

ENGINEERING PHYSICS (THEORY)

L-T-P-C

3 -1-0-3

Course Objectives

- To impart knowledge in basic concepts of physics relevant to engineering applications
- To introduce advances in technology for engineering applications

Course Outcomes	
1	To design and conduct simple experiments as well as analyze and interpret data in
2	Capability to understand advanced topics in engineering
3	Identify formula and solve engineering problems
4	Apply quantum physics to electrical phenomena

SYLLABUS

UNIT - I

Thermodynamics:

10 periods

Heat and work, first law of thermodynamics and its applications, reversible and irreversible processes, heat engine, Carnot cycle and its efficiency, Carnot's theorem, second law of thermodynamics, entropy – entropy change in reversible and irreversible processes, entropy and second law, entropy and disorder, entropy and probability, third law of thermodynamics

A text book of Engineering Physics -- M.N.Avadhanulu & P.G.Kshirasagar, S.Chand Publications

UNIT-II

10 periods

Electromagnetism:

Faraday's law of induction, Lenz's law, Integral and differential forms of Faraday's law, self-inductance, energy stored in electric and magnetic fields, Poynting vector, displacement current, Maxwell's equations in integral form (no derivation), wave equation, propagation of electromagnetic waves in free space

Physics - Resnick & Halliday Volume II Wiley India Publications

Ultrasonics: Properties of ultrasonic waves, production of ultrasonic waves by magnetostriction and piezoelectric methods, applications of ultrasonics

A text book of Engineering Physics -- M.N.Avadhanulu & P.G.Kshirasagar, S.Chand Publications

UNIT–III

10 periods

Optics

Interference: Introduction, principle of superposition, coherence, Young's double slit experiment, conditions for interference, interference in thin films by reflection, wedge shaped film and Newton's rings

Diffraction: Introduction, Fresnel and Fraunhofer diffraction, diffraction at a single slit

Polarisation: Introduction, types of polarized light, double refraction in uniaxial crystals, Nicol's prism, quarter and half-wave plate, production and detection of plane, circular and elliptically polarized light

A text book of Engineering Physics M.N.Avadhanulu & P.G.Kshirasagar, S.Chand Publications

UNIT–IV

10 periods

Lasers: Introduction, characteristics of a laser beam, spontaneous and stimulated emission of radiation, population inversion, Ruby laser, He-Ne laser, semiconductor laser, applications of lasers

Fibre optics: Introduction to optical fibers, principle of propagation of light in optical fibers,, acceptance angle and acceptance cone, numerical aperture, types of optical fibers, modes of propagation and refractive index profiles, attenuation in optical fibers, advantages of optical fibers in communications, fiber optics communication system, applications of optical fibers, fiber optic sensors

Modern Engineering Physics -- S.L.Gupta & Sanjeev Gupta , Dhanpat Rai Publications

UNIT–V

10 periods

Quantum mechanics:

Planck's hypothesis, wave-particle duality, introduction to quantum theory, de-Broglie concept of matter waves, Heisenberg's uncertainty principle, Schrodinger's time independent and time dependent wave equations, physical significance and properties of the wave function ψ , application of Schrodinger wave equation for a particle in one dimensional well – Eigen wave functions and energy Eigen values of the particle

Elements of Statistical mechanics: Elementary concepts of Maxwell-Boltzman , Bose-Einstein and Fermi-Dirac statistics (no derivation)

Modern Engineering Physics -- S.L.Gupta & Sanjeev Gupta , Dhanpat Rai Publications

Reference Books:

- 1)Engineering physics – V. Rajendran McGrawHill Education Private Ltd
- 2) Engineering Physics -- S.O.Pilai , Sivakami New Age International Publishers
- 3) University Physics -- Young & Freedman , Pearson Education
- 4) Engineering Physics -- A.Marikani PHI Learning Private Limited
- 5) Physics Resnick & Halliday Volume I Wiley India Publications