganic molecules, chromophore, bathochromic shift, hypsochromic shift, Woodward-Fisher rules for calculating λ_{max}	12
Unit III Infrared spectroscopy Electromagnetic spectrum, modes of molecular vibration, theory and interpretation of IR spectra	12
Unit IV Physico-Chemical Analysis Thermogravimetric analysis, differential scanning colorimetry, X-ray diffraction, energy dispersive X-Ray	14
Unit V Applications of Analytical Techniques Applications in various domains	03

Self Study:

The self study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self study contents.

Suggested Readings:

1. Chatwal, Anand, *Instrumental Methods of Chemical Analysis*, Himalaya Publishing House.
2. Hobart H. Willard, Lynne L. Merritt Jr., John A. Dean, *Instrumental Methods of Analysis*, CBS Publishers.
3. Douglas A. Skoog, Donald M. West, *Fundamentals of Analytical Chemistry*, Cengage Learning.

4. William Kemp, *Qualitative Organic Analysis: Spectrochemical Techniques*, European chemistry series, McGraw-Hill.
5. M. Khopker, *Basic Concepts of Analytical Chemistry*, New Academic Science
6. Seamus P.J. Higson (2006). *Analytical Chemistry*.