Semester	JAN 2023
Open to semester	2
Course code	**CH1213**
Course title	**Principles of Physical Chemistry**
Credits	3 /
Course Coordinator & participating faculty (if any)	Pramod Pillai,Angshuman Nag
Nature of Course	Lectures and Tutorials
Pre-requisites	NIL
Objectives (goals, type of students for whom useful, outcome etc)	The objective of this course is to look at chemistry at the level of molecules and atoms, and make connections between the rules governing such microscopic particles to what we observe in the macroscopic world.
Course contents (details of topics /sections with no. of lectures for each)	• Building blocks of chemistry: Chemistry at the fundamental level is about molecules, their constituent particles, and the changes they undergo. • Need for quantum mechanics: Beginning of the electronic era. Thomson's, Millikan's, and Rutherford's experiments. Necessity to explain Black-body radiation, Wave-particle duality of light, Wave-particle duality of matter • Energy quantization: Particle in a box model. Wave function and Schrödinger equation. Properties of a wave function, calculation of average value of position, applications to spectra of conjugated polymers and quantum dots. Particle in a 2D box and ring. • Hydrogen atom: Stability of the atom is explained by quantum mechanics. The orbitals are eigenfunctions of the Schrödinger equation. Shape and radial distribution function of the orbitals. • Multielectron atoms: Orbital picture • Chemical bonding: Lewis theory, valence bond theory and molecular orbital theory using the wave function approach, Potential energy surface • Intermolecular interactions: Charge-charge, dipole-dipole interaction, H-bond, differences in covalent and noncovalent interaction, Supramolecular chemistry • Interaction between light and matter: Classical picture of interaction between light and matter, energy states, transition

	between energy states
Evaluation /assessment	End-Sem Examination-35% Mid-Sem Examination-35% Others-30%
Suggested readings (with full list of authors, publisher, year, edn etc.)	1. Physical Chemistry by Peter Atkins and Julio de Paula 2. Physical Chemistry: A Molecular Approach by Donald A. McQuarrie