Part A: Introduction				
Program: **Diploma**		Class: **B.Sc.**	Semester: **Fourth**	Session:**2023-2024**
1	Course Code	**PSC – 04T**		
2	Course Title	**WAVE AND OPTICS**		
3	Course Type	**Theory**		
4	Pre-requisite (if any)	As per norms		
5	Course Learning Outcomes (CLO)	**After completion of the course students will be able to –** • Solve wave equation and understand significance of transverse waves • Acquire skills to identify and apply formulas of optics and wave physics • Understand the properties of light like interference, diffraction and polarization • Understand the applications of interference in design and working of interferometers. • Understand the resolving power of grating • Get knowledge about laser and its application.		
6	**Credit Value**	**Theory : 3**		
7	**Total Marks**	**Max. Marks: 100**	**Min Passing Marks : 40**	

Part B: Content of the Course		
Total Hours: 45		
Unit	**Topic**	**Number of Hours**
I	**Waves in Medium:** Speed of transverse waves on uniform string, speed of longitudinal waves in a fluid, energy density and energy transmission in waves. Group velocity and phase velocity and relationship between them. **Interference:** Interference: Division of amplitude and division of wave-front. Young's Double Slit experiment. 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. Michelson's Interferometer: Formation of fringes, Determination of wavelength, Wavelength difference.	**12**
II	**Diffraction:** Fresnel Diffraction: Half-period zones. Zone plate. Fresnel diffraction pattern at a straight edge, at a slit and at a wire using half-period zone analysis. Fraunhoferdiffraction:Singleslit,Double slit, Multipleslits&Plane Diffraction Grating, Resolving Power of Grating.	**11**
III	**Polarization:** Polarized light and its mathematical representation, Production of polarized light by reflection, refraction and scattering. Polarization by double refraction and Huygen's theory, Nocol prism, production and analysis of circularly and elliptically polarized light. Optical activity and Fresnel theory. Laurent's Hals shade Polarimeter and Bi-Quartz Polarimeter..	**11**
IV	**LASER:** Basic properties of LASERs, coherence length and coherence time, spatial coherence of a source, Einstein's A and B coefficients, Spontaneous and induced emissions, conditions for laser action, population inversion. **Types of Laser:** Ruby, He-Ne Laser and Semiconductor Laser, Application of Laser in communication and Holography.	**11**