DEPARTMENT OF PHYSICS

R.V. COLLEGE OF ENGINEERING

(An autonomous institution affiliated to VTU, Belagavi)
Mysore, Bangalore-560059

***Course Title*: Classical Physics (ME Stream)**	***Course Code*: 22PHY12B**
***Total Contact Hours*: 42**	***Credits: 04***
***SEE Marks*: 100**	***CIE Marks*:150**
Semester:* *ODD	***Academic Year:2022-2023***
***Lesson Plan Author*: Dr.Avadhani D N**	***Date*: 06.12.2022**

Week	Day/ Hour	Unit (Hour)	Main topic	Sub topic	COs
I	1	I(1)	**Free, Damped and Forced Vibration:**	Introduction to oscillations, types of oscillations with examples. Importance of study	1
	2	I(2)		Simple Harmonic Motion, spring mass system, series and parallel combination (derivation)	1,2
	3	I(3)	**Theory of damped oscillations**	Theory of damped oscillation, expression for displacement.	1,2
	4	I(T)		PROBLEM SOLVING	1,2,3
II	5	I(4)		Types of damped oscillations with examples, Graphical representations of damped harmonic oscillator.	1,2
	6	I(5)		Forced oscillations, Setting up differential equation. Expression for amplitude and Phase.	1,2
	7	I(6)		Discussion of amplitude and phase, for different driving frequencies. Sharpness of resonance.	1,2
	8	I(T)		PROBLEM SOLVING	1,3

III	9	II(7)	**Elastic Properties of Materials:**	Introduction to Elasticity: Stress, strain definition, stress strain curve, behaviour of elastic material.	1
	10	II(8)		Definition of modulus of elasticity.Derivation of equivalence relations for stress and strain.	1,2
	11	II(9)		Empirical relations between elastic constants and limiting values of Poisson's ratio.	1,2
	12	II(T)		PROBLEM SOLVING	1,2,3
IV	13	II(10)		PROBLEM SOLVING	1,2
	14	II(11)		Bending of beam expression. Neutral axis and neutral surface.	1,2
	15	II(12)		Derivation of Bending moment for rectangular beam. Flexural rigidity.	1,2
	16	II(T)		PROBLEM SOLVING	1,2,3
V	17	II(13)		Derivation for expression for depression for a single cantilever of rectangular cross section.	1,2
	18	II (14)	**Torsion of a Shaft**	Torsion of a cylinder, expression for torsional rigidity.	1,2
	19	II(15)		Torsion pendulum, expression for time period and rigidity modulus.	1,2
	20	II(T)		PROBLEM SOLVING	1,2,3
VI	21	III(16)	**Fundamentals of Thermodynamics:**	Introduction to Thermodynamics	1
	22	III(17)		Quasi static process. Zeroth law of thermodynamics.	1,2
	23	III(18)		Thermometry- Liquid, gas and resistance thermometers	1,2
	24	III(T)		PROBLEM SOLVING	1,2,3
VII	25	III(19)		Joule's experiment (equivalence between heat and work)	1,2
	26	III(20)		First law of Thermodynamics,	1,2

	27	III(21)		Work done in i) quasi static, ii)Isothermal, iii) cyclic process.	1,2
	28	III(T)		PROBLEM SOLVING	1,3
VIII	29	III(22)		Application of first law of thermodynamics for closed and open system.	1,2
	30	III(23)		Steady state system with examples.	1,2
	31	III(24)		Brief review of second law of thermodynamics.	1,2
	32	III(T)		PROBLEM SOLVING	1,2,3
IX	33	IV(25)		Introduction to Fluid Mechanics: Definition of Fluid, concept of continuum, classification of fluids	1,2
	34	IV(26)		Introduction to fluid properties – density, specific gravity, specific weight, relative density.	1,2,
	35	IV(27)		Newton's Law of viscosity, absolute Kinematic viscosity.	1,2
	36	IV(T)		PROBLEM SOLVING	1,2,3
X	37	IV(28)		Non-Newtonian fluid, No slip condition, Vapour pressure and cavitation.Bulk Modulus and Compressibility.	1,2
	38	IV(29)		Ultrasonic interferometer, calculation of velocity of sound, bulk modulus and incompressibility of liquid.	1,2
	39	IV(30)		Surface tension and capillarity. Derivation for capillary rise.	1,2
	40	IV(T)		PROBLEM SOLVING	1,2,3
XI	41	IV(31)	**Fundamentals of Fluid Flows:**	Types of Fluid Flows, Stream line, Streak line and Path line	1,2
	42	IV(32)		Continuity Equation in Integral form and three-dimension Cartesian coordinates	1,2
	43	IV(33)		Explore: Engineering applications of fluid mechanics.	1,2
	44	IV(T)		PROBLEM SOLVING	1,2,3
XII	45	V(34)	**Material Characterization**	Introduction to material characterization, types of characterization (destructive and	1

				non-destructive testing), Mechanical characterization	
	46	V(35)		Tensile test, explanation using various graphs.	1,2
	47	V(36)		Hardness test, types of hardness test, Rockwell hardness test for Steel, Magnetic particle testing.	1,2
	48	V(T)		PROBLEM SOLVING	1,2,3
XIII	49	V(37)		Optical Characterisation, current-Voltage (IV) characterisation, Surface characterisation (Roughness & Crystallinity)	1
	50	V(38)	**Instrumentation Techniques**	Introduction to X ray, X ray diffraction, Principle, construction and working of X-rayDiffract meter	1,2
	51	V(39)		Discussion on crystallite size determination by Scherrer equation	1,2
	52	V(T)		PROBLEM SOLVING	1,2,3
XIV	53	V(40)		Principle, construction, working and applications of Atomic Force Microscopy (AFM) and X-ray photoelectron spectroscopy (XPS).	1,2
	54	V(41)		Principle, construction, working and applications ofScanning Electron Microscopy (SEM)	1,2
	55	V(42)		Principle, construction, working and applications ofTransmission Electron Microscopy (TEM).	1,2
	56	V(T)		PROBLEM SOLVING	1,2,3

Sudha Kamath, HoD Physics.