

PBT6J004 NANOBIOTECHNOLOGY

Module-I

Concept of Nano-biotechnology & Historical background. Fundamental sciences and broad areas of Nanobiotechnology, Various applications of Nano-biotechnology, biology at the nano interface, Cell – Nanostructure interactions, Science of Self-assembly and self organization from,

Module-II

Structural and functional principles of nanobiotechnology. Protein-based Nanostructures: Nanomotors and DNA based nanostructures. Tools of measurement: Scanning probe techniques (SPM), Electron Microscopy. Introduction to Nanostructures: Fullerenes, Quantum Dots and Metal-based Nanostructures, nanopolymers. Carbon nanotubes, nanoparticles and nanowires. Microbial synthesis of nanoparticles, magnetosomes, bacteriorhodopsin. Micro- and nano – fabrication: Chemical Vapor Deposition, Photolithography, Features of Nanoscale Growth, Micromachining: MEMS; BioMEMS, microarray technology,

Module-III

Microfabricated devices, Nanoanalysis and nanobiosensors; Lab-on-a-chip devices and their potential in nanobiotechnology. Medical Applications of Nanobiotechnology: Polymeric nanocontainers for drug delivery and gene delivery, imaging applications, Nanoparticles' Cytotoxicity

Text Book:

1. Niemeyer C M and Mirkin C A, Nanobiotechnology: Concepts, Applications and Perspectives, Wiley VCH, 2004
2. Chattopadhyaya KK and Banerjee AN, Nanoscience and Nanotechnology, PHI learning Pvt. Ltd.
3. Bionanotechnology by David S.Goodsell, 2004, Wiley Publications. Pages-337.