SYLLABUS

Diploma in Spectroscopy

DEPARTMENT OF PHYSICS
INSTITUTE OF SCIENCE
BANARAS HINDU UNIVERSITY

(Last Updated in BoS Meeting dated 26-May-2018)

Diploma in Spectroscopy

Theory:

(1) Introduction: Electromagnetic spectrum, energy units used in spectroscopy

(2) Atomic Spectra: Energy levels, quantum numbers and spectroscopic terms, dipole selection rules, splitting of spectral lines, qualitative discussion of alkali and alkaline earth atom spectra.

(3) Molecular spectra: Qualitative discussion of molecular binding, molecular orbitals, types of molecular energies and qualitative discussion of rotational, vibrational and electronic spectra.

(4) Magnetic Resonance Spectroscopy: Qualitative description of NMR and ESR spectra.

(5) Spectrochemical Analysis: Principle of qualitative and quantitative spectrochemical analysis.

(6) Sources of radiation: Conventional light sources (arcs, sparks and discharge), Sources for UV,VIS, IR, Microwave and X-ray. Laser sources (He-Ne, argon ion, dye and semiconductor lasers).

(7) Detectors of radiations: Thermal detectors, Photographic detectors, CCD, PMT detector.

(8) Spectroscopic Measurement: Resolving power and limit of resolution, prism spectrograph and spectrometers, grating spectrographs and spectrometers, FTIR spectrometer, Raman spectrometer.

Reference Books:

1. Spectrophysics by A. Thorne
2. Atomic and Molecular Spectroscopy by Rajkumar
3. Experimental spectroscopy by Sawyer
4. Experimental spectroscopy by Harrison