Paper Units	**Course Content** **Semester-II** **Waves and Optics**	**Nos. Of Lecture in hour**	**January,19-April'19 14 weeks**		**May,2019 to June,2019 4 weeks**		
PHSACOR 04T	**Superposition of Collinear Harmonic oscillations** Linearity and Superposition Principle. Superposition of two collinear oscillations having (1) equal frequencies and (2) different frequencies (Beats). Superposition of N collinear Harmonic Oscillations with (1) equal phase differences and (2) equal frequency differences	4	4	INTERNAL ASSESSMENT		PERIODICAL EXAMINATION	END SEMESTER UNIVERSITY EXAMINATION
	Superposition of two perpendicular Harmonic Oscillations Graphical and Analytical Methods. Lissajous Figures with equal an unequal frequency and their uses.	3	3				
	Wave Motion : Plane and Spherical Waves. Longitudinal and Transverse Waves. Progressive (Travelling) Wave and its differential equation. phase and group velocities for harmonic waves. Pressure of a Longitudinal Wave. Energy Transport. Intensity of Wave. Water Waves: Ripple and Gravity Waves	4	4				
	Velocity of Waves : Velocity of Transverse Vibrations of Stretched Strings. Velocity of Longitudinal Waves in a Fluid in a Pipe. Newton's Formula for Velocity of Sound. Laplace's Correction.	5	5				
	Superposition of Two Harmonic Waves : Standing (Stationary) Waves in a String: Fixed and Free Ends. Analytical Treatment. Changes of wavefunction with respect to Position and Time. Energy of Vibrating String. Transfer of Energy. Normal Modes of Stretched Strings. Longitudinal Standing Waves and Normal Modes. Open and Closed Pipes. Superposition of N Harmonic Waves.	7			7		

	Wave Optics : Electromagnetic nature of light. Definition and properties of wave front. Huygens Principle. Temporal and Spatial Coherence. Characteristics of Laser light.	4	4				
	Interference: Division of amplitude and wavefront. Young's double slit experiment. Lloyd's Mirror and Fresnel's Biprism. Phase change on reflection: Stokes' treatment. Interference in Thin Films: parallel and wedge-shaped films. Fringes of equal inclination (Haidinger Fringes); Fringes of equal thickness (Fizeau Fringes). Newton's Rings: Measurement of wavelength and refractive index. **Interferometer :** Michelson Interferometer-(1) Idea of form of fringes (No theory required), (2) Determination of Wavelength, (3) Wavelength Difference, (4) Refractive Index, and (5) Visibility of Fringes. Fabry-Perot interferometer. **Diffraction and Holography :** Kirchhoff's Integral Theorem and Fresnel-Kirchhoff's Integral formula (Qualitative discussion only). Fraunhofer diffraction: Single slit, rectangular aperture. Resolving Power of an optical instrument – Rayleigh's criteria. Double slit. Multiple slits. Diffraction grating. Resolving power of grating. Fresnel Diffraction: Fresnel's Assumptions. Fresnel's Half-Period Zones for Plane Wave. Explanation of Rectilinear Propagation of Light. Theory of a Zone Plate: Multiple Foci of a Zone Plate. Fresnel's Integral, Fresnel diffraction pattern of a straight edge, a slit and a wire. Holography: Principle of Holography. Recording and Reconstruction Method. Theory of Holography as Interference between two Plane Waves. Point source holograms.	9 4 8 8 4	9 4 8 4		4 4		