

UNIT I: Spectroscopic techniques, UV-Vis, IR, Raman and fluorescence- principle, instrumentation and applications.

UNIT II: Diffraction Techniques: X-Ray diffraction techniques – X-Ray generation and properties – X-Ray scattering –Electron diffraction–instrumentation and applications.

UNIT III: Microscopic analysis, SEM, AFM, STM, STEM, TEM, confocal microscopy, fluorescence microscopy – principle, instrumentation, working, applications.

UNIT IV: Elemental composition, energy dispersive spectroscopy, ICP-MS, XPS, Auger electron spectroscopy, selected area diffraction.

UNIT V: Thermal analysis – principle, instrumentation, applications. Particle size analysers, DLS, zeta potential, BET and Electrochemical surface area analysis.

TEXT BOOKS/REFERENCES:

1. Spectroscopic Methods for Nanomaterials Characterization, Volume 2, Edited by Sabu Thomas Raju Thomas Ajesh Zachariah Raghvendra Kumar, Elsevier, 2017
2. Microscopy Methods in Nanomaterials Characterization, Volume 1, Edited by Sabu Thomas Raju Thomas Ajesh Zachariah Raghvendra Kumar, Elsevier, 2017
3. “Principles of Instrumental Analysis”, Eighth Edition. D. A. Skoog and D. M. West, Thomsons-Brooks/Cole, 2004.
4. Nanomaterial Characterization: Introduction, Ratna Tantra, John Wiley & Sons, Inc, 2016
5. Lakowicz, Joseph R Principles of Fluorescence Spectroscopy, 3rd edition, Springer, 2006