1.	Title of the course	Statistical Mechanics
2.	Course number	CY513L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To CY5022/6
6.	To be offered by	Department of Chemistry
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	**Course Objective(s):** This course will provide the basics of both equilibrium and nonequilibrium statistical mechanics pertaining to understand the underlying principles of several bio-physical processes related to molecules and materials. The recent cutting edge related research topics will also be discussed.	
10.	**Course Content:** Equilibrium Statistical Mechanics: Ensembles, Canonical ensemble, Grand canonical ensemble, partition function, Central limit theorem, Boltzmann statistics, Fermi-Dirac and Bose-Einstein statistics, Liouville theorem, Ideal mono-, di- and polyatomic gas, Lattice model, Distribution function theory of liquids. Non-equilibrium statistical Mechanics: Stochastic variables, Random events, Markov processes, Einstein relation, Langevin apporach, Fluctuation-dissipation theorem, Fokker-Planck description, Kramers rate, Master equation, First passage time problems.	
11.	**Textbook(s):** 1. Donald A. McQuarrie, *Statistical Mechanics*, Viva Books (2011). 2. Van Kampen N G, *Stochastic Processes in Physics and Chemistry*, North Holland (2007).	
12.	**Reference(s):** 1. Biman Bagchi, *Statistical Mechanics for Chemistry and Material Science*, CRC Press (2018). 2. Robert Zwanzig, *Nonequilibrium Statistical Mechanics*, Oxford University Press (2001).	