

P2PNBC08 - NANOMATERIALS FOR ENERGY & ENVIRONMENT

Module I (8 hours)

Energy Overview: Energy Characteristics - Fundamentals of environment, Environmental impact assessment, Nanomaterials used in energy and environmental applications and their properties. Nanomaterials in automobiles.

Module II (10 hours)

Improvements in solar energy conversion and storage; better energy-efficient lighting; stronger and lighter materials that will improve energy transportation efficiency; use of low-energy chemical pathways to break down toxic substances for remediation and restoration; and better sensors and controls to increase efficiency in manufacturing and processing.

Module III (12 hours)

Device applications Energy – Hydrogen Storage and Production – Fuel Cells – Battery – Carbon Nanotubes for energy storage, Hydrogen Storage in Carbon Nanotubes, Use of nanoscale catalysts to save energy and increase the productivity in industry, Rechargeable batteries based on nanomaterials.

Module IV (12 hours)

Pollution by Nano-particles, Waste remediation: Nanoporous polymers and their applications in water purification, Photo-catalytic fluid purification. Energy conversion, Hierarchical self-assembled nano-structures for adsorption of heavy metals.

Text Books

1. W.F. Kenney: Energy Conservation in the Process Industries, Academic Press, 1984
2. Tetsuo Soga, Nanostructured Materials For Solar Energy Conversion, Elsevier
3. Robert K, Ian H, Mark G, Nanoscale Science and Technology, John Wiley & Sons Ltd., 2005