

Wave Optics & Electromagnetism

Course Code: BEB207

Contact Hours: 60

Credit: 04 (L-3, T-1, P-0)
MM: 100

Interference

Introduction and Methods of interference: Division of amplitude and division of wavefront, Phase change on reflection, Interference in thin films: Parallel film, wedge-shaped films, Newton's rings: measurement of wavelength and refractive index

Diffraction

Introduction of diffraction, Types of diffraction, Difference between interference and diffraction, Difference between Fresnel and Fraunhofer diffraction, Diffraction due to (i) a single slit, (ii) double slit and (iii) N-slits (plane transmission grating)

Polarization

Phenomenon of double refraction, Uni-axial & bi-axial crystals, Ordinary & extra ordinary rays, Quarter wave plate & half wave plate, Analysis of plane, circularly & elliptically polarized light

Electromagnetic Induction

Faraday's law, Lenz's law, self and mutual induction, energy stored in magnetic field

Electromagnetic theory


Maxwell's equations: proof & physical significance, plane electromagnetic waves, displacement current and equation of continuity, electromagnetic wave propagation: plane wave in free space, plane waves in good conductors, Poynting theorem and Poynting vector


Text Books:

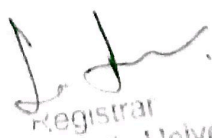
1. Francis Arthur Jenkins and Harvey Elliott White, Fundamentals of Optics McGraw-Hill, 1976
2. Eugene Hecht and A. R. Ganesan, Optics, Pearson Education, 2002
3. Brijlal & Subhramanyam, Optics, S. Chand Publications, 2011
4. Edward M. Purcell, Electricity and Magnetism, (McGraw-Hill Education, 1986)
5. David J. Griffiths, Introduction to Electrodynamics, 3rd Edn, (Benjamin Cummings, 1998).
6. K.K. Tiwari, Electricity and Magnetism S. Chand Publication

Reference Books:

1. Abdul Al-Azzawi, Light and Optics: Principles and Practices, CRC Press, 2007
2. A. K. Ghatak & K. Thyagarajan, Contemporary Optics, Plenum Press, 1978
3. Arthur F. Kip, Fundamentals of Electricity and Magnetism, (McGraw-Hill, 1968)
4. J. H. Fewkes & John Yarwood, Electricity and Magnetism, Vol.-I (Oxford Univ. Press, 1991).
5. D. C. Tayal, Electricity and Magnetism. (Himalaya Publishing House, 1988).


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