



(Integrated Bachelor-Masters Programme)  
**IBMP (B Sc.- M Sc. Physics) Semester - I**

Course Code	IS01CPHY51	Title of the Course	Foundations in Physics-I
Total Credits of the Course	02	Hours per Week	02

Course Objectives:	1. To provide training in the basic foundations of Physics with a wider scope of applications in multidisciplinary fields. During this first semester the fundamentals of the thermodynamic properties and elastic properties of matter are introduced.

Course Content		
Unit	Description	Weightage* (%)
1.	<p><b>ELEMENTS OF THERMODYNAMICS</b>            Concept Of Temperature, Heat in Thermodynamics, Comparison of Heat and Work; Internal Energy, First Law of Thermodynamics, Applications of the First Law, Heat Engine, The Carnot Cycle, Heat Pump Second Law of Thermodynamics, Entropy, Third Law of Thermodynamics.</p> <p><b>THERMOELECTRICITY</b>            Seebeck Effect, Thermocouple, Thermoelectric Series, Variation of Thermoelectric E.M.F. with Temperature, The Peltier Effect, The Thomson Effect, Thermoelectric Power, Relation Between Thomson Coefficient and Thermoelectric Power, The Thermoelectric Laws, Thermoelectric Cooling.</p>	50%
2.	<p><b>Basic Elastic Properties of Matter:</b> Introductory Stress and Strain, Types of Elasticity, Work done per Unit Volume in a Strain, Deformation of a Cube Bulk Modulus Modulus of Rigidity, Young's Modulus Relation connecting the Elastic Constants, Poisson's Ratio, Determination of Young's Modulus Determination of Poisson's Ratio for Rubber, Twisting Couple on a Cylinder (or wire) Variation of stress in a twisted cylinder (or wire) strain energy in a twisted cylinder (or wire), Torsional Pendulum, Determination of the Coefficient of Rigidity (<math>\eta</math>) for a Wire.</p> <p><b>Applications of the Elastic Properties:</b> The Cantilever, different Loaded conditions.</p>	50%

Teaching-Learning Methodology	Direct Teaching through Chalk- and Black board ICT enabled teaching Question-Answer and Problem solving Laboratory assisted learning
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Get the basic understanding of the fundamental principles of thermodynamics, its consequences towards analyzing various thermal phenomena.
2.	Learn the elastic properties of matter with specific applications of various materials under stress.
3.	Apply the foundational course on thermodynamics and elastic properties of matter in understanding and analyzing various phenomena associated with thermal cooling, thermo electricity and deciding the load bearing strength of cantilevers.
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Suggested References:	
Sr. No.	References
1.	A TEXTBOOK OF ENGINEERING PHYSICS Dr. M.N. Avadhanulu and Dr. P.G. Kshirsagar ( Revised Ed. 2014) S. CHAND & COMPANY PVT. LTD, NEW DELHI-110 055 Elements of Properties of Matter D.S. Mathur S. Chand & Co., New Delhi (2006)
2.	Elements of Properties of Matter by D.S. Mathur, S. Chand & Co., New Delhi (2006)
2.	Heat, Thermodynamics and Statistical Physics (Rev. Ed 2012, Reprint 2014) by Brijlal, Dr. N. Subrahmanyam, and P S Hemne, S. Chand & Co. Pvt. Ltd, New Delhi (2003)
3	Thermodynamics and Statistical Mechanics by Greiner, Neise and Stocker, Springer Int. Ed. First Indian Reprint 2007.





On-line resources to be used if available as reference material

On-line Resources

<http://www.chem.umd.edu/thermobook>

<http://www.freebookcentre.net> › Physics › ThermoDyn..

Elasticity – The Physics Hypertextbook

<https://physics.info> › elasticity

The elastic properties of matter | SpringerLink

<https://link.springer.com> › chapter

Elasticity in Physics | Definition, Types – Elasticity – Learn Cram

<https://www.learn cram.com> › physics › elasticity

<https://www.tcd.ie> › current › [Lecture 2.14.pdf](#)

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