II B. Tech – II Semester

(20ME4752) NANO ENGINEERING

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	1	-	4

Pre-Requisites: Engineering physics, Engineering mathematics

UNIT-I:
General Introduction: Basics of Quantum Mechanics, Harmonic oscillator, magnetic Phenomena, band structure in solids, Mossbauer and Spectroscopy, optical phenomena bonding in solids, Anisotropy.

UNIT-II:
Silicon Carbide: Application of Silicon carbide, nano materials preparation, Sintering of SiC, X-ray Diffraction data, electron microscopy sintering of nano particles,
Nano particles of Alumina and Zirconia: Nano materials preparation, Characterization, Wear materials and nano composites,

UNIT-III:
Mechanical properties: Strength of nano crystalline SiC, Preparation for strength measurements, Mechanical properties, Magnetic properties,

UNIT –IV:
Electrical properties: Switching glasses with nano particles, Electronic conduction with nano particles.
Optical properties: Optical properties, special properties and the coloured glasses

UNIT-V:
Process of synthesis of nano powders, Electro deposition, Important naon materials. **Investigating and manipulating materials in the nanoscale:** Electron microscopics, scanning probe microscopics, optical microscopics for nano science and technology, X-ray diffraction.

Course Outcomes:

A student who successfully fulfills this course requirement will be able to:

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1.	Explain the fundamental principles of nanotechnology and their application to biomedical engineering.	L2
2.	Apply engineering and physics concepts to the nano-scale and non-continuum domain.	L2
3.	Identify and compare state-of-the-art nanofabrication methods and perform a critical analysis of the research literature.	L2
4.	Design processing conditions to engineer functional nanomaterials.	L5
5.	Evaluate current constraints, such as regulatory, ethical, political, social and economical, encountered when solving problems in living systems.	L2

Correlation of Cos with POs & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	1	3	3	1	1	1	1	1	2	2
CO2	3	3	2	2	1	2	1	0	3	2	1	1	3	3
CO3	3	3	2	3	1	1	3	1	2	1	0	1	3	2
CO4	3	3	3	3	1	3	1	1	2	3	2	0	3	2
CO5	3	3	2	2	2	3	2	0	3	1	1	1	3	2

TEXT BOOKS

1. Nano Materials- A.K.Bandyopadhyay/ New Age Publishers.
2. Nano Essentials- T.Pradeep/TMH

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