Prasad V. Potluri Siddhartha Institute of Technology, Kanuru, Vijayawada

PVP20

Department of Freshman Engineering

Engineering Physics

Course Code	20BS1203	**Year**	I	**Semester**	II
Course Category	Basic Science	**Branch**	ECE	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	Nil
Continuous Internal Evaluation	30	**Semester End Evaluation**	70	**Total Marks**	100

Course Outcomes

Upon successful completion of the course, the student will be able to

CO1	**Understand** the electric, magnetic, optical communication and semiconductor principles in technical aspects. **(L2)**
CO2	**Apply** the knowledge of Physics and optical Principles in optoelectronic devices. **(L3)**
CO3	**Apply** basic laws of electromagnetism and materials for engineering applications**. (L3)**
CO4	**Analyze** the theory of solids and deduce different analytical parameters. **(L4)**
CO5	**Examine** the mechanism of electromagnetic, in sensors and semiconductor devices. **(L4)**
CO6	**Ability** to understand the concepts of optical fibers, the theory of solids, laws of electromagnetism, principles of semiconductor devices and submit a report.

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1														
CO2	3												1	2
CO3	3												1	2
CO4		3											1	2
CO5		3											1	2
CO6									2	2		2	1	2

Syllabus

Unit No.	Syllabus	Mapped CO's
1	**Fiber Optics:** Introduction, advantages of optical fibers, principle and structure, acceptance angle, numerical aperture, modes of propagation, classification of fibers, fiber optic communication, fiber optic sensors (Temperature, displacement and force), applications.	CO1,CO2 CO5, CO6
2	**Dielectric and Magnetic materials** **Dielectric-materials:** Introduction, electronic polarization, dielectric polarizability, susceptibility and dielectric constant, types of polarizations (Qualitative),frequency dependence of polarization, Lorentz field (quantitative), Clausius-Mossotti equation. **Magnetic materials:** Introduction, magnetic dipole moment, magnetization, magnetic susceptibility and permeability, origin of permanent magnetic moment, classification of magnetic materials, domain theory, hysteresis, soft and hard magnetic materials.	CO1,CO3 CO4, CO6
3	**Electromagnetics:** **Electrostatic field:** Electric potential, Coulombs law and Gauss law, derivation of Coulombs law from Gauss law, applications of Gauss law (line charge, thin sheet of charge and solid charged sphere), Gauss law of	CO1,CO3 CO5, CO6

	electrostatics in dielectric medium, Poisson's and Laplace equations. **Magnetostatic field:** Bio–Savart law, Faraday's and Ampere's laws in integral and differential form, displacement current, continuity equation and Maxwell's equations (qualitatively).	
4	**Semiconductor Physics** Introduction, origin of energy band, intrinsic and extrinsic semiconductors, generation and recombination, carrier concentration in intrinsic semiconductors, variation of Fermi level with temperature in intrinsic semiconductor, n-type and p-type semiconductors, carrier concentration in n type and p type semiconductors, variation of Fermi level with temperature in extrinsic semiconductors.	CO1,CO3, CO4, CO6
5	**Semiconductor Devices** Drift and diffusion currents in semiconductors, Hall effect and its applications, p-n junction diode formation and V-I characteristics, direct and indirect band gap semiconductors, construction and working of photodiode, LED, solar cell	CO1, CO2, CO5, CO6

Learning Resources

Text Books

1. R. K. Gaur, S. L. Gupta, "Engineering Physics", Dhanpat Rai Publications, 8th Edition, 2001.
2. S. O. Pillai, Solid State Physics, New age international publishers, 7th edition (2016).

Reference Books

1. A Text Book of Engineering Physics, M.N.Avadhanulu & P.G.Kshrisagar, S.Chand Publications, fourth edition, 2014.
2. Semiconductor Devices & Physics, S.M.Sze,Wiley, 2008.
3. Applied Physics, P.K. Palanai Swamy, Sci-Tech Publications. December, 2018
4. Engineering Physics, Dr.M.Arumugam, Anuradha Publications, Second edition, 2005.
5. Introduction To Electrodynamics, David.J.Griffths, Pearson Education India Learning Private Limited, Fourth edition, 2015.

e- Resources & other digital material

1. http://physicsforidiots.com/physics/electromagnetism/
2. https://www.arcelect.com/fibercable.htm
3. http://freevideolectures.com/Course/3048/Physics-of-Materials/36
4. https://www.iitk.ac.in/mse/electronic-materials-and-devices
5. https://link.springer.com/chapter/10.1007/978-3-319-48933-9_35