NANOSTRUCTURED MATERIALS AND APPLICATIONS

Unit - I: Nanostructured materials: Nanomaterials –Carbon Nanotubes. Fullerenes, Quantum Dots, Nanocomposites – Properties – Methods of preparation: Sol-gel, CVD, Sputtering, MBE, Lithography.

Unit - II: Characterization Tools Electron Microscopy Techniques - SEM, TEM, X ray methods STM –Fluorescence Microscopy - Single Molecule Surface Enhanced Resonance Raman Spectroscpy – AFM, Magnetic Resonance Imaging,.

Unit - III: Nanomagnetism Mesoscopic magnetism – Magnetic measurements: Miniature Hall Detectors, Intgrated DC SQUID Microsusceptometry – Magnetic recording technology, Biological Magnets

Unit - IV: Nanoelectronics and integrated systems Basics of nanoelectronics – Single Electron Transistor - Quantum Computation – Parallel architechture for nanosystems –MEMS/ NEMS: Bulk micromachining - Isotropic and anisotropic etching, LIGA Process and electroplating

Unit – V: Biomedical Applications Bio molecular motors - Drug delivery systems – Micro/Nanofluidics: Design of microfilters, microseparators, microneedles, micromixers and microreactors.

References

1. *Semiconductors for micro and nanotechnology: an introduction for engineers,* Jan Korvink & Andreas Greiner, Weinheim Cambridge: Wiley-VCH, 2002.
2. *Nanoscale characterisation of surfaces & interfaces,* N John Dinardo, Weinheim Cambridge: Wiley-VCH, 2000 2nd ed
3. *Nanotechnology,* G Timp (ed), AIP press/Springer, 1999.
4. *Microfluidics for Biotechnology* , Berthier J and Silberzan P, Artech House, London, 2010.
5. *Fundamentals of Microfluidics and lab on a chip for biological analysis and discovery,* Paul C H Li, Taylor and Francis group, 2010.

Mrs. RB 11-3-15

Mrs. BM for Senate 11-3-15