ACHARYA NAGARJUNA UNIVERSITY - UG SYLLABUS
Group: B.Sc Subject: PHYSICS Year: I Sem: II

UNIT-I

Interference of light:

Introduction, Conditions for interference of light, Interference of light by division of wave front and amplitude,Phase change on reflection-Stokes' treatment, Lloyd's single mirror,Interference in thin films: Plane parallel and wedge-shaped films, colours in thin films, Newton's rings in reflected light-Theory and experiment, Determination of wavelength of monochromatic light, Michelson interferometer and determination of wavelength.

UNIT-II

Diffraction of light:

Introduction, Types of diffraction: Fresnel and Fraunhoffer diffractions, Distinction between Fresnel and Fraunhoffer diffraction,Fraunhoffer diffraction at a single slit, Plane diffraction grating,Determination of wavelength of light using diffraction grating, Resolving power of grating, Fresnel's half period zones, Explanation of rectilinear propagation of light, Zone plate, comparison of zone plate with convex lens.

UNIT-III

Polarisation of light

Polarized light: Methods of production of plane polarized light, Double refraction, Brewster's law, Malus law, Nicol prism, Nicol prism as polarizer and analyzer, Quarter wave plate, Half wave plate, Plane, Circularly and Elliptically polarized light-Production and detection, Optical activity, Laurent's half shade polarimeter: determination of specific rotation, Basic principle of LCDs

UNIT-IV

Aberrations and Fibre Optics

Monochromatic aberrations, Spherical aberration, Methods of minimizing spherical aberration, Coma, Astigmatism and Curvature of field, Distortion; Chromatic aberration-the achromatic doublet; Achromatism for two lenses (i) in contact and (ii) separated by a distance.

Fibre optics: Introduction to Fibers, different types of fibers, rays and modes in an optical fiber, Principles of fiber communication (qualitative treatment only), Advantages of fiber optic communication.

UNIT-V

Lasersand Holography

Lasers: Introduction, Spontaneous emission, stimulated emission, Population Inversion, Laser

principle, Einstein coefficients, Types of lasers-He-Ne laser, Ruby laser, Applications of lasers; Holography: Basic principle of holography, Applications of holography

Practical Course II: Wave Optics

Minimum of 6 experiments to be done and recorded

1. Determination of radius of curvature of a given convex lens-Newton's rings.

2. Resolving power of grating.

3. Study of optical rotation –polarimeter.

4. Dispersive power of a prism.

5. Determination of wavelength of light using diffraction grating-minimum deviation method.

6. Determination of wavelength of light using diffraction grating-normal incidence method.

7. Resolving power of a telescope.

8. Refractive index of a liquid-hallow prism

9. Determination of thickness of a thin wire by wedge method

10. Determination of refractive index of liquid-Boy's method.

11. Determination of wavelength of Laser Light by using diffraction granting