

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE PROGRAMME IN COMPUTER SCIENCE**  
 SYLLABUS WITH EFFECT FROM 2023-2024

**Year: II**

**Semester: III**

<b>Elective: Physics-I (Theory)</b> (Common to B.Sc. CS with AI & Software Applications)	<b>225E3C</b>
<b>Lecture Hours: 3 per week</b>	<b>Credits: 2</b>
<p>Learning Objectives: (for teachers: what they have to do in the class/lab/field)</p> <p>This paper introduces the students to the basic concepts of Elasticity, Rotational motion, Heat and thermodynamics, Sound, Optics, Atomic and Nuclear Physics</p>	
<p>Course Outcomes: (for students: To know what they are going to learn)</p> <ol style="list-style-type: none"> <li>1. Explore the fundamental concepts of physics</li> <li>2. Import knowledge about the importance of material properties, heat, sound, optics, atomic and nuclear physics.</li> <li>3. Understand the energy involved in nuclear reaction</li> <li>4. Carry out the practical by applying these concepts</li> <li>5. Get depth knowledge of physics in day today life</li> </ol>	

Units	Contents
<b>I</b>	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.
<b>II</b>	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.
<b>III</b>	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. Convection 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).
<b>IV</b>	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.

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<b>V</b>	<p>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.</p>
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**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.Murugesan, 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.