LESSON PLAN FOR ENGINEERING PHYSICS (Th-2a)

Discipline: CSE,CE,MI	**Semester:** 2nd Semester (2023 A.B)		**Name of teaching faculty:** Sushree Sangita Satapathy
Subject: Engineering Physics	**No. of days/ Per week class allotted:** 4		Date of commencement: 06/02/2024 To: 04/05/2024
Week	**Class day**	**Unit**	**Theory topics**
1	1	1	Physical quantities - (Definition).Definition of fundamental and derived units. Systems of units (FPS, CGS, MKS and SI units)
	2		Definition of dimension. Dimensional formulae of physical quantities, Dimensional equations.
	3		Application of dimensional analysis, Principle of homogeneity. Checking the dimensional correctness of Physical relations
	4	2	Scalar and Vector quantities (definition and concept), Representation of a vector – examples, types of vectors
2	1		Triangle and Parallelogram law of vector Addition (Statement only). Simple Numerical
	2		Resolution of Vectors – Simple Numerical on Horizontal and Vertical components
	3		Vector multiplication (scalar product and vector product of vectors)
	4	3	Concept of Rest and Motion. Displacement, Speed, Velocity, Acceleration & Force (Definition, formula, dimension & SI units).
3	1		Equations of Motion under Gravity (upward and downward motion). Circular motion: Angular displacement
	2		Angular velocity and Angular acceleration (definition, formula & SI units). Relation between – (i) Linear & Angular velocity, (ii) Linear & Angular acceleration)
	3		Define Projectile, Examples of Projectile. Expression for Equation of Trajectory
	4		Time of Flight, Maximum Height and Horizontal Range for a projectile fired at an angle, Condition for maximum Horizontal Range
4	1	4	Work – Definition, Formula & SI units, Friction – Definition & Concept
	2		Types of friction (static, dynamic), Limiting Friction (Definition with Concept).
	3		Laws of Limiting Friction, Coefficient of Friction – Definition & Formula
	4		Numerical on coefficient of friction, Methods to reduce friction
5	1	5	Newton's Laws of Gravitation – Statement and Explanation, Universal Gravitational Constant (G)- Definition, Unit and Dimension
	2		Acceleration due to gravity (g)- Definition and Concept. Definition of mass and weight, Relation between g and G.
	3		Variation of g with altitude and depth, Kepler's Laws of Planetary Motion
	4	6	Simple Harmonic Motion (SHM) - Definition & Examples, Expression (Formula/Equation) for displacement
6	1		Expression for velocity and acceleration of a body/ particle in SHM.
	2		Wave motion – Definition & Concept, Transverse and Longitudinal wave motion – Definition, Examples & Comparison
	3		Definition of different wave parameters (Amplitude, Wavelength, Frequency, Time

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			Period), Derivation of Relation between Velocity, Frequency and Wavelength of wave
	4		Ultrasonic – Definition, Properties & Applications.
7	1	7	Heat and Temperature – Definition & Difference, Units of Heat (FPS, CGS, MKS & SI).
	2		Specific Heat (concept, definition, unit, dimension and simple numerical)
	3		Change of state (concept), Latent Heat (concept, definition, unit, dimension and simple numerical)
	4		Thermal Expansion – Definition & Concept, Expansion of Solids (Concept)
8	1		Coefficient of linear, superficial and cubical expansions of Solids – Definition & Units, Relation between α, β & ϒ
	2		Work and Heat - Concept & Relation.
	3		Joule's Mechanical Equivalent of Heat (Definition, Unit), First Law of Thermodynamics (Statement and concept only)
	4	8	Reflection & Refraction – Definition, Laws of reflection and refraction
9	1		Refractive index – Definition, Formula &Simple numerical.
	2		Critical Angle & Total internal reflection – Concept, Definition & Explanation
	3		Refraction through Prism (Ray Diagram & Formula)
	4		Fiber Optics – Definition, Properties & Applications.
10	1	9	Electrostatics – Definition & Concept, Statement & Explanation of Coulombs laws, Definition of Unit charge
	2		Absolute & Relative Permittivity (ε) – Definition, Relation & Unit, Electric potential and Electric Potential difference (Definition, Formula & SI Units)
	3		Electric field, Electric field intensity (E) – Definition, Formula & Unit, Capacitance - Definition, Formula & Unit
	4		Series and Parallel combination of Capacitors (Formula for effective/Combined/total capacitance & numerical).
11	1		Magnet, Properties of a magnet, Coulomb's Laws in Magnetism – Statement & Explanation
	2		Unit Pole (Definition), Magnetic field, Magnetic Field intensity (H) - (Definition, Formula & SI Unit)
	3		Magnetic lines of force (Definition and Properties), Magnetic Flux (Φ) & Magnetic Flux Density (B) – Definition, Formula & Unit
	4	10	Electric Current – Definition, Formula & SI Units, Ohm's law and its applications.
12	1		Series and Parallel combination of resistors (No derivation, Formula for effective/Combined/ total resistance & Simple numerical).
	2		Kirchhoff's laws (Statement & Explanation with diagram).
	3		Application of Kirchhoff's laws to Wheatstone bridge - Balanced condition of Wheatstone's Bridge – Condition of Balance (Equation).
	4		Electromagnetism – Definition & Concept, Fleming's Left Hand Rule
13	1	11	Force acting on a current carrying conductor placed in a uniform magnetic field
	2		Faraday's Laws of Electromagnetic Induction, Lenz's Law
	3		Fleming's Right Hand Rule, Comparison between Fleming's Right Hand Rule and Fleming's Left Hand Rule.
	4	12	LASER & laser beam (Concept and Definition)

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14	1		Principle of LASER- absorption, spontaneous emission and stimulated emission
	2		Population Inversion & Optical Pumping
	3		Properties & Applications of LASER
	4		Wireless Transmission – Ground Waves, Sky Waves, Space Waves (Concept & Definition)
15	1		Revision
	2		Revision
	3		Revision
	4		Revision

S. Satapathy

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