1.	Title of the course	Physics of Softmatter
2.	Course number	CH519L
3.	Structure of credits (L-T-P-C)	3-0-0-3
4.	New course/modification to	New
5.	To be offered by	Chemical Engineering
6.	Prerequisite	CoT
7.	**Course Objective(s):** To discuss the theoretical concepts and practical applications of softmatter. To discuss the characterization and modelling tools for softmatter.	
8.	**Course Content:** Introduction: Historical overview, length and time scales, Brownian motion, intermolecular forces, forces on colloidal scale; Macromolecules & Colloids: polymer conformations, entropy, random walks, glass transition, behaviour of polymers in solvents and melts, Flory-Huggin's theory, origin of viscoelasticity in polymers; Types of colloids, stability of colloids, depletion interactions, electrokinetic effects, Deraguin Landau Verwey Overbeek theory; Self-assembly: Thermodynamics of self-assembly, formation of micelles, vescicles, membranes, bilayers, aggregation & coagulation in colloids, liquid-liquid phase separation (LLPS), liquid crystals, phase transitions (isotropic, smectic, nematic); Self-assembly in biological systems, under external fields and at interfaces; Applications of Softmatter: Food, biology, biomedical, industrial, medicine; Characterization of softmatter: Light scattering, optical microscopy, rheology, electron microscopy; Modelling & simulation of softmatter: Modelling and simulation techniques of softmatter.	
9.	**Textbook(s):** 1. Jones R A L, Soft condensed matter, Oxford University Press (2002) 2. Daoud M and Williams C E, Soft Matter Physics, Springer (1999)	
10.	**Reference(s):** 1. Fernandez-Nieves A and Puertas A M, Fluids, Colloids and Soft Materials: An Introduction to Soft Matter Physics, Wiley (2016) 2. Isrealchivili J, Introduction to molecular and surface forces, 3rd Edition, Academic Press (2011) 3. Frenkel D and Smit B, Understanding Molecular simulations from Algorithms to Applications, 2nd Edition, Academic Press (2002)	