PVP SIDDHARTHA INSTITUTE OF TECHNOLOGY
KANURU ,VIJAYAWADA -520007
(AUTONOMOUS)
PVP 14 REGULATION

ENGINEERING PHYSICS

(Common to EEE, AE, ME, ECE during I B.Tech, I Sem)
(Common to CSE, IT, CE during I B.Tech, II Sem)
(COMMON FOR EE1T3,ME1T3,EC1T3,AE1T3,CE2T3,CS2T3,IT2T3)

Lecture: 3 periods/week **Internal assessment: 30 marks**
Credits:3
Tutorial: 1 period /week **Semester end examination: 70 marks**

COURSE OBJECTIVES:

To make student understand

- The concepts of Quantum Physics.
- The theoretical picture about a crystal structure .
- How to determine the different crystal structures by using X-diffraction techniques.
- The properties of different types of solids and to have the knowledge about the energy-band diagram in the materials.
- The advanced topics such as lasers,fibre optics and nano-materials.

COURSE OUTCOMES:

After completion of the course the student will be able to

CO1) Acquire the knowledge of Quantum physics having the basics about the atomic scale of the systems.
CO2) Learn crystal structure and the X-ray diffraction Techniques the student could differentiate the different types of crystals.
CO3) Get the knowledge about the different types of solids using the appropriate solids as per requirement.
CO4) Understand advanced topics about the forthcoming developments in Engineering Physics.

P.V.P.Siddhartha Institute of Technology(Autonomous), I B.Tech. syllabus under PVP14 regulations

UNIT-I
QUANTUM PHYSICS

Planck's black body theory of radiation - Debroglie hypothesis – Properties of matter waves –G.P. Thomson experiment– Davison and Germer experiment – Heisenberg uncertainity principle –Time independent & Time dependent Schrödinger wave equation – physical significance of wave function – Particle in one dimensional potential box.

UNIT-II
Crystal Structure & X-ray Diffraction:

Introduction – Space lattice – Basis - unit cell - Lattice parameters – Bravais lattices – Crystal systems – Structure and packing fraction of simple , bcc , fcc crystals. Directions and planes in crystals – miller indices –Distance between successive parallel planes- Diffraction of X rays – Bragg's law –Laue method- Powder method.

UNIT-III
PHYSICS OF SOLIDS-I

Classical free electron theory-Quantum free electron theory- Fermi Dirac distribution function-Bloch theorem- Kronig penny model(qualitative treatment)- Classification of materials .
Dielectric constant – electronic, ionic and orientation polarizations–internal fields in solids – Clausius Mossotti relation –causes of dielectric breakdown.

UNIT-IV
PHYSICS OF SOLIDS-II

Introduction – intrinsic semiconductor and carrier concentration- Fermi level in intrinsic semiconductor conductivity in intrinsic semiconductor– extrinsic semiconductor –carrier concentration- Fermi level in extrinsic semiconductor – Drift and diffusion current – Einstein's relations – Direct and Indirect band gap semiconductors.
Origin of magnetic moment – classification of magnetic materials – Hysteresis curve – soft and hard magnetic materials- applications
.

UNIT-V
ADVANCED PHYSICS

Lasers Characteristics of lasers – spontaneous and stimulated emission of radiation – population inversion – pumping – Ruby, Helium-Neon & Semiconductor lasers- Applications of lasers.
Fiber optics Principle of optical fiber – Acceptance angle and numerical aperture – Attenuation in optical fibers – applications of optical fibers.
Introduction – Surface to volume ratio- Quantum confinement effect- properties and preparation of nanomaterial – nanotubes – SWNT- MWNT- Applications of nanomaterials

.
Learning Resources

Text Books:
1. Solid state Physics by S.O.Pillai. (New Age International Publications)
2. Engineering physics by M.R.Srinivasan (New Age International Publications).

Reference Books:
1. Engineering physics by D.K.Bhattacharya and A.Bhaskaran. (Oxford Publications).
2. Engineering physics by R.K Gaur and S.L. Gupta, Dhanpat Rai Publications

e-learning resources:
http://nptel.ac.in/courses.php
http://jntuk-coeerd.in/