



Sr. No	Topic	Total Hours	Weightage (%)
1	Introduction: 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, Viscosity and comparison of viscosities	08	20
2	Simple Harmonic motion: Free, forced, resonance, damped and un-damped vibration, damped harmonic motion, Force vibration and amplitude resonance, Velocity resonance and energy intake, Wave motion, transverse and longitudinal vibration	07	20
3	Acoustic Ultrasonic Acoustic: Introduction, Classification and Characteristics of sound, Sabine's formula for reverberation (Without Derivations), Introduction of Absorption co-efficient Sound absorbing materials, Factors affecting the acoustics of building and their remedies Ultrasonic: Properties of ultrasound, Generation of ultrasound by (1) piezoelectric method and (2) magnetostriction method, Methods for Ultrasound Velocity measurement Applications of ultrasound: Industry, Medicine Introduction of NDT Advantages of NDT, NDT through ultrasound.	06	15
4	Super Conductivity: Superconductivity, General Properties of superconductors, Types of Superconductors, Applications: Magnets, Josephson effect, SQUID, Maglev, other	06	15

5	Modern Physics: Introduction, Characteristics of laser radiation, Introduction to LASER: Einstein's theory, Properties of LASER. Population inversion and pumping. Production of LASER: Nd-YAG laser, CO2 laser. Applications of LASER, Fiber Optics: Introduction and principle of Optical Fiber, Advantages of Optical Fiber, Total Internal Reflection, Numerical Aperture and Acceptance angle, Modes of Propagation, Types of Optical Fiber, Applications of optical fiber	07	20
6	NANO Material: Nanoscale, Surface to volume ratio and Surface effects on Nanomaterials, Electron confinement, Nanomaterials and Nanotechnology, properties and Applications of Nanomaterials, Advantages and Disadvantages of Nanomaterials, Synthesis of Nanomaterials, Engineering Materials: Shape Memory Alloys: Introduction, Synthesis, Properties and Applications Metallic Glasses: Introduction, Synthesis, Properties and Applications Energy Materials: Solar cells, Fuel cells (H ₂ O ₂ , Lithium cell), Ultra-capacitors	06	20

Text Books:

1. G Vijayakumari Engineering Physics, 7th & 2nd edition Vikas-Publication
2. Engineering Physics by V. Rajendran: Tata McGraw-Hill Education

Reference Books:

3. Sears and Zemansky University Physics Pearson Publication
4. Fundamental of Physics – Halliday, Resnick & Walker; John Wiley & Sons, Inc.
5. Concepts of modern physics by Arthur Beiser
6. Engineering Physics by V. Rajendran: Tata McGraw-Hill Education.
7. University Physics with Modern Physics by Young, Freedman & Lewis Ford
8. Engineering Physics - Gaur R.K. and Gupta S.L

List of Open-Source Software/learning website:

1. <http://www.howstuffworks.com/> -- Tech stuff
2. <http://www.sciencefairadventure.com/>
3. <https://www.bragitoff.com/>
4. <https://vlab.amrita.edu/>
5. <http://vlabs.iitb.ac.in/vlab/labsps.html>
6. <https://www.vlab.co.in/broad-area-physical-sciences>

Lab/Practical:

1. Characteristics of P-N Junction Diode
2. Characteristics of Zener Diode
3. Characteristics of Light Emitting Diode
4. Optical Fiber Communication using analog link
5. Numerical Aperture of Various Optical Fiber Cable
6. Study the temperature dependence of resistance of a semiconductor by four probe method
7. To find Ultrasonic velocity in given liquid medium by ultrasonic interferometer
8. To Determine Hall Co-efficient & Mobility of Semiconductor by Hall Effect.
9. Characteristics of a solar cell.
10. To determine the young's modulus of elasticity of the material of a sample beam by bending.
11. Hysteresis Loop of a Magnetic Material
12. Determine dielectric constant of Solid Materials.
13. Determine the wavelength of the laser light by diffraction grating method

Course Learning Outcomes (CLO): On completion of this course, the students will be able to

Course Outcomes	Description	Bloom's Taxonomy Level
CLO1	Learn to apply concepts of Parameter of Material in Civil and Mechanical Engineering	Understanding (2) Evaluate (5)
CLO2	To learn the idea of oscillation motion	Understanding (2) Applying (3) Analyze (4)
CLO3	Learn the idea of superconductivity and importance in advancement of technologies.	Understanding (2) Applying (3)
CLO4	Describe the laser systems and their applications and identify the applications of lasers and photonics	Applying (3) Understanding (2)
CLO5	Learn and apply concepts of nano systems.	Remembering (1) Understanding (2)
CLO6	Learn the concepts related to different properties of the Advance materials used in manufacturing.	Understanding (2) Applying (3)

Mapping of CLO with PO and PSO:

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	L	M		M	L	L										
CLO2	H	M	H	L	M	M	L									
CLO3	M	L				L	L									
CLO4	H	L	M		M	H										
CLO5			H	M			H									
CLO6	M	M	L	H	L	H										

H: High, M: Medium, L: Low