



ସରକାରୀ ବହୁବୃତ୍ତି ଶିକ୍ଷାନୁଷ୍ଠାନ ବାଲେଶ୍ୱର, ବାଲେଶ୍ୱର
GOVERNMENT POLYTECHNIC – BALESHWAR, BALESHWAR

Lesson Plan

Discipline: Common		Name of Faculty: Kartikeswar Rana
Subject: Applied Physics (TH 2)	No. of days per week Class allotted: 4 Total period: 128	From Date: 17-08-2026
Week	Class Day	Theory
1st	1 st	Introduction to the Subject, Syllabus and Course Outcomes
	2 nd	Unit 1: Physical world, Units and Measurements Physical quantities; fundamental and derived, Units and systems of units (FPS, CGS and SI units)
	3 rd	Dimensions and dimensional formulae of physical quantities Principle of homogeneity of dimensions
	4 th	Dimensional equations and their applications - conversion from one system of units to other
2nd	1 st	Checking of dimensional correctness of equations
	2 nd	Derivation of simple equations, Limitations of dimensional analysis.
	3 rd	Measurements: Need, measuring instruments, least count, types of measurement (direct, indirect)
	4 th	error propagation, error estimation
3rd	1 st	Significant figures
	2 nd	Problem solving class
	3 rd	Unit 2: Force and Friction Scalar and Vector quantities – examples, Representation of vector, Types of vectors.
	4 th	Types of vectors (Continue), Addition and Subtraction of Vectors, Triangle and Parallelogram law (Statement only)
4th	1 st	Scalar and Vector Product
	2 nd	Resolution of a Vector and its application to inclined plane and lawn roller.
	3 rd	Force, Momentum, Statement and derivation of conservation of linear momentum,
	4 th	Its applications such as recoil of gun, rockets, Impulse and its applications.
5th	1 st	Circular motion, definition of angular displacement, angular velocity, angular acceleration, frequency, time period
	2 nd	Relation between linear and angular velocity, linear acceleration and angular acceleration (related numerical)
	3 rd	Centripetal and Centrifugal forces with live examples, Expression and applications such as banking of roads and bending of cyclist.
	4 th	Doubt Clear Class

Week	Class Day	Theory
6th	1 st	Unit 3: Work, Power and Energy Work: Concept and units, examples of zero work, positive work and negative work
	2 nd	Friction: concept, types
	3 rd	Laws of limiting friction, coefficient of friction
	4 th	Reducing friction and its engineering applications,
7th	1 st	Work done in moving an object on horizontal and inclined plane for rough and plane surfaces and related applications.
	2 nd	Energy and its units, kinetic energy, gravitational potential energy with examples Derivation of gravitational potential energy
	3 rd	Mechanical energy, conservation of mechanical energy for freely falling bodies, trans- formation of energy (examples).
	4 th	Transformation of energy with examples
8th	1 st	Power and its units, power and work relationship, calculation of power (Numerical problems).
	2 nd	Doubt Clear Class
	3 rd	Unit 4: Circular and Rotational Motion Circular motion, angular displacement, angular velocity
	4 th	Angular acceleration, frequency, time period
9th	1 st	Relation between linear and angular velocity, linear and angular acceleration
	2 nd	Moment of inertia and its physical significance
	3 rd	Numerical solved
	4 th	Centripetal and centrifugal force with live examples
10th	1 st	Expression and applications such as banking of roads and bending of cyclist
	2 nd	Translational and rotational motions with examples
	3 rd	Definition of torque and angular momentum and their examples Conservation of angular momentum (quantitative) and its applications
	4 th	Moment of inertia and its physical significance, Radius of gyration for rigid body
11th	1 st	Theorem of parallel and perpendicular axes (statements only)
	2 nd	Moment of inertia of rod, disc, ring and sphere (hollow and solid) (Formulae only).
	3 rd	Unit 5: Properties of Matter Elasticity: definition of stress and strain
	4 th	Moduli of elasticity, Hooke's law, significance of stress-strain curve.
12th	1 st	Pressure: definition, units, atmospheric pressure, gauge pressure, absolute Pressure
	2 nd	Fortin's Barometer and its applications.
	3 rd	Surface tension: concept, units, cohesive and adhesive forces, angle of contact, Ascent Formula (No derivation)
	4 th	Viscosity and coefficient of viscosity:
13th	1 st	Terminal velocity, Stoke's law and effect of temperature on viscosity, application in hydraulic system
	2 nd	Hydrodynamics: Fluid motion, stream line and turbulent flow
	3 rd	Reynold's number Equation of continuity
	4 th	Bernoulli's Theorem (only formula and numericals) and its applications.

