

M.Sc. Semester I - Chemistry
PAPER: CHEM 407: SUPRAMOLECULAR CHEMISTRY AND
NANOSCIENCE
[CSIR- UGC NET - TOPICS: INTR 1, 4]

Total Credits – 3

Total Hours – 45

Objectives:

- To understand the chemistry of molecular assemblies and the intermolecular bond that result from species held together by intermolecular forces.
- To understand matter at the dimensions between 1 to 100 nanometres where physical, chemical, and biological properties appear different in important ways.

Unit-1 Supramolecular chemistry

Definition and Development of Supramolecular Chemistry, Classification of Supramolecular Host–Guest compounds, Receptors, Coordination and the Lock and Key Analogy, Binding Constants, Cooperativity and the Chelate Effect, Preorganisation and Complementarity, Thermodynamic and Kinetic Selectivity, and Discrimination, Nature of Supramolecular Interactions, Solvation and Hydrophobic Effects, Supramolecular Concepts and Design.

Unit-2 Nanoscience

Introduction, Classification of Nanostructured material, unique properties of Nanomaterials, Synthesis Routes, Tool to characterise nanomaterials.

Unit-3 Applications of Nanoscience and Supramolecular chemistry

- (A) Applications of nanomaterials, Nanostructured materials with high application potential, Concerns and challenges of nanotechnology.
- (B) Dendrimers: Concepts, synthesis, Guest – Host chemistry and applications, Molecular Self-Assembly in Supramolecular chemistry: Hydrogen bond directed and transition metal coordinated Self – Assembly, Supramolecular and molecular devices - Photonic, Electronic and ionic: Chemonics and semiochemistry.

References:

1. Supramolecular Chemistry by Jonathan W. Steed and Jerry L. Atwood, Second Edition Published by John Wiley and Sons, Ltd, Publication.2103.
2. Textbook of Nanoscience and Nanotechnology by B S Murty, P Shankar, Baldev Raj, B B Rath and James Murday Published by Universities Press private limited 2016.
3. An introduction to Supramolecular Chemistry by Asim K. Das and Mahua Das Published by CBS publishers & Distributors Pvt. Ltd. 2020.