Course Number and Name

BPH101 - ENGINEERING PHYSICS I

Credits and Contact Hours

3 & 45

Course Coordinator's Name

Dr. Sree Latha

Text Books and References

TEXT BOOKS

1. Sears.F.W., Zemansky.M.W., Young.H.D,;'University Physics; Narosa Publishing House.
2. Avadhanulu. M.N.; Engineering Physics-Vol-1; S.Chand And Company Ltd, 2010.

REFERENCES

1. Rajendran.V, And Marikani . A, 'Engineering Physics' Tata Mcgrow ?Hil Publications Ltd,3rd Edition, New Delhi (2004).
2. Sears., Zemansky.,, Young.;'College Physics; Addison Wesley Publishing Company.
3. Mukundan. A, Usha.S., Lakshmi.V; 'Engineering Physics' Scitech Publications (India) Pvt.Ltd., Chennai, 2006.
4. Resnick, R., and Halliday, D. and Walker, J.; Fundamental of Physics; John Wiley and Sons.

Course Description

To impart a sound knowledge on the basic concepts of modern sciences like engineering applications of ultrasonic's, lasers, fundamentals of crystal physics and utility of solar energy.

Prerequisites	Co-requisites
+2 level Physics	Nil

required, elective, or selected elective (as per Table 5-1)

Required

Course Outcomes (COs)

CO1:Understand the principles and laws of physics

CO2:To understand the impact of crystal physics.

CO3 :Learn the properties of elasticity & heat transfer.

CO4 :Acquire knowledge on quantum physics.

CO5 :To understand the concepts on laser and ultrasonics & its applications.

CO6 :Understand the principle of laser and its applications in engineering & medicine.

Student Outcomes (SOs) from Criterion 3 covered by this Course

COs/SOs	a	b	c	d	e	f	g	h	i	j	k
CO1	H						M			H	
CO2		L	H		M				M		L
CO3											
CO4	H		M	L						L	
CO5		L	L								L
CO6											

List of Topics Covered

UNIT I CRYSTAL PHYSICS 9

Lattice – Unit cell – Bravais lattice – Lattice planes – Miller indices – d spacing in cubic lattice – Calculation of number of atoms per unit cell – Atomic radius – Coordination number – Packing factor for SC, BCC, FCC and HCP structures – Diamond and graphite structures (qualitative treatment)- Crystal growth techniques –solution, melt (Bridgman and Czochralski) and vapour growth techniques (qualitative)

UNIT II PROPERTIES OF MATTER AND THERMAL PHYSICS 9

Elasticity-Hooke's law - Relationship between three modulii of elasticity (qualitative) – stress - strain diagram – Poisson's ratio –Factors affecting elasticity –Bending moment – Depression of a cantilever –Young's modulus by uniform bending- I-shaped girders Modes of heat transfer- thermal conductivity- Newton's law of cooling - Linear heat flow – Lee's disc method – Radial heat flow – Rubber tube method – conduction through compound media (series and parallel).

UNIT III QUANTUM PHYSICS 9

Black body radiation – Planck's theory (derivation) – Deduction of Wien's displacement law and Rayleigh – Jeans' Law from Planck's theory – Compton effect. Theory and experimental verification – Properties of Matter waves – G.P Thomson experiment-Schrödinger's wave equation – Time independent and time dependent equations – Physical significance of wave function – Particle in a one dimensional box - Electron microscope - Scanning electron microscope - Transmission electron microscope**.**

UNIT IV ACOUSTICS AND ULTRASONICS 9

Classification of Sound- decibel- Weber–Fechner law – Sabine's formula- derivation using growth and decay method – Absorption Coefficient and its determination –factors affecting acoustics of buildings and their remedies. Production of ultrasonics by magnetostriction and piezoelectric methods - acoustic grating -Non Destructive Testing – pulse echo system through transmission and reflection modes - A,B and C – scan displays, Medical applications – Sonogram.

UNIT V PHOTONICS AND FIBRE OPTICS 9

Spontaneous and stimulated emission- Population inversion –Einstein's A and B coefficients - derivation. Types of lasers – Nd:YAG, CO_2, Semiconductor lasers (homo junction & hetero junction)- Industrial and Medical Applications. Principle and propagation of light in optical fibres – Numerical aperture and Acceptance angle - Types of optical fibres (material, refractive index, mode) – attenuation, dispersion, bending - Fibre Optical Communication system (Block diagram) - Active and passive fibre sensors- Endoscope.