LESSON PLAN FOR APPLIED PHYSICS [TH-2]

Discipline: All Branches	**Session:** 2026-27		**Name of teaching faculty:** Ms. Sushree Sangita Satapathy & Dr. Santanu Kumar Nayak
Subject: Applied Physics	**No. of days/ Per week class allotted:** 4		Date of commencement: 17/08/2026 To
Week	**Class day**	**Unit**	**Theory topics**
1	1	1	Physical quantities; fundamental and derived, Units and systems of units (FPS, CGS and SI units)
	2		Dimensions and dimensional formulae of physical quantities
	3		Principle of homogeneity of dimensions, Dimensional equations and their applications
	4		Conversion from one system of units to other
2	1		Checking of dimensional equations
	2		Derivation of simple equations, Limitations of dimensional analysis
	3		Errors in measurements (systematic and random)
	4		Absolute error, relative error, error propagation
3	1		Error estimation, and significant figures
	2		**Revision & Doubt Clarification**
	3	2	Scalar and Vector quantities – examples, representation of vector, Types of vectors
	4		Addition and Subtraction of Vectors, Triangle and Parallelogram law (Statement only)
4	1		Scalar and Vector Product
	2		Resolution of a Vector, Newton's laws of motion, Force, Momentum
	3		Statement & derivation of conservation of linear momentum, Its applications such as recoil of gun
	4		Application: Rockets, Impulse and its applications
5	1		Friction: concept, types of Friction
	2		Laws of limiting friction, coefficient of friction, Angle of Friction, Angle of Repose
	3		Methods of reducing friction and its engineering applications
	4		**Revision & Doubt Clarification**
6	1	3	Work: Concept and units, examples of zero work, positive work and negative work
	2		Energy and its units, kinetic energy, Work-energy Theorem (concepts only),
	3		Gravitational potential energy with examples and derivations
	4		Mechanical energy, conservation of mechanical energy for freely falling bodies
7	1		Power and its units, power and work relationship
	2		Calculation of power (numerical problems)
	3		**Revision & Doubt Clarification**

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	4		Circular motion, definition of angular displacement, angular velocity, angular acceleration, frequency, time period
8	1		Relation between linear and angular velocity, linear acceleration and angular acceleration (related numerical)
	2		Centripetal and Centrifugal forces with live examples
	3		Expression and applications such as: banking of roads (without friction)
	4		Bending of cyclist
9	1	4	Translational and rotational motions with examples
	2		Definition of torque and angular momentum and their examples
	3		Conservation of angular momentum (quantitative) and its applications
	4		Moment of inertia and its physical significance, radius of gyration for rigid body
10	1		Theorems of parallel and perpendicular axes (statements only)
	2		Moment of inertia of rod, disc, ring and sphere (hollow and solid); (Formulae only)
	3		**Revision & Doubt Clarification**
	4		Elasticity: definition of stress and strain
11	1		Moduli of elasticity, Hooke's law
	2		Significance of stress-strain curve
	3		Pressure: definition, units, atmospheric pressure, gauge pressure, absolute pressure
	4		Surface tension: concept, units, cohesive and adhesive forces
12	1	5	Angle of contact, applications of surface tension
	2		Viscosity and coefficient of viscosity: Terminal velocity
	3		Stoke's law and effect of temperature on viscosity, application in hydraulic systems.
	4		Hydrodynamics: Fluid motion, streamline and turbulent flow
13	1		Reynold's number, Equation of continuity
	2		Bernoulli's Theorem (only formula and numericals) and its applications
	3		**Revision & Doubt Clarification**
	4		Periodic motion, Oscillatory motion, Simple Harmonic Motion (SHM): definition
14	1		SHM: Expression for displacement, velocity
	2		Expression for acceleration, time period, frequency
	3		Total Energy of a particle executing SHM
	4		Free, forced and resonant vibrations with examples
15	1	6	Wave motion, transverse and longitudinal waves with examples
	2		Definitions of wave velocity, frequency and wave length and their relationship, Wave equation
	3		Amplitude, phase, phase difference, Principle of superposition of waves
	4		Characteristics of sound wave (Intensity, Loudness, Pitch & Quality)
16	1		Reverberation, Reverberation time, echo (concepts only)

