

UNIT - 8

Economic Analysis of power plant: Cost of energy production, selection of plant and generating equipment, performance and operating characteristics of power plants, tariffs for electrical energy.

6 Hours

TEXT BOOKS:

1. **Power Plant Engineering**, P.K Nag, 3rd Ed. Tata McGraw Hill 2nd ed 2001,
2. **Power Plant Engineering**. Morse F.T., Van Nstrand.1998

REFERENCE BOOKS:

1. **Water Power Engg.**, Edition 3, Barrows, TMH, New Delhi. 1998
2. **Plant Engg. Hand Book**, Stanier, McGraw Hill. 1998
3. **Hydraulic Machines**, Jagadish Lal, Metropollitan Co 1996.
4. **Principles of Energy Conversion**, A.W. Culp Jr., McGraw Hill. 1996
5. **Power Plant Technology**, M.M. EL-Wakil, McGraw Hill, International. 1994
6. **Power Station Engg. Economics**, Skrotizke and V opat. 1994
7. **Power Plant Engineering**, Domakundawar, Dhanpath Rai sons.2003

NANOTECHNOLOGY

Subject Code	: 10ME834	IA Marks	: 25
Hours/Week	: 04	Exam Hours	: 03
Total Hours	: 52	Exam Marks	: 100

PART – A

UNIT - 1

An Overview Of Nano-Science & Nanotechnology – historical background – nature, scope and content of the subject – multidisciplinary aspects – industrial, economic and societal implications.

05 Hours

UNIT - 2

Experimental Techniques And Methods for investigating and manipulating materials in the nano scale – electron microscope – scanning probe

microscope – optical and other microscopes – light scattering – x-ray diffraction.

07 Hours

UNIT - 3

Fullerenes – discovery, synthesis and purification – chemistry of fullerenes in the condensed phase – orientational ordering – pressure effects – conductivity and superconductivity – ferromagnetism – optical properties.

Carbon Nanotubes – synthesis and purification – filling of nanotubes – mechanism of growth – electronic structure – transport properties – mechanical and physical properties – applications.

07 Hours

UNIT - 4

Self-Assembled Monolayers – monolayers on gold – growth process – phase transitions – patterning monolayers – mixed monolayers – applications.

GAS PHASE CLUSTERS – history of cluster science – formation and growth – detection and analysis – type and properties of clusters – bonding in clusters.

07 Hours

PART – B

UNIT - 5

Semiconductor Quantum Dots – synthesis – electronic structure of nanocrystals – how quantum dots are studied – correlation of properties with size – uses.

05 Hours

UNIT - 6

Monolayer-Protected Metal Nanoparticles – method of preparation – characterization – functionalized metal nanoparticles – applications – superlattices.

Core-Shell Nanoparticles – types – characterization – properties – applications.

Nanoshells – types – characterization – properties – applications.

08 Hours

UNIT - 7

Nanobiology – interaction between biomolecules and nanoparticle surfaces – materials used for synthesis of hybrid nano-bio assemblies – biological applications – nanoprobe for analytical applications – nanobiotechnology – future perspectives.

Nanosensors – what make them possible – nanoscale organization for sensors – characterization – nanosensors based on optical properties – nanosensors based on quantum size effects – electrochemical sensors – sensors based on physical properties – nanobiosensors – sensors of the future.

Nanomedicines – approach to development – nanotechnology in diagnostic and therapeutic applications.

08 Hours

UNIT - 8

Molecular Nanomachines – covalent and non-covalent approaches – molecular motors and machines – other molecular devices – single molecular devices – practical problems involved.

Nanotribology – studying tribology on the nanoscale – applications.

05 Hours

TEXT BOOKS:

1. **NANO: The Essentials – Understanding Nanoscience and Nanotechnology**; T Pradeep (Professor, IIT Madras); Tata McGraw-Hill India (2007)
2. **Nanotechnology**; Richard Booker & Earl Boysen; Wiley (2005).

REFERENCE BOOKS:

1. **Introduction to Nanoscale Science and Technology [Series: Nanostructure Science and Technology]**, Di Ventra, et al (Ed); Springer (2004)
2. **Nanotechnology Demystified**, Linda Williams & Wade Adams; McGraw-Hill (2007)
3. **Introduction to Nanotechnology**, Charles P Poole Jr, Frank J Owens, Wiley India Pvt. Ltd., New Delhi, 2007.