

LESSON PLAN OF APPLIED PHYSICS
GOVT.POLYTECHNIC, JAGATSINGHPUR

Discipline– Civil/Electrical/ Mechanical/Chemical/ Petrochemical	EXAM PATTERN: ANNUAL	Name of the teaching faculty:- Sri Chinmmaya Kumar Panda, Lecturer St-II (Physics)	
		SUB:APPLIED PHYSICS COURSE CODE:TH 2	
ACADEMIC SESSION: 2026-27	Periods per Week-04	Commencement of Classes from date: 17.08.2026 to 17.04.2027 No. of weeks : 35 Total Periods : 140	
Course Outcomes (CO)	CO1: Apply the concepts of physical quantities, units, dimensions, measurement techniques, and error analysis to solve engineering and scientific problems accurately. CO2: Analyze the principles of mechanics including force, friction, work, power, energy, circular motion, rotational motion, and conservation laws in practical engineering applications. CO3: Explain and evaluate the properties of matter, elasticity, fluid mechanics, wave motion, oscillations, sound, and thermal phenomena relevant to engineering systems. CO4: Apply the laws of geometrical optics and optical instruments to analyze image formation, optical fibers, and related technological applications. CO5: Analyze electrostatic and electrical circuits using concepts of electric fields, capacitors, current electricity, electromagnetic induction, magnetic effects of current, and electrical measuring instruments. CO6: Explain the principles of semiconductor devices, p-n junctions, rectifiers, lasers, and modern physics concepts, and relate them to engineering and technological applications.		
Week	Class Day	TOPICS TO BE COVERED	
1 st	1st	Introduction:- To provide Information about the Syllabus, Pattern of Examination etc.	
	2nd	Unit 1: Physical world, Units and Measurements: Physical quantities; fundamental and derived Units and systems of units (FPS, CGS and SI units)	
	3rd	Dimensions and dimensional formulae of physical quantities such as velocity, acceleration, force, linear momentum, kinetic energy, potential energy, work, power, pressure and density	
	4th	Principle of homogeneity of dimensions, Dimensional equations and their applications (conversion from one system of units to other)	
2 nd	1st	Checking of dimensional equations & derivation of simple equations	
	2nd	Limitations of dimensional analysis, Errors in measurements (systematic and random)	
	3rd	Absolute error, Relative error & error propagation	
	4th	Error estimation and significant figures	
3 rd	1st	Unit 2:Force and Friction: Scalar and Vector quantities – examples	
	2nd	Representation of vector & types of vectors	
	3 rd	Addition and Subtraction of Vectors, Triangle and Parallelogram law (Statement only)	
	4th	Scalar and Vector Product	
4 th	1st	Resolution of a Vector	
	2nd	Newton's Laws of Motion, Force, Momentum	
	3rd	Statement and derivation of conservation of linear momentum	
	4th	Applications of Conservation of linear momentum such as recoil of gun, rockets	
	1st	Impulse and its applications	

5 th	2nd	Friction: Concept, types, laws of limiting friction
	3rd	Coefficient of friction, Angle of Friction, Angle of Repose, Methods of reducing friction and its engineering applications
	4th	Unit 3: Work, Power, Energy: Work: Concept and units
6 th	1st	Examples of zero work, positive work & negative work
	2nd	Energy and its units, kinetic energy, Work-Energy Theorem (Concepts only)
	3rd	Gravitational potential energy with examples and derivations
	4th	Mechanical energy, conservation of mechanical energy for freely falling bodies
7 th	1st	Power and its units, power and work relationship
	2nd	Calculation of power (numerical problems) & Revision of Unit- 1, 2 & 3
	3rd	Unit 4: Circular & Rotational Motion: Circular motion, definition of angular displacement, angular velocity, angular acceleration, frequency, time period
	4th	Relation between linear and angular velocity, linear acceleration and angular acceleration (related numerical)
8 th	1st	Centripetal and Centrifugal forces with live examples
	2nd	Expression and applications such as banking of roads, bending of cyclist
	3rd	Translational and rotational motions with examples
	4th	Definition of torque and angular momentum and their examples
9 th	1st	Conservation of angular momentum (quantitative) and its applications
	2nd	Moment of inertia and its physical significance
	3rd	Radius of gyration for rigid body, Theorems of parallel and perpendicular axes (statements only)
	4th	Moment of inertia of rod, disc, ring and sphere (hollow and solid); (Formulae only)
10 th	1st	Unit 5: Properties of Matter: Elasticity: definition of stress and strain, moduli of elasticity
	2nd	Hooke's law, significance of stress-strain curve
	3rd	Pressure: definition, units, atmospheric pressure, gauge pressure, absolute pressure
	4th	Surface tension: concept, units, cohesive and adhesive forces, angle of contact, applications of surface tension
11 th	1st	Viscosity and coefficient of viscosity: Terminal velocity
	2nd	Stoke's law and effect of temperature on viscosity
	3rd	Application in hydraulic systems
	4th	Hydrodynamics: Fluid motion, stream line and turbulent flow
12 th	1st	Reynold's number, Equation of continuity
	2nd	Bernoulli's Theorem (only formula and numerical) and its applications
	3rd	UNIT - 6: Waves and Oscillations: Periodic Motion, Oscillatory Motion

