1.	Title of the course	Molecular Thermodynamics
2.	Course number	CH515L
3.	Status of the course	Core
4.	Structure of credits	3-0-0-3
5.	Offered to	PG
6.	New course/modification to	New
7.	To be offered by	Department of Chemical Engineering
8.	To take effect from	January 2023
9.	Prerequisite	CoT
10.	Whether approved by the Department	Yes
11.	**Course Objective(s):** To analyze chemical thermodynamics from the point of view of molecular interactions in solids, liquids and gases. To apply these principles to interfacial phenomena and phase equilibria.	
12.	**Course Content:** Introduction to intermolecular forces and potentials, non-ideal gas equation of state, evaluation of virial coefficients from intermolecular potential, properties of solutions, phase equilibria, application to vapor-liquid equilibria and liquid-liquid equilibria, properties of electrolyte solutions, Debye-Huckel theory, electrical double layer, thermodynamics of DNA, proteins, polymers and surfaces, application to adsorption isotherms, introduction to molecular simulations for phase-equilibria.	
13.	**Textbook(s):** 1. Prausnitz J, Lichtenthaler R N and De Azevedo E G, *Molecular Thermodynamics of Fluid-Phase Equilibria*, 3rd Edition, Pearson (1998). 2. de Pablo J J and Schieber J D, *Molecular Engineering Thermodynamics*, 1st Edition, Cambridge Series in Chemical Engineering, Cambridge University Press (2014).	
14.	**Reference(s):** 1. Cox H and McQuarrie C, *Problems and Solutions to Accompany Molecular Thermodynamics*, 1st Edition, University Science Books, U.S. (1999). 2. McQuarrie D A and Simon J D, *Molecular Thermodynamics*, 1st Edition, University Science Books (1999). 3. Shell M S, *Thermodynamics and Statistical Mechanics: An Integrated Approach*, 1st Edition, Cambridge University Press (2015).	