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DEPARTMENT OF PHYSICS

Annexure - I

1. **Subject Code**: TPH 101/201 **Course Title:** Engineering Physics
2. **Contact Hours**: L: 3 T: --- P: --- **Semester**: I / II
3. **Credits:** 3
4. **Pre-requisite**: Basic Knowledge of Physics
5. **Course Outcomes**: After completion of the course students will be able to

1. Define the wave nature of light through different phenomenon.
2. Extend the knowledge of Laser, fiber optics and polarization in engineering problems.
3. Understand the concept of theory of relativity.
4. Examine the behavior of Electromagnetic Waves (EM) using Maxwell Equations.
5. Explain the properties of Superconductors.
6. Discuss quantum theory of radiation and applications of Schrodinger wave equations.

UNIT	CONTENTS	Contact Hrs
Unit/Module-I	**Interference:** Conditions of interference, Spatial and temporal coherence, Bi-prism experiment, interference in wedge shaped film, Newton's rings. **Diffraction:** Fraunhofer diffraction at single slit and n-slits (Diffraction Grating). Rayleigh's criteria of resolution. Resolving power of grating.	**9**
Unit/Module- II	**Polarization:** Basic theory of double refraction, Malus law, Ordinary and Extra-ordinary ray, Production and detection of plane, circularly and elliptically polarized light, specific rotation and polarimeters. **Laser:** Spontaneous and Stimulated emission of radiation, Einstein Coefficients' Principle of laser action. Construction and working of Ruby and He-Ne laser photovoltaic effect. **Fiber Optics:** Introduction to Fiber Optics, types of fiber, acceptance	**9**

	angle and cone, numerical aperture	
Unit/Module-III	**Special theory of relativity:** Inertial and non inertial frames, Galilean transformation, Michelson-Morley experiment, Einstein postulates of special theory of relativity, Lorentz transformation equation, length contraction, time dilation, variation mass of velocity, Mass energy relation.	**8**
Unit/ Module-IV	**Superconductivity:** Essential properties of Superconductors, zero resistivity, Type I, Type II superconductors and their properties. **Electromagnatism:** Displacement current, Three electric vectors (**E**, **P**, **D**), Maxwell's equations in integral and differential forms. Electromagnetic wave propagation in free space.	**8**
Unit/ Module-V	**Quantum Mechanics:** Quantum concept and radiation, Wave particle duality (de-Broglie concept of matter waves), Heisenberg's uncertainty principle, Schrodinger's wave equation in one dimension under a conservative force field, wave function and its significance, Eigen values and Eigen functions for particle confined in one dimensional infinite potential box (rigid box).	**8**
	Total	**42**

Text Books:

- Ajoy Ghatak, "Optics", 4th Edition, Tata Mc Graw Hill, 2009
- N. Subrahmanyam Brijlal & M. N. Avadhanulu, "Optics :", 24th Edition, S. Chand, 2010
- A. Beiser, "Concepts of Modern Physics", Tatac Mc Graw Hill
- Resnick, Krane, Halliday, "Physics (vol I&II)", 5th Edition, Wiley, 2007
- Robert Resnick, "Introduction to Special Relativity", Wiley Publishers, 2007

Reference Books:

- John R. Taylor, Chris D. Zafiratos, Michael A. Dubson, "Modern Physics", 1st Edotion, Pearson Education , 2007

- Gerd Keiser, “Optic Fiber Communication” 5th Edition, Tata Mc. Graw Hill, 2017
- Alastair I M Rae, Jim Napolitano, “Quantum Mechanics” 6th Edition, Wiley, 2015
- David J. Griffiths, “Introduction to Electrodynamics”, 3rd Edition, Prentice, 2011
- Charles P. Poole, Jr. Frank J. Owens , “Introduction to Nanotechnology”, Wiley, 2017
- Hug D. Young & Roger A. Freedman, “University Physics”, 12th Edition, Pearson Publication, 2008
- Alan Giambattista, Betty Mc. Carthy Richardson, Robert C Richardson, “Fundamentals of Physics”, 1st Edition, Tata Mc Graw Hill, 2009