

Syllabus

PANJAB UNIVERSITY, CHANDIGARH

B.Sc. Part-II

SEMESTER-III

Paper-B : OPTICS AND LASERS-I

(30 Hrs.)

UNIT-I

Interference. Concept of coherence, spatial and temporal coherence, coherence time, coherence length, area of coherence. Conditions for observing interference fringes. Interference by wavefront division and amplitude division. Young's double slit experiment. Lloyd's mirror and Fresnel's biprism, phase change on reflection. Newton's rings. Michelson interferometer—working, principle and nature of fringes. Interference in thin films, Role of interference in anti-reflection. Multiple beam interference, Fabry-Perot interferometer, nature of fringes, finesse.

UNIT-II

Diffraction. Huygen-Fresnel theory half period zones, zone plates. Distinction between Fresnel and Fraunhofer diffraction due to single slit and intensity distribution, double slits and multiple slits (qualitative). Fraunhofer diffraction at rectangular (qualitative discussion) and circular apertures. Effects of diffraction in optical imaging, resolving power of microscope and telescope, diffraction grating, its use as a spectroscopic element, resolving power, Moire's fringes.

Polarization. Concept and analytical treatment of unpolarised, plane polarized and elliptically polarized light. Double refraction, Nicol prism, sheet polarisers, retardation plates. Production and analysis of polarized light (quarter and half wave plates).