
EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical Exam	–	–
Oral Exam	–	–
Term Work	–	25

SYLLABUS

1. Fundamentals of Science behind Nanotechnology

- Electron , Atom & Ions , Molecules, Metals
- Biosystems
- Molecular Recognition
- Electrical Conduction & Ohm's Law
- Quantum Mechanics and Quantum Ideas
- Optics

2. Fullerenes

- Combustion Flame Synthesis
- Crystal Formation
- Sintering
- Organic Synthesis Method
- Super Critical Oligomerization
- Solar Process
- Electric Arc Process

3. Carbon Nano Tubes (CNT)

- Synthesis of CNT
 - Electric Arc Discharge Process
 - Laser Ablation Process
 - CVD
 - HIPCO Process
 - Surface Mediated growth of Vertically Aligned Tubes
- Physical Properties of CNTs
- Morphology of CNT

4. Nanostructuring Methods

- Vacuum Synthesis
- Gas Evaporation Tech
- Condensed Phase Synthesis
- Sol Gel Processing
- Polymer Thin Film
- Atomic Lithography
- Electro deposition
- Plasma Compaction

Characterization of Nanostructures – 4 Hours

- Transmission Electron Microscope
- Scanning Electron Microscope
- Microwave Spectroscopy
- Raman Microscopy
- X ray Diffraction

5. Calculations in Nanotechnology

- Particle Size Distribution
- Particle Size & Measurement Methods
- Fluid Particle Dynamics
- Particle Collection Mechanisms
- Particle Collection Efficiency

6. NanoBiology

- Interaction between Biomolecules & Nanoparticle Surface
- Influence of Electrostatic Interactions in the binding of Proteins with Nanoparticles
- The Electronic effects of biomolecule - Nanoparticle Interaction
- Different Types of Inorganic materials used for the synthesis of Hybrid Nano-bio assemblies
- Application

Catalysis

- Nature of Catalysis
- Surface area of NanoParticles
- Porous Materials
- Pillared Clay
- Colloids

Reference Books :

1. Nanostructuring Operations in NanoScale Science and Engineering (*Kal Ranganathan Sharma*) McGraw-Hill Companies
2. Nanotechnology: Basic Calculations for Engineers and Scientists (*Louis Theodore*) A John Willy & Sons
3. Nanotechnology: A Gentle Introduction to the Next Big Idea (*Mark Ratner*) Daniel Ratner
4. Nano-The Essentials, Understanding Nanoscience and Nanotechnology (*T.Pradeep*)
5. Introduction to NanoTechnology (*Charles P. Poole, Jr. and Frank J. Owens*) John Wiley & Sons,2003
6. Nanotechnology: Basic and Emerging technologies (*Michael Wilson*) Chapman & Hall/CRC-Rs,3311.93
7. Principal of NanoTechnology – Molecular Based Study of Condensed Matter in Small Systems (*G .Ali Mansoori*)
8. NanoTechnology Assessment and Prospective (*Schmid et al.*) Springer

