

LESSON PLAN

SUBJECT: APPLIED PHYSICS (TH-2)

BRANCH: MECHANICAL, ELECTRICAL, TEXTILE, CSE

ACADEMIC SESSION: 2026-27

NAME OF THE FACULTY: Dr. ABHILASH PADHY



GOVERNMENT POLYTECHNIC, BHADRAK

[Signature]
17/08/2026.
HOD, Humanities & Sciences

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Academic Co-ordinator
Academic Co-ordinator

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Principal
Govt. Polytechnic, Bhadrak
Principal
Govt. Polytechnic
Bhadrak

Course Outcomes (COs) of Applied Physics

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.

GOVT. POLYTECHNIC BHADRAK		
DEPARTMENT OF HUMANITIES & SCIENCES		
LESSON PLAN (ACADEMIC SESSION 26-27)		
Discipline: Physics	Semester: 1st	Name of the Teaching Faculty: Dr. Abhilash Padhy
Subject: Applied Physics	No of Days/Week class allotted: 4	Beginning of Classes: 17/8/2026 Closing of Classes: 17/04/2027 No of Periods as per syllabus: 128
Week	Class Day	Theory Topics
1st	1st	Physical quantities: fundamental and derived, Units
	2nd	systems of units (FPS, CGS and SI units),
	3rd	Dimensions and dimensional formulae of physical quantities such as velocity, acceleration, force, linear momentum,
	4th	dimensional formulae of physical quantitieskinetic energy, potential energy, work, power, pressure and density,
2nd	1st	Principle of homogeneity of dimensions, Dimensional equations and their applications (conversion from one system of units to other),
	2nd	checking of dimensional equations
	3rd	Derivation of simple equations),
	4th	Limitations of dimensional analysis. Errors in measurements (systematic and random),
3rd	1st	absolute error, relative error, error propagation, error estimation and significant figures.
	2nd	Revision & Doubt solving Class
	3rd	Scalar and Vector quantities – examples, representation of vector,
	4th	types of vectors.
4th	1st	Addition and Subtraction of Vectors, Triangle and Parallelogram law (Statement only),
	2nd	Scalar and Vector Product,
	3rd	Resolution of a Vector.
	4th	Newton's Laws of Motion, Force, Momentum, Statement and derivation of conservation of linear momentum, its applications such as recoil of gun,
5th	1st	Application of conservation of linear momentum in rockets, Impulse and its applications.
	2nd	Friction: concept, types of Friction, laws of limiting friction, coefficient of friction,
	3rd	Angle of Friction, Angle of Repose, Methods of reducing friction and its engineering applications.
	4th	Solving Simple numericals

Week	Class Day	Theory Topics
6th	1st	Work: Concept and units, examples of zero work, positive work and 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.
7th	1st	Power and its units, power and work relationship, calculation of power.
	2nd	Solving Simple numericals
	3rd	Solving Simple numericals
	4th	Revision & Doubt solving Class
8th	1st	Revision & Doubt solving Class
	2nd	Monthly assessment 1
	3rd	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),
9th	1st	Centripetal and Centrifugal forces with live examples,
	2nd	Expression and applications such as banking of roads(without Friction) and bending of cyclist.
	3rd	Translational and rotational motions with examples,
	4th	Definition of torque and angular momentum and their examples,
10th	1st	Conservation of angular momentum (quantitative) and its applications.
	2nd	Moment of inertia and its physical significance, radius of gyration for rigid body,
	3rd	Theorems of parallel and perpendicular axes (statements only)
	4th	Moment of inertia of rod, disc, ring and sphere (hollow and solid); (Formulae only).
11th	1st	Solving Simple numericals
	2nd	Revision & Doubt solving Class
	3rd	Elasticity: definition of stress and strain, moduli of elasticity,
	4th	Hooke's law, significance of stress-strain curve.
	1st	Pressure: definition, units, atmospheric pressure, gauge pressure, absolute pressure

Week	Class Day	Theory Topics
12th	2nd	Surface tension: concept, units, cohesive and adhesive forces,
	3rd	angle of contact, applications of surface tension.
	4th	Viscosity and coefficient of viscosity: Terminal velocity,
13th	1st	Stoke's law and effect of temperature on viscosity, application in hydraulic systems.
	2nd	Hydrodynamics: Fluid motion, streamline and turbulent flow, Reynold's number,
	3rd	Equation of continuity, Bernoulli's Theorem (only formula and numerical).
	4th	Applications of Bernoulli's theorem
14th	1st	Solving Simple numericals
	2nd	Revision & Doubt solving Class
	3rd	Periodic Motion, Oscillatory Motion, Simple Harmonic Motion (SHM): definition,
	4th	expression for displacement, velocity, acceleration, time period, frequency,
15th	1st	Total Energy of a particle executing SHM,
	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, wave equation, amplitude, phase, phase difference,
16th	1st	principle of superposition of waves.
	2nd	Characteristics of Sound Wave (Intensity, Loudness, Pitch & Quality),
	3rd	Reverberation, reverberation time, echo (Concepts only),
	4th	Ultrasonic waves—Introduction and properties, engineering and medical applications of ultrasonic.
17th	1st	Revision & Doubt solving Class
	2nd	Monthly assessment 2
	3rd	Concept of heat and temperature,
	4th	specific heats, Thermal Capacity,
18th	1st	Latent Heat, Principle of Heat
	2nd	Solving simple numericals,

