APPLIED PHYSICS

Course Code	20BS1205	Year	I	Semester	II
Course Category	Basic Science	Branch	ME	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Nil
Continuous Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

Course Outcomes: Upon successful completion of the course, the student will be able to

CO	Statement	Skill	BTL	Units
CO1	**Understand** the principles of Mechanics, Thermal, Optical and Acoustics in technical aspects.	Understand	L2	1,2,3,4,5
CO2	**Apply** the basic laws of Heat, Sound and mechanics for engineering applications**.**	Apply	L3	1,3,4
CO3	**Identify** the principles of forces and energy in mechanical system	Apply	L3	2,5
CO4	**Analyze** the mechanism of waves, thermal, accoustics and deduce different analytical parameters	Analyze	L4	1,3,4
CO5	**Examine** the different mechanical properties and their applications	Analyze	L4	2,5
CO6	**Study** the principles of Mechanics, Thermal energy, Acoustics, sensors and make a report	Apply	L3	1,2,3,4,5

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3: High, 2: Medium, 1: Low)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1														
CO2	3												3	2
CO3	3												3	2
CO4		3											3	2
CO5		3											3	2
CO6									2	2		2	3	2

Syllabus

UNIT	Contents	Mapped COs
I	**Mechanics** :Basic laws of vectors and scalars, Resolution of vectors, parallelogram law of vectors; Conservative and non-conservative forces; F = - grad V; Inertial & Non-inertial frames of reference **Wave mechanics:** wave, Characteristics of waves, Simple harmonic oscillator; Damped harmonic motion; Forced oscillations and resonance. Degrees of freedom.	CO1 CO2 CO4
II	**Elasticity:** Concepts of elasticity and plasticity, stress and strain, Hooke's law, different moduli of elasticity, Poisson's ratio, strain energy, stress-strain diagram, elastic behavior of a material, factors affecting elasticity.	CO1 CO3 CO5

III	**Thermal Properties**: Thermal expansion of solids and liquids; Thermal conduction, convection and radiation and their fundamental laws; Heat conductions in solids; Thermal conductivity - Forbe's and Lee's disc method: theory and experiment; Applications (qualitative only): heat exchangers, ovens and solar water heaters.	**CO1 CO2 CO4**
IV	**Acoustics:** Characteristics of sound waves; Weber-Fechner Law; Absorption coefficient, determination of absorption coefficient; Reverberation time; Sabine's formula, Intensity of sound; Acoustics of Buildings, Acoustic requirements of a good auditorium.	**CO1 CO2 CO4**
V	**Sensors:** Sensors (qualitative description only); Different types of sensors and applications; working and applications of Strain and pressure sensors magnetostrictive sensors, Fibre optic methods of pressure sensing; Temperature sensor - bimetallic strip, Hall-effect sensor	**CO1 CO3 CO5**

Learning Resources
Text Books
1. D. Kleppner and Robert Kolenkow "An Introduction to Mechanics– II" Cambridge University Press, 2015 2. M.N.Avadhanulu & P.G.Kshirsagar" A Text book of Engineering Physics"-S.Chand Publications,2017 3. Ian R Sinclair, Sensor and Transducers 3rd edition, 2001, Elsevier (Newnes)
Reference Books
1. M KVarma "Introduction to Mechanics" Universities Press,2015 2. Prithwiraj Purkait, Budhaditya Biswas and Chiranjib Koley, Chapter 11, Sensors and Transducers, Electrical and Electronics Measurements and Instrumentation, First edition., Mc-Graw Hill Education (India) Private Limited, 2013
e- Resources & other digital material
1. http://physicsforidiots.com/physics/electromagnetism/ 2. https://www.arcelect.com/fibercable.htm 3. http://freevideolectures.com/Course/3048/Physics-of-Materials/36 4. https://www.iitk.ac.in/mse/electronic-materials-and-devices 5. https://link.springer.com/chapter/10.1007/978-3-319-48933-9_35