



ANNEXURE F

Indian Institute of Information Technology, Design and Manufacturing Kancheepuram

Introduction of New course

Course Title	Physics of Materials	Course No	PH2002			
Department/ Specialization	Physics	Credits	L	T	P	C
			3	1	0	4
Faculty proposing the course	Dr. Y Ashok Kumar Reddy	Status	Core <input type="checkbox"/>	Elective <input checked="" type="checkbox"/>		
Offered for	UG	Type	New <input checked="" type="checkbox"/>	Revision <input type="checkbox"/>		
To take effect from	March 2021	Submitted for approval	44 th Senate			
Prerequisite	Nil					
Learning Objectives	<ul style="list-style-type: none"> The objective of the course is to provide the insights of various states of material and their properties, nanotechnology, existing energy resources and their applications for next generation Engineers. 					
Learning Outcomes	<p>Upon successful completion, students can gain the knowledge to:</p> <ul style="list-style-type: none"> Applied Physics concepts towards materials and their applications; Evaluation and selection of suitable materials for different energy, medical and industrial applications. 					
Course Contents (with approximate breakup of hours for lecture/ tutorial/practice)	<ul style="list-style-type: none"> Physics of Matter: Atoms in crystals, Atomic bonding, Free electron theory, Band theory, Fermi Level, Energy bands, Conductors, Insulators, Semiconductors, Superconductors, Dielectrics, Magnetic and Plasmonic materials (L12+T3) Physics of Nano: Introduction to nanomaterials, Properties of nanomaterials, Types of nanomaterials, Synthesis of Nanomaterials-Top-down and Bottom-up approaches, Quantum confinement, Quantum well, Wire and Dot, Carbon Nanotubes (CNTs), Nanotechnology for medical and industrial applications (L14+T4) Physics of Energy: Introduction to energy sources, Solar energy- Solar production and Radiation, Photovoltaic solar cells; Nuclear energy- Nuclear energy processes, Fission and Fusion; Electrochemical energy- Storage and Conversion; Thermal Energy- Conduction, Convection and Radiation; Wind Energy- Turbines and Utility scale wind; Bio energy- Sources and Biomass (L16+T5) 					
Essential Reading	<ol style="list-style-type: none"> Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, Concepts of Modern Physics, 7th Edition, 2017. Charles P. Poole, Jr. Frank J. Owens, Introduction to Nanotechnology, A John Wiley-Interscience publication, 2003. M.N. Avadhanulu, P.G. Kshirsagar, T.V.S. Arun Murthy, A Textbook of Engineering Physics, S. Chand Publishing, 11th Edition, 2018. 					
Supplementary Reading	<ol style="list-style-type: none"> Charles Kittel, Introduction to Solid State Physics, 8th Edition, 2004. A.P. Zambare, R.B. Bhise, A.B. Bhise, V.D. Kulkarni, H.R. Kulkarni, Physics of Nanomaterials, Nirali Prakashan, 2019. Robert L. Jaffe, Washington Taylor, The Physics of Energy, Cambridge University Press, 2018. 					