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<tr><td>I</td><td>Course Code</td><td colspan="4">PH224001</td></tr>
<tr><td>II</td><td>Course Title</td><td colspan="4">Fundamentals of Nanoscience and Nanotechnology</td></tr>
<tr><td rowspan="2">III</td><td rowspan="2">Credit Structure</td><td>L</td><td>P</td><td>T</td><td>C</td></tr>
<tr><td>3</td><td>0</td><td>0</td><td>3</td></tr>
<tr><td>IV</td><td>Prerequisite(If any for the student)</td><td colspan="4">NIL</td></tr>
<tr><td>V</td><td>Course Content</td><td colspan="4">Basics: Introduction to nanotechnology, Bottom up and Top down approach for the synthesis of nanomaterials.

Synthetic methodologies: Sol-gel method, Micromulsion, CVD, PVD, Molecular beam epitaxy, Vapor-liquid-solid growth, (VLS or SLS), Spary pyrolysis, Template based synthesis, Lithography.

Various kind of Nanostructures: Carbon Nanotubes (CNT), Graphenes, Fullerenes, Quantum Dots and Semiconductor Nanoparticles, Metal-based Nanostructures, Nanoclusters and Nanowires, Polymer-based Nanostructures including dendrimers, metal oxide nanoparticles, Self- assembly of nanostructures, Core-shell nanostructures, Nanocomposites.

Physical properties of nanomaterials: Photocatalytic, Dielectric, Magnetic, Optical, Mechanical.

Characterization of nanomaterial’s: Measurement of properties-particle size, TEM, SEM, STM, AFM, Spectroscopy and magnetic resonance Properties of individual nanoparticles, Engineering and Bio applications and recent advancement in Nanotechnology.</td></tr>
<tr><td>VI</td><td>Text/References</td><td colspan="4">1. G. Cao, Nanostructures and Nanomaterials, Synthesis, Properties and Applications, Imperial College Press 2004.
2. T. Pradeep, Nano: The Essentials Understanding nanoscience and nanotechnology, Tata McGraw-Hill Publishing Company Limited New Delhi, 2007.
3. A. S. Edelstein and R C Cammarata, Nanomaterials Synthesis, Properties and Applications, IOP Publishing Ltd 1996.
Charles P Poole Jr. and F. J. Owens, Introduction to Nanotechnology, Wiley 2003
4. H. S. Nalwa (Editor), Nanostructured Materials & Nanotechnology Concise Edition, Academic 2001
5. W. A. Goddard, D. W. Brenner, S. E. Lyshevski, Goddard III, Handbook of Nanoscience, Engineering, and Technology CRC Press, 2003</td></tr>
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