GOVERNMENT POLYTECHNIC NAYAGARH		
LESSON PLAN-2025 (W); AY :2025-26		
Discipline: Elect. Engg./Mech Engg.	Semester:1ST	Name of the Teaching Faculty : Mrs. Sushrimayee Behera, Lect. Stage-II Physics
Subject: Applied Physics-I (Th. 2)	No. of days/ per week class allotted: 4	Semester From Date :06/08/2025 to Date: 04/12/2025 No.of Weeks: 15
Week	Class Day	Theory Topics
1st	1st	**Unit1**: Physical world,Units and Measurements
	2nd	Physical quantities ; fundamental and derived, Units and systems of units (FPS, CGS and SI units)
	3rd	Dimensions and dimensional formulae of physical quantities, Principle of homogeneity of dimensions
	4th	Dimensional equations and their applications (conversion from one system of units to other)
2nd	1st	checking of dimensional equations and derivation of simple equations), Limitations of dimensional analysis
	2nd	Measurements: Need, measuring instruments, least count, types of measurement (direct, indirect)
	3rd	Errors in measurements (systematic and random), absolute error, relative error
	4th	error propagation, error estimation and significant figures
3rd	1st	Numericals of Unit 1
	2nd	**Unit 2: Force and Motion**
	3rd	Scalar and Vector quantities– examples
		representation of vector, 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 and its application to inclined plane and lawn roller
	4th	Force, Momentum, Statement and derivation of conservation of linear momentum, its applications such as recoil of gun, rockets, Impulse and its applications
5th	1st	Circular motion,definition of angular displacement, angular velocity, angular acceleration ,frequency, time period
	2nd	Relation between linear and angular velocity, linear Acceleration and angular acceleration (related numerical)
	3rd	Centripetal and Centrifugal forces with live examples, Expression and applications such as banking of roads and bending of cyclist
	4th	Numericals of Unit 2
6th	1st	**Unit 3: Work, Power and Energy**
	2nd	Work: Concept and units, examples of zero work, positive work and negative work
	3rd	Friction: concept, types, laws of limiting friction, coefficient of friction
	4th	reducing friction and its engineering applications
	1st	Work done in moving an object on horizontal and inclined plane for rough and plane surfaces and related applications
		Energy and its units, kinetic energy, gravitational potential energy with examples and derivations
		mechanical energy, conservation of mechanical energy for freely falling bodies, transformation of energy (examples)
		Power and its units, power and work relationship, calculation of power (numerical problems)

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7th	2nd	Numericals of Unit 3
	3rd	Revision of Unit 1 to 3
	4th	**Unit4: Rotational Motion** Translational and rotational motions with examples
8th	1st	Definition of torque and angular momentum and their examples
	2nd	Conservation of angular momentum (quantitative)and its applications.
	3rd	Moment of inertia and its physical significance, radius of gyration for rigid body
	4th	Theorems of parallel and perpendicular axes (statements only)
9th	1st	Moment of inertia of rod, disc, ring and sphere (hollow and solid);(Formulae only)
	2nd	Numericals of Unit 4
	3rd	**Unit5: Properties of Matter** Elasticity: definition of stress and strain, moduli of elasticity
	4th	Hooke's law, significance of stress-strain curve.
10th	1st	Pressure: definition, units, atmospheric pressure, gauge pressure, absolute pressure
	2nd	Fortin's Barometer and its applications.
	3rd	Surface tension: concept, units, cohesive and adhesive forces
	4th	angle of contact, Ascent Formula (No derivation)
11th	1st	applications of surface tension, effect of temperature and impurity on surface tension.
	2nd	Viscosity and coefficient of viscosity: Terminal velocity
	3rd	Stoke'slaw and effect of temperature on viscosity
	4th	application in hydraulic systems
12th	1st	Hydrodynamics: Fluid motion, streamline and turbulent flow
	2nd	Reynold's number, Equation of continuity
	3rd	Bernoulli's Theorem (only formula and numerical) and its applications
	4th	Numericals of Unit 5
13th	1st	**Unit 6: Heat and Thermometry** Concept of heat and temperature, modes of heat transfer (conduction, convection and radiation with examples)
	2nd	specific heats, scales of temperature and their relationship
	3rd	Types of Thermometer (Mercury thermometer, bimetallic thermometer)
	4th	Types of Thermometer (Platinum resistance thermometer, Pyrometer)
14th	1st	Usage of Thermometers
	2nd	Expansion of solids, liquids and gases
	3rd	coefficient of linear, surface and cubical expansions
	4th	Relation between coefficient of linear and surface expansions
15th	1st	Relation between coefficient of linear and cubical expansions
	2nd	Co-efficient of thermal conductivity, engineering applications
	3rd	Numericals of Unit 6
	4th	Revision of Unit 4 to 6

