21PHY01	ENGINEERING PHYSICS	L	T	P	C
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Course Objective:

- To enhance the fundamental knowledge in physics and its applications relevant to various streams of engineering and technology.

UNIT-I	SOLID MECHANICS AND MECHANICAL PROPERTIES	9 Hours

Elasticity Stress-strain diagram and its uses – factors affecting elastic modulus - Torsional Pendulum -Young's modulus by cantilever, Uniform and non-uniform bending - stress due to bending in beams - Tensile test, plastic deformation - strengthening methods - Creep resistance, fracture fatigue-methods of increasing fatigue life.

UNIT II	LASER PRINCIPLES AND OPTICAL FIBERS	9 Hours

Laser Characteristics - Einstein coefficient &its significance-population inversion - working principle , pumping scheme ,components of Nd:YAG, He:Ne, Co2 laser- Semiconductor Laser - advanced applications of laser - light propagation through fibers - acceptance angle-numerical aperture types of optical fibers - fiber optic communication, fiber optic sensors.

UNIT III	CRYSTAL PHYSICS AND OPTOELECTRONICS	9 Hours

Crystal directions, planes and miller indices - symmetry elements-coordination number and packing factor for HCP,FCC,BCC and diamond structure - crystal imperfections - crystal growth techniques – Bridgmann Technique - classifications of optical materials - absorption, emission and scattering of lights - LED-OLED-laser diode- solar cell- quantum dot laser.

UNIT IV	QUANTUM MECHANICS	9 Hours

Black body radiation - planks concept - Duality nature, De Broglie hypothesis for matter waves - Compton effect - Heisenberg's uncertainty principle - Schrödinger time dependent wave equation - Schrödinger time Independent wave equation - particle in 1D box - scanning tunneling microscope.

UNIT V	NANO SCIENCE &ADVANCED ENGINEERING MATERIALS	9 Hours

Introduction to nano materials - properties of nano materials - quantum confinements(quantum well, wire &dot) - single electron transistor-magnetic semiconductor - preparation of nano materials – Ball milling Technique - carbon nano tubes(CNT),properties &applications of nano particles - Types and applications of Ceramics-composites-polymers- metallic materials - preparation and applications of metallic glasses – Melt Spinning System - shape memory alloy(SMA)

Course Outcomes:

Upon completion of this course, The students will gain knowledge on

1. basics of solid mechanics and mechanical properties.
2. the concepts of LASER principles and their applications in fiber optics.
3. basics of crystals, their structures , different
4. crystal growth techniques and optoelectronic devices
5. advanced physics concepts of quantum theory and its applications in tunneling microscopes.
6. the concepts of Nano science and advanced engineering materials and its applications

Text Books:

1. Dattu R.Joshi, "*Engineering Physics*",Tata McGraw- Hill,New Delih,2010.
2. Arthur Beiser et al., Concepts of Modern Physics, 2013, Sixth Edition, Tata McGraw Hill.

Reference Books:

1. Thiruvadigal, J. D., Ponnusamy,S. Sudha.D. and Krishnamohan M., "*Physics for Technologists"*, SSS Publications, 2015.
2. Leonard. I. Schiff, "*Quantum Mechanics"*, Third Edition, Tata McGraw Hill, 2010.
3. Alberto Sona, "*Lasers and their applications*", Gordon and Breach Science Publishers Ltd., 1976.
4. Wole Soboyejo, "*Mechanical Properties of Engineered Materials*", Marcel Dekker Inc., 2003. William Silfvast, Laser Fundamentals, 2008, Cambridge University Press.