

ANALYTICAL CHEMISTRY (BS-ADP 6th Semester)

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| Module Code: | Chem-329 |
| Module title: | Molecular Spectroscopy |
| Name of Scheme: | BS-ADP 6th Semester |
| Department: | School of Chemistry |
| Faculty: | Science |
| Module Type: | Optional |
| Module Rating: | 2 credits |

OBJECTIVES:

The course will enable the students to understand the use and mechanism of separation techniques (solvent extraction and electrophoresis) and their application in sample preparation. In addition, the students will acquire knowledge about the useful atomic spectroscopic techniques like AES, ICP, AFS and AAS. The students will learn these techniques and their applications in chemical analysis

SYLLABUS OUTLINE:

1. **Introduction to Spectroscopy/Spectrophotometry**
Introduction to Molecular spectroscopy, absorption in UV and Visible range; Basic principle of Spectrophotometry; Beer-Lambert's law; Deviations; Instrumentation and application.
2. **FTIR / Raman Spectroscopy:**
Origin of Infra Red Spectra; Different vibrational modes, Normal coordinate and normal vibrations, Symmetry of normal vibrations and selection rule, Raman Spectroscopy,, Vibrational Spectra in gaseous phase and inert gas matrices; Comparison of raman with Infra Red spectroscopy; Applications for qualitative and quantitative chemical analysis; Instrumentation details and their function.
3. **UV / Vis Spectroscopy:**
The Nature of Electromagnetic Radiation, The Electromagnetic Spectrum, Atomic Energy Levels, molecular Electronic Energy Levels, Instrumentation Radiation Sources, Wavelength Selection, Cells and Sampling Devices, Detectors, Readout Modules and application.

RECOMMENDED BOOKS:

1. Chemical Application of Spectroscopy by West, Inter Science Publisher Inc. N.Y. London.
2. Kinetics in Analytical Chemistry by H.B. Mark Jr. & G.A. Rechnitz, Interscience N.Y. (1968).
3. Analytical Chemistry by Gary D. Christian, John Wiley and Sons (1977).
4. Automated Chemical Analysis by J.K. Forman Stockwell, John Wiley and Sons, N.Y. (1975).
5. Advances in Infrared Group Frequencies by L.J. Bellacy, Mathuen & Col. Amsterdam (1968).
6. Fundamentals of Molecular Spectroscopy by Banwell.