

**BS103: PHYSICS
CREDITS - 4 (LTP:3,0,1)**

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)			Credits	Marks Distribution				Total Marks
L	T	P		Theory Marks		Practical Marks		
			ESE	CE	ESE	CE		
3	0	2	4	60	40	20	30	150

Course Contents:

Unit No	Topics	Teaching Hours
1.	Properties of Matter Concept of Load, Stress and Strain , Hook's Law, Stress-Strain Diagram, Ductility, Brittleness and Plasticity ,Elastic behavior of solids ,Working stress and factor of safety ,Factors affecting elasticity ,Types of Elasticity Twisting couple on a cylinder or wire-shaft, Torsional Pendulum, Cantilever-Depression of Cantilever, Young's modulus by Cantilever ,I-shape Griders ,Viscosity and comparison of viscosities	8
2.	Waves, Motion and Acoustics Simple Harmonic motion, Free, forced, resonance, damped and undamped vibration , Damped harmonic motion , Force vibration and amplitude resonance, Velocity resonance and energy intake , Wave motion, transverse and longitudinal vibration , Sound absorption and reverberation, Sabine's formula and usage (excluding derivation) Acoustic of building	10
3.	Ultrasonic and Non destructive testing (NDT) Ultrasonic waves, Properties of ultrasound, Production of ultrasonic waves, Piezoelectric and magnetostriction method, Detection of ultrasound, Application of ultrasound, Introduction of NDT ,Advantages of NDT,NDT through ultrasound	8
4.	Optics Introduction, Huygen's Principle, Superposition of waves and interference of light by wavefront splitting and amplitude splitting, Young's Double slit experiment, Newton's ring, Michelson's Interferometer, Farunhofer diffraction from a single slit and a circular aperture, Rayleigh criterion for limit of resolution and its application to vision, Diffraction grating and their resolving power.	8
5.	Lasers Properties of Laser, Einstein's theory of matter radiation : A and B coefficients, Amplification of light by population inversion, Different types of lasers, gas lasers (He-Ne) solid-state lasers(ruby), Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, laser speckles, Applications of lasers in science, engineering and medicine.	8
Total		42

List of References :

1. Dattu R Joshi, “*Engineering Physics*”, McGraw hill Publications
2. Shatendra Sharma & Jyotsan Sharma, “*Engineering Physics*” Pearson Publication
3. Barry J Goodno, James M. Gere, “*Mechanics of Materials*”, SI Edition, 9th Edition, Published: 2018
Print ISBN: 9781337093354
4. A Ghatak, “*Optics*”, McGraw Hill Education

Suggested Practical List

1. Introduction to Lab
2. Error Analysis in Physical Measurements
3. Optical Fiber for measurement of Numerical Aperture and Acceptance Angle
4. Least Square Fitting.
5. Diffraction and interference experiments (from ordinary light or laser pointers); measurement of speed of light on a table top modulation; minimum deviation from a prism.
6. Measurement of the Distance using Ultrasonic Sensors.
7. Study of Object Detection using Ultrasonic Sensors.
8. Melde’s Experiment Transverse and Longitudinal Modes
9. To determine the frequency of given laser source.
10. Frequency of AC Supply-Sonometer method
11. Wavelength of Light -Diffraction Grating Using LASER
12. Acoustic grating method set up for measurement of velocity of ultrasonic waves in liquid
13. Melde’s experiment
10. Resonator
11. Study of Damped Simple Harmonic Motion
12. Newton’s rings, Determination of using sodium light.
13. Calibration of Spectrometer & determination of unknown wavelength
14. Dispersive curve of a prism
15. Study of Fabry-Perot Etalon
16. Study of Lloyd’s Mirror
17. Study of Double Refraction in Calcite Prism

Course Outcome:

At the end of this course, students will be able to:

1. Understand the basic fundamental properties of matter.
2. Understand and apply the knowledge of waves, motion and acoustic in engineering.
3. Understand the basic of ultrasonic and its applications.
4. Understand the fundamentals of optics.
5. Understand the working principle of laser components and working of different lasers with applications