

<b>Subject Code</b>		<b>Total Contact Hour</b>	<b>45 HR</b>
<b>Semester</b>	FIRST/SECOND	<b>Total Credit</b>	<b>3</b>
<b>Subject Name</b>	<b>PHYSICS</b>		
<b>Pre-requisites</b>			

**Course Objective:**

To enhance the fundamental knowledge in Physics and its applications relevant to various streams of Engineering and Technology.

<b>Syllabus</b>	<b>Contact Hour</b>
<b>Module I: OSCILLATIONS</b> Mechanical and electrical simple harmonic oscillators, damped harmonic oscillator – heavy, critical and light damping, energy decay in a damped harmonic oscillator, quality factor, forced mechanical and electrical oscillators, steady state motion of forced damped harmonic oscillator	<b>9 hrs</b>
<b>Module II: WAVES AND OPTICS</b> Concept of wave and Wave equation, Superposition of many harmonic waves, Concept of coherent sources (Division of wave front and division of amplitude), Interference in thin parallel film, Newton's ring: Determination of wavelength of light, Refractive index of liquid). Concept of diffraction (Huygen's Principle), Types of diffraction, Franhoffer diffraction due to single slit, diffraction grating (qualitatively).	<b>9 hrs</b>
<b>Module III: ELCTROMAGNETISM</b> <b>Vector calculus:</b> Gradient, Divergence, Curl (Mathematical concept), Gauss divergence theorem and Stoke's theorem(statement only), Derivation of Maxwell's electromagnetic equation in differential form and integral form, Electromagnetic wave equations for <b>E</b> and <b>B</b> in vacuum and conducting medium, transverse nature of EM waves.	<b>9 hrs</b>
<b>Module IV: QUANTUM PHYSICS</b> Wave particle duality, concept of phase velocity group velocity, relation between them, Matter waves (de Broglie hypothesis), Wave functions, Observables as operators, Eigen function and Eigen values, Normalization, Expectation values, Schrodinger equation (Time dependent and time independent), Particle in a box.	<b>9 hrs</b>
<b>Module V: LASERS</b> Introduction to Laser, Characteristics of Lasers, Einstein's coefficients and relation between them, Lasing action, Population inversion, Three and four level pumping schemes, Ruby Laser, He-Ne Laser.	<b>8 hrs</b>

**Essential/ Supplementary Readings:**

1. Ian G. Main, Oscillations and waves in physics, Cambridge University Press
2. H.J. Pain, The physics of vibrations and waves, John Wiley & Sons Ltd.
3. E. Hecht, Optics, Pearson Education Ltd.
4. A. Ghatak, Optics, McGraw Hill Publisher
5. O. Svelto, Principles of Lasers, Springer