	4th	Simple Harmonic Motion (SHM): definition, expression for displacement, velocity, acceleration, time period, frequency, Total Energy of a particle executing SHM
13 th	1st	
	2nd	Free, forced and resonant vibrations with examples
	3rd	Wave motion, transverse and longitudinal waves with examples
	4th	Definitions of wave velocity, frequency and wave length and their relationship
14 th	1st	Wave equation, amplitude, phase
	2nd	Phase difference, principle of superposition of waves
	3rd	Reverberation, reverberation time, echo (Concepts only)
	4th	Ultrasonic waves – Introduction and properties
15 th	1st	Engineering and medical applications of ultrasonic
	2nd	Unit 7: Thermal Physics: Concept of heat and temperature
	3rd	Specific heats, Thermal Capacity, Latent Heat
	4th	Principle of Heat with numerical
16 th	1st	Scales of temperature and their relationships
	2nd	Expansion of solids
	3rd	
	4th	Coefficient of linear, superficial & cubical expansions of solids and relation among them (Relation between α, β & γ)
17 th	1st	
	2nd	Modes of heat transfer: conduction, convection with examples
	3rd	Modes of heat transfer: radiation with examples
	4th	Co-efficient of thermal conductivity, engineering applications
18 th	1st	Revision of Unit- 4,5,6 & 7
	2nd	
	3rd	UNIT - 8: Optics: Laws of Reflection, Laws of Refraction, refractive index
	4th	Image formation by spherical mirrors
19 th	1st	Mirror formula with numerical
	2nd	Image formation by lens
	3rd	Lens formula with numerical
	4th	Power of Lens, magnification of Lens
20 th	1st	Critical angle, Total internal reflection
	2nd	Applications of total Internal reflection
	3rd	Optical fiber applications in: telecommunication, medical and sensors.
	4th	Optical Instrument: Simple Microscope and its magnifying Power
	1st	UNIT - 9: Electrostatics: Coulombs law, unit of charge

21 st	2nd	Electric field, Electric lines of force and their properties
	3rd	Electric flux, Electric potential and potential difference
	4th	Gauss law: Application of Gauss law to find electric field intensity of straight charged conductor, plane charged sheet
22 nd	1st	
	2nd	Capacitance and its Units
	3rd	Capacitance of a Spherical conductor, parallel plate capacitor
	4th	Dielectric and its effect on capacitance
23 rd	1st	Series and parallel combination of capacitors (related numerical)
	2nd	
	3rd	UNIT - 10: Current Electricity: Electric Current and its units
	4th	Drift Velocity and expression of Current in terms of drift Velocity
24 th	1st	Direct and alternating current
	2nd	Resistance and its units, Specific resistance
	3rd	Conductance, Specific conductance
	4th	Series and parallel combination of resistances
25 th	1st	Effect of Temperature on Resistance
	2nd	Ohm's law and its verification, Concept of terminal potential difference
	3rd	Electromotive force (EMF) & Internal Resistance of Cell.
	4th	Kirchhoff's laws
26 th	1st	Wheatstone bridge (Balanced Condition)
	2nd	Joule's Law of heating effect of current, Electric power, Electric energy and its units (related numerical problems)
	3rd	UNIT - 11: Magnetic Effect of Current & Electromagnetism: Coulomb's Law in Magnetism, Magnetic field and its units
	4th	Magnetic intensity, magnetic lines of force & its properties
27 th	1st	Magnetic flux and units, Intensity of magnetization
	2nd	Types of magnetic materials; dia, para & ferromagnetic with their properties
	3rd	Biot-Savart's Law, Magnetic Field due to Infinite straight conductor and at the centre of a Circular coil carrying current (Formula Only)
	4th	Force on moving charge in magnetic field
28 th	1st	Force on current carrying conductor placed in a magnetic Field
	2nd	Concept of electromagnetic induction
	3rd	Faraday's Laws of Electromagnetic Induction, Lenz's Law (Statement only)
	4th	Moving coil galvanometer (principle only)
29 th	1st	Conversion of a galvanometer into ammeter and voltmeter.
	2nd	UNIT - 12: Semiconductor & Modern Physics: Energy bands in solids
	3rd	Distinguish between conductor, semi-conductor & insulator on the basis of Band Theory

	4th	Intrinsic semiconductors
30 th	1st	Extrinsic semiconductors
	2nd	Effect of Temperature on resistivity of a Semiconductor (Concept only)
	3rd	p-n junction, junction diode and V-I characteristics
	4th	
31 st	1st	Diode as rectifier – half wave rectifier
	2nd	Full wave rectifier (centre taped)
	3rd	LASER and its Properties
	4th	Spontaneous and stimulated emission
32 nd	1st	Population inversion, Optical pumping
	2nd	Engineering and medical applications of lasers
	3rd	Practicing Numerical of all Units (as per syllabus)
	4th	
33 rd	1st	Doubt Clearing Session of Unit- 8,9,10,11 & 12
	2nd	
	3rd	
	4th	
34 th	1st	Revision of Unit- 8,9,10,11 & 12
	2nd	
	3rd	
	4th	
35 th	1st	Previous Year Question Practice of Unit- 8,9,10,11 & 12
	2nd	
	3rd	
	4th	

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31/07/2026
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