BHUBANANANDA ORISSA SCHOOL OF ENGINEERING, KATAKA

DEPARTMENT: HUMANITIES AND SCIENCES

LESSON PLAN

SUBJECT: - APPLIED PHYSICS (THEORY)

ACADEMIC SESSION:-2026-27

YEAR: - 1ST

SECTION: - I1 BRANCH:- MECHANICAL

Prepared by

Dr. Biswambhar Mohanty

Sr. Lect. In Physics

Lesson Plan

Subject: Applied Physics (TH-2)

...pline : Mechnical, Sec: (I1) **...r : 1st**	**Name of Faculty : Dr. Biswambhar Mohanty**
...of period per week allotted: 4P, **...otal Period**:128 [Mon, Tues, Wed, Fri]	**Session From** **Date: 17-08-2026 to 17-04-2027**

Week	Class Day	Theory Topics
1st	1	Introduction to the Subject, Syllabus and Course Outcomes
	2	**Unit 1: Physical world, Units and Measurements** Physical quantities; fundamental and derived, Units and systems of units (FPS, CGS and SI units)
	3	Dimensions and dimensional formulae of physical quantities: such as velocity, acceleration, force, linear momentum, kinetic energy, potential energy, work, power, pressure and density.
	4	Principle of homogeneity of dimensions
2nd	5	Dimensional equations and their applications - conversion from one system of units to other
	6	Checking of dimensional correctness of equations
	7	Derivation of simple equations, Limitations of dimensional analysis.
	8	Errors in measurements (systematic and random), absolute error, relative error
3rd	9	Error propagation, Error estimation, Significant figures
	10	Doubt Clear Class
	11	**Unit 2: Force and Motion** Scalar and Vector quantities – examples, representation of vector, types of vectors.
	12	Addition and Subtraction of Vectors, Triangle and Parallelogram law (Statement only)
4th	13	Scalar Product,
	14	Vector Product,
	15	Resolution of a Vector
	16	Newton's Laws of Motion, Force, Momentum, Statement and derivation of conservation of linear momentum,
5th	17	Its applications such as recoil of gun, rockets, Impulse and its applications.
	18	Friction: concept, types of Friction
	19	laws of limiting friction, coefficient of friction, Angle of Friction, Angle of Repose
	20	Methods of reducing friction and its engineering applications.
6th	21	Monthly Class Test
	22	**Unit 3: Work, Power and Energy** Work: Concept and units, examples of zero work, positive work and negative work
	23	Energy and its units, kinetic energy,
	24	Work-Energy Theorem (Concepts only)
7th	25	Gravitational potential energy with examples and derivations
	26	Mechanical energy, conservation of mechanical energy for freely falling bodies
	27	Power and its units, power and work relationship
	28	Calculation of power (numerical problems).

Week	Class Day	Theory Topics
8th	29	Doubt Clear Class/ Revision Class
	30	**Unit 4: Circular & Rotational Motion** Circular motion, definition of angular displacement, angular velocity, angular acceleration
	31	frequency, time period, Relation between linear and angular velocity, linear acceleration and angular acceleration (related numerical)
	32	Centripetal and Centrifugal forces with live examples
9th	33	Expression and applications such as banking of roads(without Friction)
	34	bending of cyclist.
	35	Translational and rotational motions with examples
	36	Definition of torque and angular momentum and their examples,
10th	37	Conservation of angular momentum (quantitative) and its applications
	38	Moment of inertia and its physical significance, radius of gyration for rigid body,
	39	Theorems of parallel and perpendicular axes (statements only),
	40	Theorems of perpendicular axes (statements only),
11th	41	Moment of inertia of rod, disc, ring and sphere (hollow and solid); (Formulae only).
	42	Monthly Class Test
	43	**Unit 5: Properties of Matter** Elasticity: definition of stress and strain, moduli of elasticity
	44	Hooke's law, significance of stress-strain curve
12th	45	Pressure: definition, units
	46	atmospheric pressure, gauge pressure, absolute pressure
	47	Surface tension: concept, units, cohesive and adhesive forces
	48	angle of contact, applications of surface tension.
13th	49	Viscosity and coefficient of viscosity: Terminal velocity
	50	Stoke's law and effect of temperature on viscosity
	51	application in hydraulic systems
	52	Hydrodynamics: Fluid motion, streamline and turbulent flow,
14th	53	Reynold's number, Equation of continuity
	54	Bernoulli's Theorem (only formula and numerical) and its applications.
	55	**Unit-6: Waves and Oscillations** Periodic Motion, Oscillatory Motion, Simple Harmonic Motion (SHM)
	56	Simple Harmonic Motion (SHM): definition, expression for displacement, velocity, acceleration, time period, frequency
15th	57	Total Energy of a particle executing SHM,
	58	Free, forced and resonant vibrations with examples.
	59	Wave motion, transverse and longitudinal waves with examples
	60	Definitions of wave velocity, frequency and wave length and their relationship
16th	61	wave equation, amplitude, phase, phase difference,
	62	Principle of superposition of waves.
	63	Characteristics of Sound Wave (Intensity, Loudness, Pitch & Quality),
	64	Reverberation, reverberation time, echo (Concepts only)
17th	65	Ultrasonic waves–Introduction and properties, engineering and medical applications of ultrasonic
	66	**Unit 7: Thermal Physics** Concept of heat and temperature, specific heats, Thermal Capacity
	67	Latent Heat, Principle of Heat with numerical
	68	Heat with numerical
	69	scales of temperature and their relationships