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Discipline: Elect. /Cse/Civil/Mech	Semester: 2nd	Name Of The Teaching Faculty: Sushrimayee Behera
Subject: Applied Physics - II	No. Of Days/Week Class Allotted: 4	No. Of Weeks:15 From – 04.02.2025 to 17.05.2025
Week	Class Day	Theory Topics
1	1	Introduction to Wave Motion and Types of Waves
	2	Wave Equation and Superposition Principle
	3	Introduction to Simple Harmonic Motion (SHM)
	4	Time Period, Frequency, and Energy in SHM
2	1	Simple Harmonic Progressive Waves and Energy Transfer
	2	Vibrations of a Cantilever and Resonance
	3	Acoustics of Buildings: Reverberation, Echo, Noise
	4	Ultrasonic Waves: Properties and Applications
3	1	Basic Optical Laws: Reflection and Refraction
	2	Refractive Index and Image Formation by Mirrors and Lenses
	3	Lens Formula, Power of Lens, and Magnification
	4	Defects in Lenses and Corrective Measures
4	1	Total Internal Reflection, Critical Angle, and Applications in Optical Fibers
	2	Optical Instruments: Simple and Compound Microscope
	3	Astronomical Telescope, Magnifying Power, and Resolving Power
	4	Coulomb's Law and Unit of Charge
5	1	Electric Field and Electric Lines of Force
	2	Electric Flux, Electric Potential, and Potential Difference
	3	Gauss's Law and its Application to Different Charge Distributions
	4	Capacitors and Their Working
6	1	Types of Capacitors and Capacitance
	2	Capacitance of a Parallel Plate Capacitor and its Calculation

"		3	Dielectric and its Effect on Capacitance, Dielectric Breakdown
		4	Electric Current and Its Units
"	7	1	Direct and Alternating Current
		2	Resistance and Its Units
		3	Specific Resistance, Conductance, and Specific Conductance
		4	Series and Parallel Combination of Resistances
"	8	1	Factors Affecting Resistance of a Wire and Carbon Resistors with Colour Coding
		2	Ohm's Law and Its Verification
		3	Kirchhoff's Laws and Wheatstone Bridge (Slide Wire Bridge)
"		4	Terminal Potential Difference and Electromotive Force (EMF)
"	9	1	Heating Effect of Current, Electric Power, and Electric Energy
		2	Types of Magnetic Materials: Diamagnetic, Paramagnetic, and Ferromagnetic with Properties
		3	Magnetic Field and Its Units
		4	Magnetic Intensity, Magnetic Lines of Force, and Magnetic Flux
"	10	1	Concept of Magnetization
		2	Electromagnetic Induction and Faraday's Laws
		3	Lorentz Force (Force on a Moving Charge in a Magnetic Field)
"		4	Force on a Current-Carrying Conductor and Rectangular Coil in a Magnetic Field
"	11	1	Moving Coil Galvanometer: Principle, Construction, and Working
		2	Conversion of a Galvanometer into Ammeter and Voltmeter
		3	Energy Bands in Solids
		4	Types of Materials: Insulator, Semiconductor, Conductor
"	12	1	Intrinsic and Extrinsic Semiconductors
		2	p-n Junction, Junction Diode, and V-I Characteristics
		3	Types of Junction Diodes
"		4	Diode as Rectifier: Half-Wave and Full-Wave Rectifier (Centre

		Tapped)
13	1	Transistor: Description, Three Terminals, and Types (pnp and npn)
	2	Some Electronic Applications of Transistors (list only)
	3	Photocells and Solar Cells: Working Principle and Applications
	4	Lasers: Energy Levels, Ionization, and Excitation Potentials
14	1	Spontaneous and Stimulated Emission, Population Inversion
	2	Pumping Methods, Optical Feedback
	3	Types of Lasers: Ruby, He-Ne, and Semiconductor
	4	Laser Characteristics and Engineering & Medical Applications
15	1	Fiber Optics: Introduction, Light Propagation, and Acceptance Angle
	2	Fiber Types and Applications in Telecommunication, Medical, and Sensors
	3	Nanoscience and Nanotechnology: Introduction and Nanomaterials
	4	Properties at Nanoscale, Nanotechnology-Based Devices and Applications

15.01.2025
Lect. Physics