

Subject Code: 2SC1050101	Subject Title: Physics
Course Type: Core Course	

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 use of Mathematics in Physics.
- To know the basic concept of Electronics.
- Understand the various laws of Heat and Thermodynamics.
- To know the basic concept of Optics.

Teaching scheme (hours) per week		credit		Theory Examination		Practical Examination		Total
Theory	Practical	Theory	Practical	University Assessment	Cont. Assessment	University Assessment	Cont. Assessment	
4	4	4	2	70	30	30	20	150

A. Physics Theory:

Unit	Content	Lectures	Weight(%)
1	Vectors analysis: Triple product of vectors, Scalar triple product, Some important conclusions from scalar triple product, the vector triple product $A \times (B \times C)$, Differentiation of a vector with respect to time, Scalar and vector field, Partial Differentiation and gradient, Rate of flow of a vector field, Vector integration, Surface integral, Gauss's Divergence theorem, Stoke's theorem. Simple Harmonic Motion and Damped Vibration: Composition of two simple harmonic motion along the same direction of the same frequency, Composition of two simple harmonic motion acting upon a particle simultaneously at right angles to each other, same time period but in different in phase, Motion in a resisting medium.	15	25
2	D.C. Circuits: Simple R-L Circuit-Growth and Decay of current Helmholtz equation, R-C circuit, Measurement of high resistance by method of leakage, Comparison of capacities by De Sauty's method, Ideal L-C Circuit, Series LCR Circuit. Network Theorems: Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum power theorem.	15	25
3	Heat and Thermodynamics: Second law of thermodynamics, Carnot's Theorem, Thermodynamic Scale of Temperature, Identity of perfect Gas Scale and Absolute Scale, Thermodynamics of Refrigeration. Entropy: Entropy, Change in entropy in a reversible process, Change of entropy in an Irreversible process, Principle of increase of entropy or degradation of energy, Formulation of the second law in terms of entropy, Entropy and second law.	15	25
4	Refraction through lenses: Principle foci, list possible distance between an object and its real image in a convex lens, derivation produced by thin lens, Equivalent focal length of two thin lenses separated by a finite distance, cardinals points of an optical system, principle foci and focal planes, Principal point and principal planes, Nodal points, aberration, spherical aberrations in a lens, spherical aberrations in a lens, chromatic aberration. Interference: Interference in a thin films, interference due to reflected light, interference due to transmitted light, determination of wave length of sodium light using Newton ring, Refractive index of a liquid using Newton s Ring	15	25

Basic Reference book:

1. A textbook on Oscillations, Waves and Acoustics by M. Ghosh & D. Bhattacharya.
2. Waves and Oscillations By N. Subrahmanyam & Brij Lal
3. Electricity and Magnetism By K.K.Tiwari
4. Thermodynamics and Statistical Physics by Singhal, Agarwal and Prakash.
5. Electronic Devices & Circuits by Allen Mottershead
6. Hand book of Electronics by Gupta & Kumar

B. Physics Practical:

1. Simple pendulum
2. M.I of a Fly wheel
3. Verification of Steafan's law using A.C. Source
4. Refractive index of liquid using convex lens.
5. Study of resonator
6. P-N junction diode as half wave rectifier (without filter)
7. P-N junction diode as half wave rectifier (with series inductor filter)
8. V-I Characteristics of Zener diode.
9. Verification of Thevenin's theorem.
10. Determination of capacity 'c' of condenser.
11. Study of the series resonance with frequency variation.
12. Characteristics of common Emitter Transistor