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	2		Ultrasonic waves- Introduction and properties, Engineering and medical applications of ultrasonic
	3		**Revision & Doubt Clarification**
	4	7	Concept of heat and temperature
17	1		Specific heats, Thermal Capacity, Latent heat
	2		Principle of Heat with numericals
	3		Scales of temperature and their relationships
	4		Expansion of solids
18	1		Coefficient of linear, superficial and cubical expansions of solids
	2		Relation among coefficient of linear, superficial and cubical expansions
	3		Modes of heat transfer (conduction, convection and radiation with examples)
	4		Co-efficient of thermal conductivity, engineering applications
19	1		**Revision & Doubt Clarification**
	2	8	Laws of reflection, Laws of refraction, refractive index
	3		Image formation by spherical mirrors
	4		Mirror Formula with numerical
20	1		Image formation by Lens
	2		Lens formula with numerical
	3		Power of lens, magnification of Lens
	4		Critical angle, Total internal reflection
21	1		Applications of total internal reflection, Optical fiber applications in: telecommunication, medical and sensors.
	2		Optical Instrument: Simple Microscope and its magnifying Power
	3		**Revision & Doubt Clarification**
	4	9	Coulombs law, unit of charge, Electric field
22	1		Electric lines of force and their properties
	2		Electric flux, Electric potential and potential difference
	3		Gauss law: Application of Gauss law to find electric field intensity of straight charged conductor
	4		Application of Gauss law to find electric field intensity of plane charged sheet
23	1		Capacitance and its units, Capacitance of a spherical conductor, parallel plate capacitor
	2		Dielectric and its effect on capacitance
	3		Series and parallel combination of capacitors
	4		Numericals on series and parallel combination of capacitors
24	1		**Revision & Doubt Clarification**
	2	10	Electric Current and its units, Drift velocity and expression of current in terms of drift velocity
	3		Direct and alternating current, Resistance and its units, Specific resistance, Conductance, Specific conductance

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	4		Series and parallel combination of resistances
25	1		Effect of temperature on resistance, Ohm's law and its verification
	2		Concept of terminal potential difference and Electromotive force (EMF) & Internal resistance of cell
	3	10	Kirchhoff's laws
	4		Wheatstone bridge (Balanced condition)
26	1		Joule's law of heating effect of current, Electric power
	2		Electric energy and its units (related numerical problems)
	3		**Revision & Doubt Clarification**
	4		Coulomb's law in Magnetism, Magnetic field and its units
27	1		Magnetic intensity, magnetic lines of force and its properties
	2		Magnetic flux and units, Intensity of magnetisation
	3		Types of magnetic materials: dia, para, and ferromagnetic with their properties
	4		Biot- Savart's law
28	1	11	Magnetic field due to infinite straight conductor and at the centre of a circular coil carrying current (Formula only)
	2		Force on moving charge in magnetic field
	3		Force on current carrying conductor placed in a magnetic field
	4		Concept of electromagnetic induction
29	1		Faraday's laws of electromagnetic induction, Lenz's law (Statement only)
	2		Moving coil galvanometer (Principle only), Conversion of a galvanometer into ammeter and voltmeter
	3		**Revision & Doubt Clarification**
	4		Energy bands in solids- Distinguish between conductor, semiconductor & insulator on the basis of Band theory.
30	1		Intrinsic and extrinsic semiconductors
	2		Effect of temperature on resistivity of a semiconductor (Concept only)
	3		P-N junction, junction diode and V-I characteristics
	4	12	Diode as rectifier- half wave and full wave rectifier (centre taped)
31	1		LASER and its Properties
	2		Spontaneous and stimulated emission
	3		Population inversion, Optical Pumping, Engineering and medical applications of lasers.
	4		**Revision & Doubt Clarification**
32	1		**Revision & Doubt Clarification**
	2		**Revision & Doubt Clarification**
	3		**Q&A discussion**
	4		**Previous year question discussion**

Prepared By S. Satapathy 29/07/26

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