

## CURRICULUM PLAN

**Even Semester (2024-2025)**

**Name of the Teacher: Dr. Sajid Iqbal (Paper shared with Dr. Upasana Issar)**

**Course: B.Sc. (H) Chemistry, Year- III, Semester- VI**

**Name of Paper and Class Assigned: DSC 18: Photochemistry and Spectroscopy (Physical Chemistry VI),  
1 Period per Week**

Contents	Allocation of Lectures	Month wise schedule to be followed	Tutorial/Assignment/ Presentation etc.
<p><b>Unit-2: Rotational, Vibrational , Raman and Electronic Spectroscopy</b></p> <p>Rotational spectroscopy: Selection rules, intensities of spectral lines, determination of bond lengths of diatomic molecules, isotopic substitution, classification of molecules based on moment of inertia, applications of rotation spectroscopy (e.g. microwave appliances)</p> <p>Vibrational spectroscopy: Classical equation of vibration, computation of force constant, amplitude of diatomic molecular vibrations, anharmonicity, Morse potential, dissociation energies, fundamental frequencies, overtones, hot bands, degrees of freedom for polyatomic molecules, modes of vibration, concept of group frequencies.</p> <p>Vibration-rotation spectroscopy: diatomic vibrating rotator, P, Q, R branches.</p> <p>Raman spectroscopy: Qualitative treatment of Rotational Raman effect; effect of nuclear spin, Vibrational Raman spectra, Stokes and anti-Stokes lines; their intensity difference, rule of mutual exclusion.</p>	10	1 <sup>st</sup> week of January – 2 <sup>nd</sup> week of March	-Syllabus Overview -Reference Books -Understanding the concept -Numerical Problem -Presentation on the topic assigned
<p><b>Unit-3: NMR and ESR</b></p> <p>Nuclear Magnetic Resonance (NMR) spectroscopy: Principles of NMR spectroscopy, Larmor precession, chemical shift and low-resolution spectra, different scales (<math>\delta</math> and <math>T</math>), spin-spin coupling and high resolution spectra, interpretation of PMR spectra of simple organic molecules like methanol, ethanol and acetaldehyde.</p> <p>Principles of ESR spectroscopy, hyperfine structures, ESR of simple radicals</p>	10	3 <sup>rd</sup> week of March – 1 <sup>st</sup> week of May	-Understanding the concept -Problem Discussion - Presentation -Class Test -Solving previous year questions