

MBS-554: BIO-NANOTECHNOLOGY

40 h

Unit-I

12 h

Nanomaterials- Definition of nanomaterials, Nanoparticles and types of nanoparticles. Properties of nanoparticles and metallic nanoparticles. Properties and Characterizations: Optical (UV- Vis/Fluorescence), X-ray diffraction, Imaging and size (Electron microscopy, light scattering, Zeta potential), Surface and Vibrational (FTIR and RAMAN), SERS Magnetic, Electrical and Electrochemical.

Unit-II

14 h

Green Nanotechnology: Green Synthesis, need for green synthesis of nanoparticles Extracellular and intracellular nanoparticles. Biological synthesis of nanoparticles using bacteria, fungi, actinomycetes, yeast, virus and plants. **Principles of nanoparticles synthesis**, Biopolymeric nanoparticles. Nanomaterials and Toxicity Evaluation: Cytotoxicity, Genotoxicity, *in vivo* tests/assays etc. Toxicological Hazards of Nanoparticles: Current data on toxicology of engineered Nanoparticles.

Unit-III

14 h

Applications of Nanoparticles- Antimicrobial activity, targeted drug delivery, combination chemotherapy (cancer therapy), Antioxidant and haemolytic properties, applications in water and waste water treatment and catalytic properties., in **food preservation. Nano medicine and its developments.**