

PH25101	PHYSICS FOR MECHANICAL ENGINEERING (I Year B.E. MECH Engineering)	L	T	P	C
		3	0	0	3
COURSEOBJECTIVES:					
<ul style="list-style-type: none">To understand the fundamental principles of mechanics.To gain knowledge on the mechanical effect of force.To demonstrate the concept of static equilibrium on particles.To outline the importance of quantum mechanics.To explain the working of laser & its application					
UNIT I	FUNDAMENTAL MECHANICS				9
Introduction – statics and dynamics – the centre of mass of a system of particles – kinetic energy of a system of particles – Theorems of the moment of inertia – moment of inertia of diatomic molecule – rotational energy levels.					
UNIT II	EFFECT OF FORCE				9
Introduction to Newtonian mechanics – Newton’s law - Vector representation of Force - Parallelogram law for Addition of Forces – Lami’s theorem - Triangular law of forces – Dot product & cross Product - classification of the system of forces – Problems on forces using vector representations.					
UNIT III	STATICS OF PARTICLES				9
Forces on a particle - resolution of a force- Resultant of several concurrent forces: Equilibrium of a particle - forces in space - equilibrium of a particle in space.					
UNIT IV	QUANTUM MECHANICS				9
Black body radiation (Qualitative) – Planck’s hypothesis - Matter waves – de Broglie hypothesis - Electron microscope – Uncertainty Principle – The Schrodinger Wave equation (time-independent and time-dependent) – Physical significance of wave function - Degenerate energy states - Barrier penetration and quantum tunneling - Tunneling microscope.					
UNIT V	LASERS				9
Laser – characteristics – spontaneous and stimulated emission - population – inversion - Metastable states - CO ₂ laser, Semiconductor laser - Industrial and medical applications - Optical Fibers – Total internal reflection – Numerical aperture and acceptance angle – Fiber optic communication.					
TOTAL: 45 PERIODS					
COURSE OUTCOMES:					

At the end of the course, learners will be able to

CO1: Understand the fundamental principles behind the mechanics

CO2: Infer the basic mechanical principle to understand the forces on particles

CO3: Solve basic problems on particles using the concept of static equilibrium

CO4 Demonstrate the importance of quantum physics.

CO5: Know the basics of optics, lasers and its applications.

TEXT BOOKS:

1. R. K. Gaur, S. L. Gupta, "Engineering Physics", 8th Edition, Dhanpat Rai Publication, New Delhi.
2. Beer, F.P and Johnston Jr. E.R., "Vector Mechanics for Engineers (In SI Units): Statics and Dynamics", Eighth Edition, Tata McGraw-Hill Publishing company, New Delhi (2004)
3. Meriam J.L and Kraig L.G, 'Engineering Mechanics-Statics and Dynamics', 9th Edition, John Wiley & sons, 2021.
4. Vela Murali, "Engineering Mechanics", 3rd Edition, Oxford University Press, 2017.

REFERENCES:

1. Hibbler, R.C and Ashok Gupta, "Engineering Mechanics: Statics and Dynamics", 11th Edition, Pearson Education, 2010.
2. Irving H. Shames and Krishna Mohana Rao. G., "Engineering Mechanics – Statics and Dynamics", 4th Edition, Pearson Education, 2006.
3. Rajasekaran S and Sankarasubramanian G., "Engineering Mechanics Statics and Dynamics", 3rd Edition, Vikas Publishing House Pvt. Ltd., 2005.

CO-PO-PSO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2	1	-	-	-	-	-	-	1	-	-	1	1
CO2	2	1	-	-	-	-	-	-	1	-	-	1	1
CO3	2	1	-	-	-	-	-	-	1	-	-	1	1
CO4	2	1	-	-	-	-	-	-	1	-	-	1	1
CO5	2	1	-	-	-	-	-	-	1	-	-	1	1
Course Contribution	2	1	-	-	-	-	-	-	1		-	1	1

