1.	Title of the course	Nanochemistry: Principles and Applications
2.	Course number	CY607L
3.	Status of the course	Elective
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 Chemistry
8.	To take effect from	January 2023
9.	Prerequisite	Nil
10.	Whether approved by the Department	Yes
11.	**Course Objective(s):** To discuss the fundamental understanding of nanochemistry including theoretical basis, synthesis, properties, characterizations, structure, data interpretation. To illustrate the application of nanochemistry for understanding the depth knowledge of the rapidly developing research domain.	
12.	**Course Content:** Introduction; Solution-based synthesis: top-down, bottom-up, sol-gel process; Deposition methods: thin films, vapor deposition, layer by layer, atomic layer deposition; Nanostructures: cage, fiber, flower, wire, rod, sheet; Quantum confinement; Magnetic and electrical properties, surface and mechanical properties, electrostatic and steric stabilization, optical properties, plasmonics of metal nanoparticles; Low dimensional materials; Characterization techniques: powder X-ray diffraction, electron and neutron diffraction, X-ray photoelectron spectroscopy, dynamic light scattering, small angle X-ray scattering, atomic force microscopy, scanning electron microscopy, transmission electron microscopy; Applications: nanoelectronics, waste treatment, catalysis, nanomedicine.	
13.	**Textbook(s):** 1. Das A K and Das M, *An Introduction to Nanomaterials and Nanoscience*, 1st Edition, CBS Publisher (2017). 2. Rao C N R, Müller A and Cheetham A K, *The Chemistry of Nanomaterials: Synthesis, Properties and Applications*, 1st Edition, John Wiley and Sons (2004).	
14.	**Reference(s):** 1. Bhushan B, *Handbook of Nanotechnology*, 1st Edition, Springer (2005). 2. Cahn R W and Lifshitz E M, *Concise Encyclopaedia of Materials Characterization: Advances in Materials Sciences and Engineering*, 1st Edition, Elsevier (2016). 3. Cao G and Wang Y, *Synthesis, Properties & Applications*, 2nd Edition, Imperial College Press (2004). 4. Pradeep T, *Nano: The Essentials*, 1st Edition, McGraw Hill (2007).	