

### 13P1WPH113Advanced Materials Science

<b>Subject Code</b>	<b>13P1WPH113</b>	
<b>Credits</b>	3	<b>Contact Hours:03</b>
<b>Module No.</b>	<b>Subtitle of the Module</b>	<b>Topics</b>
1.	<b>Introduction</b>	Structure, defects in solids, bonds and bands in materials, thermodynamics in materials, kinetics, nucleation and growth, coalescence, coagulation and size distributions.
2.	<b>Semiconductor basics</b>	Crystalline and Non-Crystalline Semiconductors, Fermi level, carrier concentration, mobility, conductivity, p-n junctions-band diagram, forward and reverse I-V characteristics, C-V, transistor-basic concepts, Doping in solids
3.	<b>Growth techniques</b>	Sputtering, MBE, CBD, CVD, PECVD, oxidation, microlithography, plasma etching, thin film deposition, metallization,
4.	<b>Magnetic Materials</b>	Magnetostatics, magnetism of electrons (all types), nanoscale magnetism, spin electronics and magnetic recording, Applications
5.	<b>Electronic materials</b>	Electrical properties of polymers, ceramics, dielectrics, and amorphous materials Optical materials and their properties.
6.	<b>Applications</b>	Xerography, Holography, photolithography, Solid State batteries, radiation sensors and measuring devices, Waveguides, IR devices etc.

<b>Recommended Reading</b> (Books/Journals/Reports/Websites etc.: Author(s), Title, Edition, Publisher, Year of Publication etc. in IEEE format)	
1.	Rolf E. Hummel, Electronic properties of materials, Springer
2.	J.M.D. Coey, Magnetism and Magnetic Materials, Cambridge

3.	Jean-Michel Guenet, Polymer-Solvent Molecular compounds, elsevier
4.	C. Kittel, An Introduction to Solid State Physics, Wiley
5.	K.Seeger, Semiconductor Physics, Springer
6.	Davis & Mott, Electronic process in Non-Crystalline Materials