Week	Class Day	Theory
14th	1 st	Unit 6: Waves and Oscillation Periodic motion, Oscillatory motion
	2 nd	Simple Harmonic Motion (SHM): definition, expression for displacement, velocity, acceleration, time period, frequency
	3 rd	Total energy of a particle executing SHM
	4 th	Free, forced and resonant vibrations with examples
15th	1 st	Wave motion, transverse and longitudinal waves with examples
	2 nd	Definition of wave velocity, frequency and wavelength and their relationship
	3 rd	Wave equation, amplitude, phase, phase difference, principle of superposition of wave
	4 th	Characteristic of sound wave (Intensity, Loudness, Pitch and Quality), Reverberation, reverberation time
16th	1 st	Echo, noise, coefficient of absorption of sound, methods to control reverberation time and their applications
	2 nd	Ultrasonic waves – Introduction and properties, engineering and medical applications of ultrasonic.
	3 rd	Problem solving
	4 th	UNIT 7: Thermal Physics Concept of heat and temperature, Specific heats, Thermal capacity
17th	1 st	Principal of heat with numerical scales of temperature and their relationships
	2 nd	Expansion of solids, coefficient of linear expansion of solids
	3 rd	Coefficient of superficial and cubical expansion of solids
	4 th	Relation between coefficient of linear expansion, superficial expansion of solid
18th	1 st	Relation between coefficient of linear expansion and cubical expansion of solid
	2 nd	Modes of heat transfer with examples, conduction and convection process
	3 rd	Radiation process with example, Thermal conductivity, factors affecting thermal conductivity
	4 th	Co-efficient of thermal conductivity and it's engineering applications
19th	1 st	Problem solving class
	2 nd	UNIT 8: Optics Basic optical laws; Reflection and Refraction
	3 rd	Refractive index, and image formation by mirrors
	4 th	Images and image formation by lens and thin lenses
20th	1 st	Lens formula, power of lens
	2 nd	Magnification and defects
	3 rd	Total internal reflection, Critical angle and conditions for total internal reflection, applications of total internal reflection in optical fiber
	4 th	Applications of total internal reflection in optical fiber
21st	1 st	Optical fiber application in telecommunication, medical and sensor
	2 nd	Optical Instruments; simple microscope, magnifying power
	3 rd	Problem solving
	4 th	UNIT 9: Electrostatics Coulombs law, unit of charge, Electric field, Electric lines of force and their properties
22nd	1 st	Electric flux, Electric potential and potential difference
	2 nd	Gauss law: Application of Gauss law to find electric field intensity of straight charged conductor
	3 rd	Plane charged sheet and charged sphere.
	4 th	Capacitor and its working, Types of capacitors, Capacitance and its units.

Week	Class Day	Theory
	1 st	Effective capacitance of series and parallel connected circuit

23rd	2 nd	Capacitance of a spherical conductor, parallel plate capacitor
	3 rd	Dielectric and its effect on capacitance
	4 th	Problem solving class
24th	1 st	Unit 10: Current electricity Electric current and its units, Drift velocity
	2 nd	Expression of current in terms of drift velocity, DC and AC current
	3 rd	Resistance and its units, specific resistance, conductance, specific conductance
	4 th	Series and parallel combination of resistance, effect of temperature on resistance
25th	1 st	Ohm's law and its verification, Kirchhoff's laws
	2 nd	Wheatstone bridge and its applications (slide wire bridge only)
	3 rd	Concept of terminal potential difference and Electromotive force (EMF)
	4 th	Heating effect of current, Electric power, Electric energy and its units (related numerical problems)
26th	1 st	Advantages of Electric Energy over other forms of energy
	2 nd	Numericals
	3 rd	UNIT 11: Magnetic effect of current and Electromagnetism Coulombs's law of Magnetism, magnetic field and its units
	4 th	Types of magnetic materials; dia, para and ferromagnetic with their properties
27th	1 st	Magnetic field and its units, magnetic intensity, magnetic lines of force and its properties
	2 nd	Magnetic flux and units, magnetization
	3 rd	Concept of electromagnetic induction, Faraday's Laws
	4 th	Biota-Savart's law, Magnetic field due to infinite straight conductor and at the center of a circular current carrying wire
28th	1 st	Lorentz force (force on moving charge in magnetic field). Force on current carrying conductor placed on a magnetic field
	2 nd	Concept of electromagnetic induction, Faraday's laws of electromagnetic induction
	3 rd	Lenz's law with example
	4 th	Moving coil galvanometer; principle, construction and working
29th	1 st	Conversion of a galvanometer into ammeter and voltmeter.
	2 nd	UNIT 12: Semiconductor and Modern Physics Energy bands in solids, Types of materials (insulator, semi-conductor, conductor)
	3 rd	Intrinsic and extrinsic semiconductors, p-n junction
	4 th	Junction Diode and V-I characteristics, types of junction diodes
30th	1 st	Diode as rectifier – half wave and full wave rectifier (center taped).
	2 nd	Lasers: Energy levels, ionization and excitation potentials
	3 rd	Spontaneous and stimulated emission
	4 th	Population inversion, pumping methods
31st	1 st	Optical feedback and types of lasers
	2 nd	Laser characteristics, engineering and medical applications of lasers
	3 rd	Engineering and medical applications of lasers
	4 th	Numericals
32nd	1 st	Revision
	2 nd	Revision
	3 rd	Revision
	4 th	Revision

BOOK REFERENCES:

1. Applied Physics-I and II (English) by Prof. Vinod Kumar Yadav
2. Text Book of Physics for Class XI & XII (Part-I, Part-II); N.C.E.R.T., Delhi
3. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi

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