

Subject Code:2SC1050301

Subject Title: Physics 301

COURSE OBJECTIVE:

Physics is a science to understand the nature. This course is designed to get basic understanding of the physical world.

LEARNING OUTCOMES:

- Develop an actual understanding of the Heat and Thermodynamics and Kinetic theory of gases.
- To know the basic concept of Special theory of Relativity.
- Understand the Crystal Structure and its application in various fields.

Teaching scheme (hours) per week		credit		Theory Marks		Practical Marks		Total
Theory	Practical	Theory	Practical	University Assessment	Cont. Assessment	University Assessment	Cont. Assessment	
3	--	3	--	70	30	--	--	100

A. Physics Theory:

Unit	Content	Lectures	Weight (%)
1	Heat and Thermodynamics: Characteristic functions, Enthalpy, The Helmholtz and Gibbs function, Two Mathematical Theorems, Maxwell's equations, The T-ds equations, Energy equation, The Thermal Expansivity, Compressibility, Joule-Kelvin effect (Porous plug Experiment), Liquefaction of Gases by Joule-Kelvin effect. Kinetic Theory of Gases: Maxwell's Distribution Law of Velocities, Deduction of Maxwell-Boltzmann law, Determination of the values of constants 'a' and 'b', Experimental Test of Maxwell's Law.	15	33
2	Optics and Sound: Distinction between Interference and diffraction, Fresnel and Fraunhofer types of diffraction, Fraunhofer diffraction at a double slit, Fraunhofer diffraction at double slit (Calculus method), Distinction between single slit and double slit diffraction pattern, Fraunhofer diffraction at N slit, Plane diffraction grating, Theory of plane transmission grating, Dispersive power of Grating Sound: Microphones, Carbon Microphone, Condenser Microphone, Loudspeaker- (i) Fixed coil or moving iron type loudspeaker and (ii) Moving coil type loudspeaker (20.8) Recording of sound: Miller Phonodisk	15	34
3	Basics of Crystal: Crystalline and Amorphous Solids, Crystal Lattice and Crystal Structure, Unit Cell and Primitive Cell, Symmetry Elements in Crystals, The Seven crystal Systems, Coordination Number, Some important crystal structure, Simple	15	33

	Cubic Structure, Body Centered Cubic Structure, Face Centered Cubic Structure, Wigner-Seitz Cells, Miller Indices, The spacing of a set of crystal planes. Theory of Relativity: Newtonian Relativity, Michelson-Morley experiment, Special theory of relativity, Lorentz Transformation, Consequences of Lorentz Transformation (a) Relativity of Simultaneity (b) the Lorentz-Fitz Gerald length Contraction (c) Time Dilation, Addition of Velocities, Mass-energy relation, Space time.		
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Basic Reference book:

1. University Physics by Sears, Zeemansky and Young. (6th Edition) Narosa Publication, New Delhi.
2. Heat Thermodynamics and Statistical Physics by Brijlal, Dr. Subrahmanyam, P.S.Hemne -S.Chand &Co..
3. Waves and Oscillations by N Subramanyam, Brijlal.
4. A Text book of Light by D.N.Vasudeva - S. Chand &Co.
5. Fundamentals of Optics by Jonkin's and White
6. Optics by Ajoy Ghatak
7. Principles of Optics by B.K. Mathur
8. Introduction to Solid State Physics By C.Kittle (John Willey)
9. Elements of Solid State Physics by J.P.Srivastava (PHI)