

Course Title	Waves and Optics
Course Code	MPHY-112
Credit Hours	CH3
Pre- requisites	FSc / A-Level (Physics) or equivalent
Learning outcomes	To introduce the ideas of harmonic motion in depth and concept of waves in physics with special attention on light waves
Contents	Periodic motion and mechanical waves: simple harmonic motion and applications, pendulum, damped oscillation, forced oscillation and resonance, mechanical waves, mathematical description speed of transfers waves, energy and wave motion, wave interference, standing waves, normal Modes. Sound waves: Speed and intensity of sound waves, standing sound waves and normal modes Resonance and interferences, beats, Doppler's effects, shock waves. Propagation of light and geometric optics: Light waves, reflection, refraction, Speed of light, dispersion and polarization, total internal reflection, Scattering of light, Huygens' Principle, plane and spherical mirrors, spherical and refracting surfaces, thin lenses, cameras, the eye, magnifier, microscopes and telescopes. Interference and diffraction: Two source interference, coherence, interference for thin films, intensity in double slit interference, Michelson interferometer, Fraunhofer and Fresnel diffraction, single slit diffraction, intensity of single slit, Multiple slits, Grating, X-Ray Diffraction, Circular Aperture and resolving power, Holography.
Teaching-learning Strategies	Classroom teaching / Lecturing
Assignments-Types and Number	Problem/work sheets: 3-4
Text Books	1. The Physics of Vibrations and Waves, by J. Pain, Wiley, (6th edition) (2005). 2. Vibrations and Waves, by P. French, CBS Publishers (2003). 3. Physics (Volume 1 & 2) by R. Resnick, D. Halliday and K. S. Krane (5th Ed), Wiley (2002). 4. University Physics with Modern Physics by H. D. Young, R. A. Freedman (14th Edition), Addison-Wesley (2015). 5. Fundamentals of Physics by D. Halliday, R. Resnick and J. Walker (9th Ed), JWiley (2011).