16HS102 ENGINEERING PHYSICS

I Year I semester

UNIT - 1 **L-9**

ULTRASONICS: Introduction, Production of ultrasonic waves - Piezoelectric method; Properties of ultrasonic waves, Types of ultrasonic waves, Determination of velocity of ultrasonic waves in solids and liquids, SONAR - Medical applications.

NON-DESTRUCTIVE TESTING: Introduction, Types, Visual inspection, Liquid penetrate testing, Ultrasonic Testing Systems, X - Ray radiography.

UNIT - 2 **L-9**

LASERS: Characteristics of laser light, Spontaneous and Stimulated emission of radiation, He-Ne laser, CO_2 laser, Semiconductor laser, Applications.

HOLOGRAPHY: Holography and applications.

FIBER OPTICS: Principle of optical fiber, Acceptance angle, Numerical aperture, Types of fibers, Dispersion and attenuation in optical fibers, Optical fiber communication system, Fiber optic sensors.

UNIT - 3 **L-9**

QUANTUM MECHANICS: Introduction, Matter waves, Schroedinger's time independent wave equation, Physical significance of the wave function, Particle in one dimensional potential well, Tunneling phenomenon.

FREE ELECTRON THEORY OF METALS: Introduction, Classical free electron theory, Electrical conductivity of metal, Quantum free electron theory, Fermi - Dirac distribution function and its variation with temperature.

PARTICLE ACCELERATORS: Introduction, Cyclotron, Synchrocyclotron, Betatron and applications.

UNIT - 4 **L-9**

SOLAR ENERGY: Solar radiation, Photovoltaic effect, Solar cells, Efficiency of solar cell, Solar thermal energy conversion systems.

PHOTONICS: LED, LCD, Photo conducting materials, Photo detectors, Photonic crystals, Non- linear optical behaviour of materials, Applications.

UNIT - 5 **L-9**

NANO MATERIALS: Introduction, Fabrication of nano materials - Ball milling - Sol-Gel method; Physical and chemical properties of nano materials, Applications.

FUNCTIONAL MATERIALS: Smart materials, Shape memory alloys, Chromic materials (Thermo, Photo and electro), Metallic glasses, Advanced ceramics, Composites, Fiber reinforced plastics/metals, Biomaterials.

TEXT BOOKS:

1.V.Rajendran, “Engineering Physics”, 7th edition, McGraw Hill Education (India) Pvt.Ltd., 2014.

2.D.K. Bhattacharya and Poonam Tandon, “Engineering Physics”, Oxford University Press, 2015.

REFERENCE BOOKS :

1.M.R. Srinivasan, “Engineering Physics”, 1st edition, New Age International Publishers, 2008.

2.M.N. Avadhanulu & P.G. Kshirsagar, “Engineering Physics”, 1st edition, Chand and Company Ltd., 1992.

3.Sukhatme S.P., “Solar Energy”, 2nd edition, TMH publication, 2005.

4. Dr. Arumugam “Materials Science”, 3rd edition, Anuradha Publications, 2002.