

13P1WPH111 Introduction to Nanotechnology

Subject Code	13P1WPH111	
Credits	3	Contact Hours:03
Module No.	Subtitle of the Module	Topics
1.	History of Technological evolution	Introduction
2.	Nano-material	Definition, nano-scale, Moore's Law.
3.	Material behaviors	at low dimensions. Transport, optical, thermal, electrical and mechanical properties.
4.	Physics of nano-materials	Quantum well structures, quantum dots, quantum wires : Electronic and optical properties, Atomic clusters, clusters of rare gases, clusters of alkali metals, Hall Effect and Quantum Hall Effect, fractional quantum Hall effects, Jellium model
5.	Carbon nanostructures	Fullerene, Nanotubes (SWNTs & MWNTs) etc. and their Electronic structure, transport, optical, thermal and mechanical properties.
6.	Classes of nanomaterials	nanostructures and their applications in electronics, photonic and nonlinear optics.
7.	Physics of amorphous materials	Preparation of amorphous materials, metallic glass: PVD, sputtering, CVD, quenching, chemical reduction technique, etc. Glasses: Theory for glass transition, glass transition temperature, Chalcogenide glasses and structure of disordered materials, Electronic density of states, localization phenomenon, transport, optical and dielectric properties. Amorphous nano-materials.

Recommended Reading (Books/Journals/Reports/Websites etc.: Author(s), Title, Edition, Publisher, Year of Publication etc. in IEEE format)

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| 1. | Introduction of nanomaterials, by Cao |
| 2. | G. Timp, Nanotechnology, Springer-Verlag New York Inc. (2005) |
| 3. | Nano Electronics and Information Technology : Rainer Waser |

4.	Handbook of nanotechnology: Bhushan
5.	Nanostructures: Tsakalakos, Ovidko & Vasudevan
6.	Physics of Amorphous Solids: Richard Xylen
7.	Electronic process in Non-Crystalline Materials: Davis & Mott.