Week	Class Day	Theory Topics
18th	3rd	scales of temperature and their relationships
	4th	Expansion of solids, coefficient of linear, superficial and cubical expansions of solids, relation among them.
19th	1st	relation among linear, superficial and cubical expansions of solid.
	2nd	Modes of heat transfer (conduction, convection and radiation with examples),
	3rd	Co-efficient of thermal conductivity, engineering applications.
	4th	Revision & Doubt solving Class
20th	1st	Laws of reflection, Laws of refraction, refractive index,
	2nd	Image formation by spherical mirrors,
	3rd	Mirror Formula with numerical,
	4th	Image formation by Lens,
21st	1st	Lens formula with numerical, Power of lens, magnification of Lens.
	2nd	Critical angle, Total internal reflection, applications of total internal reflection,
	3rd	Optical fiber applications in: telecommunication, medical and sensors.
	4th	Optical Instrument: Simple Microscope and its magnifying Power
22nd	1st	Solving Simple numericals
	2nd	Revision & Doubt solving Class
	3rd	Coulomb's law, unit of charge, Electric field,
	4th	Electric lines of force and their properties,
23rd	1st	Electric flux, Electric potential and potential difference,
	2nd	Gauss law: Application of Gauss law to find electric field intensity of straight charged conductor, plane charged sheet.
	3rd	Application of Gauss law to find electric field intensity of a plane charged sheet.
	4th	Capacitance and its units. Capacitance of a Spherical conductor, parallel plate capacitor
24th	1st	dielectric and its effect on capacitance
	2nd	Series and parallel combination of capacitors (related numerical).
	3rd	Revision & Doubt solving Class
	4th	Monthly assessment 3

Week	Class Day	Theory Topics
25th	1st	Electric Current and its units, Drift Velocity and expression of Current in terms of drift Velocity,
	2nd	Direct and alternating current, Resistance and its units, Specific resistance, Conductance, Specific conductance,
	3rd	Series and parallel combination of resistances.
	4th	Effect of Temperature on Resistance. Ohm's law and its verification,
26th	1st	Concept of terminal potential difference, Electromotive force (EMF) & Internal Resistance of Cell.,
	2nd	Kirchhoff's laws,
	3rd	Wheatstone bridge (Balanced Condition)
	4th	Joule's Law of heating effect of current, Electric power, Electric energy and its units
27th	1st	(related numerical problems)
	2nd	Revision & Doubt solving Class
	3rd	Coulomb's Law in Magnetism, Magnetic field and its units, magnetic intensity,
	4th	magnetic lines of force and its properties,
28th	1st	magnetic flux and units, Intensity of magnetization,
	2nd	Types of magnetic materials: dia, para and ferromagnetic with their properties,
	3rd	Biot-Savart's Law,
	4th	Magnetic Field due to Infinite straight conductor and at the Centre of a circular coil carrying current (Formula Only),
29th	1st	Force on moving charge in magnetic field,
	2nd	Force on current carrying conductor placed in a magnetic Field,
	3rd	Concept of electromagnetic induction, Faraday's Laws of Electromagnetic Induction, Lenz's Law (Statement only)
	4th	Moving coil galvanometer (principle only),
30th	1st	Conversion of a galvanometer into ammeter and voltmeter.
	2nd	Revision & Doubt solving Class
	3rd	Energy bands in solids- Distinguish between conductor, semi-conductor & insulator on the basis of Band Theory,
	4th	Intrinsic and extrinsic semiconductors, Effect of Temperature on resistivity of a Semiconductor (Concept only),

Week	Class Day	Theory Topics
31st	1st	p-n junction, junction diode
	2nd	and V-I characteristics,
	3rd	Diode as rectifier – half wave and full wave rectifier (centre taped).
	4th	LASER and its Properties,
32nd	1st	spontaneous and stimulated emission, population inversion, optical pumping,
	2nd	engineering and medical applications of lasers.
	3rd	Revision & Doubt solving Class
	4th	Monthly assessment 4
33rd	1st	Previous year question practice
	2nd	Previous year question practice
	3rd	Previous year question practice
	4th	Previous year question practice
34th	1st	Previous year question practice
	2nd	Previous year question practice
	3rd	Previous year question practice
	4th	Previous year question practice

Signature of the Teaching Faculty

Signature of HOD, Humanities & Sciences