

Course Objectives :

- To discuss the methods available for characterization of nano materials.
- To discuss and analyse the nano materials and their properties.
- To discuss the design of Environmental remediation techniques employing nano material

Nano technology products- Nanomaterials (nanostructures) Nanodevices and nanosystems. Nanomaterials for Environmental Protection. Synthesis of nanomaterials by Physico-chemical approaches. Bionanocomposites

Characterization Methods: Optical Microscopy, Scanning Electron Microscopy, Transmission Electron Microscopy, Atomic Force Microscopy, Scanning Tunneling Microscopy, Optical Absorption and Emission Spectroscopy, Thermogravimetric Analysis, Differential Scanning Calorimetry, Thermomechanical Analysis, X-Ray, neutron diffraction.

Nanomaterials-Remediation: Nano Membranes, Nano Meshes, Nano Fibres, Nano Clays and Adsorbents, Zeolites, Nano Catalysts, Carbon Nano Tubes, Bio Polymers, Single Enzyme Nano particles, Bio Metallic Iron Nano Particles, Nano Semi-Conductors, Photo catalysis, Nano-sensors.

Nano Remediation Technologies: Environmental Nano Remediation Technology - Thermal, Physico-Chemical and Biological Methods, Nano Filtration for treatment of waste – removal of organics & inorganics and pathogens, Nanotechnology for water remediation and purification. Treatment of industrial waste waters using nano particles/ modified structures/devices.

References:

1. Environanotechnology by Mao Hong fan, Chin-pao Huang, Alan E Bland, Z Honglin Wang, Rachid Sliman, Ian Wright. Elsevier, 2010.
2. Nanotechnology: Importance and Application by M.H. Fulekar, IK International, 2010
3. Nanotechnologies, Hazards and Resource efficiency by M. Steinfeldt, Avon Gleich, U. Petschow, R. Haum. Springer, 2007
4. Nanotechnology: Health and Environmental risk by Jo Anne Shatkin. CRC press, 2008