UNIVERSITY OF MADRAS

B.Sc. DEGREE PROGRAMME IN COMPUTER SCIENCE

SYLLABUS WITH EFFECT FROM 2023-2024

Year: I **Semester: I**

Elective: Physics-I (Theory) (Common to B.Sc. CS with AI)	**125E1C**
Lecture Hours: 3 per week	**Credits: 2**

Learning Objectives: (for teachers: what they have to do in the class/lab/field)

This paper introduces the students to the basic concepts of Elasticity, Rotational motion, Heat and thermodynamics, Sound, Optics, Atomic and Nuclear Physics

Course Outcomes: (for students: To know what they are going to learn)

1. Explore the fundamental concepts of physics
2. Import knowledge about the importance of material properties, heat, sound, optics, atomic and nuclear physics.
3. Understand the energy involved in nuclear reaction
4. Carry out the practical by applying these concepts
5. Get depth knowledge of physics in day today life

Units	Contents
I	Properties of Matter Young's modulus – Rigidity modulus – Bulk modulus – Poisson's ratio (definition alone) – Bending of beams – Expression for Bending Moment – Determination of Young's Modulus – Uniform and Non-Uniform bending. Expression for Couple per unit twist – Work done in twisting a wire – Torsional oscillations of a body– Rigidity modulus of a wire and M.I. of a disc by Torsion Pendulum.
II	Viscosity Viscosity – Viscous force – Co-efficient of Viscosity – Units and Dimensions – Poiseuille's formula for co-efficient of viscosity of a liquid – determination of co-efficient of viscosity using burette and comparison of Viscosities - Bernoulli's theorem – Statement and proof – Venturi meter – Pitot tube.
III	Conduction, Convection and Radiation Specific heat Capacity of Solids and Liquids – Dulong and Petit's law – Newton's law of Cooling – Specific Heat Capacity of a Liquid by Cooling – Thermal Conduction –Coefficient of Thermal Conductivity by Lee's disc Method. Convention Process – Lapse Rate – Green House Effect – Black Body Radiation – Planck's Radiation Law – Rayleigh Jean's Law, Wien's Displacement Law – Stefan's Law of Radiation. (No Derivations).
IV	Thermodynamics Zeroth and I Law of Thermodynamics – II law of Thermodynamics – Carnot's engine and Carnot's cycle – Efficiency of a Carnot's Engine – Entropy – Change in Entropy in Reversible and Irreversible Process – Change in entropy of a perfect gas – Change in Entropy when Ice is converted into steam.

V	Optics Interference – Conditions for Interference Maxima and Minima – Air Wedge – Thickness of A Thin Wire – Newton's Rings – Determination of Wavelength Using Newton's Rings. Diffraction – Difference Between Diffraction and Interference – Theory of Transmission Grating – Normal Incidence – Optical Activity – Biot's Laws – Specific Rotatory Power – Determination of Specific Rotatory Power Using Laurent's Half Shade Polarimeter.

TEXT BOOKS:
BOOKS FOR STUDY:

1. Properties of matter, Brijlal and Subramanyam, Eurasia Publishing co., New Delhi, III Edition 1983
2. Element of properties of matter, D.S.Mathur, S.Chand& Company Ltd, New Delhi, 10th Edition 1976
3. Heat and Thermodynamics, Brijlal&Subramanyam, S.Chand& Co, 16th Edition 2005
4. Heat and Thermodynamics, D.S. Mathur, Sultan Chand& Sons, 5th Edition 2014.
5. Optics and Spectroscopy, R.Murugeshan, S.Chand and co., New Delhi, 6th Edition 2008.
6. A text book of Optics, Subramanyam and Brijlal, S. Chand and co., New Delhi, 22nd Edition 2004.
7. Optics, Sathya Prakash, Ratan PrakashanMandhir, New Delhi, VII Edition 1990.