	Class Day	Theory Topics
18th	70	Expansion of solids, coefficient of linear, superficial and cubical expansions of solids
	71	relation among coefficient of linear, superficial and cubical expansions of solids
	72	Modes of heat transfer (conduction, convection and radiation with examples)
19th	73	Co-efficient of thermal conductivity
	74	Engineering applications.
	75	**Unit-8: Optics** Laws of reflection, Laws of refraction
	76	refractive index, Image formation by spherical mirrors
20th	77	Mirror Formula with numerical,
	78	Image formation by Lens, Lens formula with numerical,
	79	Power of lens, magnification of Lens.
	80	Critical angle, Total internal reflection
21st	81	applications of total internal reflection
	82	Optical fiber applications in: telecommunication, medical and sensors.
	83	Optical Instrument: Simple Microscope and its magnifying Power
	84	Simple Microscope magnifying Power
22nd	85	**UNIT-9: Electrostatics** Coulomb's law, unit of charge
	86	Electric field, Electric lines of force and their properties
	87	Electric flux, Electric potential and potential difference
	88	Gauss law
23rd	89	Application of Gauss law to find electric field intensity of straight charged conductor
	90	Application of Gauss law plane charged sheet
	91	Capacitance and its units
	92	Capacitance of a Spherical conductor
24th	93	parallel plate capacitor, dielectric and its effect on capacitance
	94	Series and parallel combination of capacitors (related numerical).
	95	Unit-10: Current Electricity Electric Current and its units, Drift Velocity and expression of Current in terms of drift Velocity
	96	Direct and alternating current
25th	97	Resistance and its units, Specific resistance, Conductance, Specific conductance
	98	Series and parallel combination of resistances.
	99	Effect of Temperature on Resistance
	100	Ohm's law and its verification, Concept of terminal potential difference
26th	101	Electromotive force (EMF) & Internal Resistance of Cell.
	102	Kirchhoff's laws,
	103	Wheatstone bridge (Balanced Condition)
	104	Joule's Law of heating effect of current, Electric power,
27th	105	Electric energy and its units (related numerical problems).
	106	Monthly Class Test
	107	**Unit-11: Magnetic Effect of Current &Electromagnetism** Coulomb's Law in Magnetism, Magnetic field and its units
	108	magnetic intensity, magnetic lines of force and its properties, magnetic flux and units,
	109	Intensity of magnetization, Types of magnetic materials: dia,para and ferromagnetic with their properties

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28th	110	Biot-Savart's Law,
	111	Magnetic Field due to Infinite straight conductor
	112	at the Centre of a circular coil carrying current (Formula Only),
29th	113	Force on moving charge in magnetic field
	114	Force on current carrying conductor placed in a magnetic Field
	115	Concept of electromagnetic induction, Faraday's Laws of Electromagnetic Induction, Lenz's Law (Statement only)
	116	Moving coil galvanometer (principle only)
30th	117	Conversion of a galvanometer into ammeter
	118	Conversion of a galvanometer into voltmeter.
	119	Monthly Class Test
	120	**Unit-12: Semiconductor & Modern Physics** Energy bands in solids- Distinguish between conductor, semi-conductor & insulator on the basis of Band Theory
31st	121	Intrinsic and extrinsic semiconductors,
	122	Effect of Temperature on resistivity of a Semiconductor (Concept only)
	123	p-n junction, junction diode and V-I characteristics
	124	Diode as rectifier – half wave and full wave rectifier (centre taped).
32nd	125	LASER and its Properties, spontaneous and stimulated emission
	126	population inversion, optical pumping
	127	Engineering and medical applications of lasers.
	128	Revision & VST

References :

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31/7/2025

Concerned faculty
Dr. Biswambhar Mohanty

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