



Program	BACHELOR OF TECHNOLOGY (B.Tech)	Semester - 2
Type of Course	Basic Science Course	
Prerequisite		
Rationale	-	
Effective From A.Y.	2025-26	

Teaching Scheme (Contact Hours)				Examination Scheme				
Lecture	Tutorial	Lab	Credit	Theory Marks		Practical Marks		Total Marks
				SEE TH	IAT	SEE P	CCE	
3	-	2	4	70	30	50	50	200

SEE - Semester End Examination, IAT - Internal Assessment Test, CCE - Continues & Comprehensive Evaluation

Course Content		T - Teaching Hours W - Weightage	
Sr.	Topics	T	W
1	Waves and Oscillation Oscillations : Simple Harmonic Motion, - its expression and differential equation, Damped Oscillation – differential equation and its solution, critical damping, Forced Vibration – differential equation, Amplitude and velocity resonance, Numerical problems. Ultrasonic waves: Production of ultrasonic waves (Piezoelectric and magnetostriction method), application of Ultrasonic waves	9	20
2	Acoustics Basic of sound waves: Velocity, frequency, wavelength, intensity, loudness, timber of sound. Sabine's formula, Reverberation, Reverberation time, Remedies over reverberation, absorption of sound, absorbent materials, Factor affecting on Good acoustic, Criteria for good acoustics of a building, Numerical problems.	4	10
3	Laser Characteristic properties of a LASER beam, Interaction of Radiation with Matter, Einstein's A and B Coefficients and Expression for Energy Density (Derivation), Main Component of Laser, Laser Action, Population Inversion, Metastable State, Types of Laser, Nd: YAG Laser, He-Ne Laser, Application of Laser, Numerical problems.	8	20
4	Elastic Properties of Solid Hook's Law, Stress-Strain Curve, Stress hardening and softening. Elastic Moduli, Poisson's ratio, Relation between Y , n and σ ; (with derivation), Mention relation between K , Y and σ ; limiting values of Poisson's ratio. Beams, Bending moment and derivation of expression, Cantilever and I section girder and their Engineering Applications, Elastic materials (qualitative). Failures of engineering materials-Ductile fracture, Brittle fracture, Stress concentration, Fatigue and factors affecting fatigue (only qualitative explanation), Numerical problems.	10	20
5	Crystallography	8	20



Course Content		T - Teaching Hours W - Weightage	
Sr.	Topics	T	W
	Crystalline and amorphous solids, Lattice and unit cell, Seven crystal system and Bravais lattices, Symmetry operation, Miller indices, Atomic radius, Coordination number, Packing factor calculation for SC, BCC, FCC, Bragg's law of X-ray diffraction, Laue Method, Powder crystal method, Numerical problems		
6	Advanced Engineering Materials Shape Memory Alloy : Introduction, synthesis, Properties and Application Metallic Glasses : Introduction, synthesis, Properties and Application Nanotechnology : Introduction, Length scale in physics, Quantum size effect (quantum dot, wire and well) Bio-Materials : Introduction, Properties and Application Energy Materials : Types of Solar cells, p-n Junction Solar cells – Principle, Construction, working, efficiency, Application, Advantage and Disadvantage	6	10
Total		45	100

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application
Weightage	30	40	30

NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes

At the end of this course, students will be able to:	
C01	Analyse the concepts of oscillations and waves.
C02	Develop the fundamental concept of Acoustics
C03	Develop the fundamental concept of LASERS and their relevant applications.
C04	Extend the basics of Elastic properties of solids.
C05	Outline the fundamental overview of crystallography
C06	Develop the basic fundamental of advanced engineering material



CO PO Mapping

CO	CO - 1	CO - 2	CO - 3	CO - 4	CO - 5	CO - 6
PO - 1	1	1	1	1	1	1
PO - 2	1	1	1	1	1	1
PO - 3						
PO - 4						
PO - 5	1	1	1	1	1	1
PO - 6						
PO - 7						
PO - 8	1	1	1	1	1	1
PO - 9						
PO - 10					1	1
PO - 11	1	1	1	1	1	1

List of Practical

1.	Determine the wavelength of laser using diffraction grating
2.	Determine the divergence of laser
3.	To study the characteristics of Zener diode
4.	To study the characteristics of P-N Junction diode
5.	To study the characteristics of LED diode
6.	Study of the voltage and current of solar cells also study the voltage and current of the Solar cell in series and parallel
7.	Determine the Young modulus of the Elasticity of material by bending
8.	Velocity measurement of Ultrasonic wave in given sample (liquid) using Ultrasonic Interferometer
9.	To determine the moment of inertia of a flywheel about its own axis of rotation