1.	Title of the course	Principles of Spectroscopy
2.	Course number	CY507L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To CY5202/10
6.	To be offered by	Department of Chemistry
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	**Course Objective(s):** To introduce the theoretical aspects of molecular spectroscopy, and to connect the concepts of group theory with spectroscopy. To impart a candid understanding of the theoretical underpinnings of spectroscopy, an omnipotent branch of chemistry.	
10.	**Course Content:** Radiation and matter, Fermi's Golden Rule, Einsteins Coefficients, Spectral lineshapes; Rotational Spectroscopy: molecular rotors, degeneracies, Stark effect, selection rules, spin-orbit coupling, polyatomic molecules; Vibrational Spectroscopy: harmonic oscillator, selection rules, Morse oscillator, bond dissociation, normal modes and group theory; Raman Spectroscopy: Raman and Rayleigh scattering, polarizability, selection rules, rotational and vibrational Raman spectra, polyatomic molecules; Electronic Spectroscopy: Jablonski diagram, Franck-Condon principle, Electronic transition, selection rules, term symbols, Russel Saunders spin-orbit coupling, d-d and CT transitions; Emission Spectroscopy: fluorescence and phosphorescence, Stokes shift, quantum yield, Kasha's rule; Introduction to magnetic resonance spectroscopy.	
11.	**Textbook(s):** 1. Hollas J M, *Modern Spectroscopy*, Wiley (2004). 2. Levine I N, *Molecular Spectroscopy*, Wiley-Blackwell (1975).	
12.	**Reference(s):** 1. Barrow G M, *Introduction to Molecular Spectroscopy*, McGraw-Hill Inc. (1962). 2. Harris D C, and Bertolucci M D, *Symmetry and Spectroscopy*, Dover Publications (1989). 3. Long D A, *Raman Spectroscopy*, McGraw Hill Education (1977). 4. Slichter C P, *Principles of Magnetic Resonance*, Springer (1990).	