

SUDDHANANDA ENGINEERING AND RESEARCH CENTER

LESSON PLAN: ENGG. PHYSICS FACULTY NAME- **PROF. MADHUSMITA MOHARANA**

UNIT 1 - UNITS AND DIMENSIONS

SL.NO	TOPIC	DAY	DATE
1	Physical quantities - (Definition), Definition of fundamental and derived units, systems of units (FPS, CGS, MKS and SI units).	1	
2	Definition of dimension and Dimensional formulae of physical quantities.	2	
3	Dimensional equations and Principle of homogeneity, Checking the dimensional correctness of Physical relations.	2	

UNIT 2 - SCALARS AND VECTORS

SL.NO	TOPIC	DAY	DATE
1	Scalar and Vector quantities (definition and concept), Representation of a Vector – examples, types of vectors.	1	
2	Triangle and Parallelogram law of vector Addition (Statement only). Simple Numerical.	2	
3	Resolution of Vectors – Simple Numericals on Horizontal and Vertical components, Vector multiplication (scalar product and vector product of vectors).	3	

UNIT 3 - KINEMATICS

SL.NO	TOPIC	DAY	DATE
1	Concept of Rest and Motion, Displacement, Speed, Velocity, Acceleration & FORCE (Definition, formula, dimension & SI units).	1	
2	Equations of Motion under Gravity (upward and downward motion) - no derivation, Circular motion: Angular displacement, Angular velocity and Angular acceleration (definition, formula & SI units).	2	
3	Relation between –(i) Linear & Angular velocity, (ii) Linear & Angular acceleration).	3	
4	Define Projectile, Examples of Projectile. Expression for Equation of Trajectory, Time of Flight.	4	
5	Expression for Maximum Height and Horizontal Range for a projectile fired at an angle.	5	
6	Condition for maximum Horizontal Range.	6	

UNIT 4 – WORK AND FRICTION

SL.NO	TOPIC	DAY	DATE
1	Work – Definition, Formula & SI units.	1	
2	Friction – Definition & Concept.	2	
3	Types of friction (static, dynamic), Limiting Friction (Definition with Concept).	3	
4	Laws of Limiting Friction (Only statement, No Experimental Verification), Coefficient of Friction – Definition & Formula.	4	
5	Coefficient of Friction – Definition & Formula, Simple Numericals, Methods to reduce friction.	5	

UNIT 5 - GRAVITATION

SL.NO	TOPIC	DAY	DATE
1	Newton's Laws of Gravitation – Statement and Explanation.	1	
2	Universal Gravitational Constant (G)- Definition, Unit and Dimension, Acceleration due to gravity (g)- Definition and Concept.	2	
3	Definition of mass and weight, Relation between g and G.	3	
4	Variation of g with altitude and depth (No derivation – Only Explanation).	4	
5	5 Kepler's Laws of Planetary Motion (Statement only).	5	

UNIT 6 - OSCILLATIONS AND WAVES

SL.NO	TOPIC	DAY	DATE
1	Simple Harmonic Motion (SHM) - Definition & Examples.	1	
2	Expression (Formula/Equation) for displacement, velocity, acceleration of a body/ particle in SHM.	2	
3	Wave motion – Definition & Concept, Transverse and Longitudinal wave motion – Definition, Examples & Comparison.	3	
4	Definition of different wave parameters (Amplitude, Wavelength, Frequency, Time Period).	4	
5	Derivation of Relation between Velocity, Frequency and Wavelength of a wave.	5	
6	Ultrasonics – Definition, Properties & Applications.	6	

UNIT 7 - HEAT AND THERMODYNAMICS

SL.NO	TOPIC	DAY	DATE
1	Heat and Temperature – Definition & Difference, Units of Heat (FPS, CGS, MKS & SI).	1	
2	Specific Heat (concept, definition, unit, dimension and simple numerical).	2	
3	Change of state (concept), Latent Heat (concept, definition, unit, dimension and simple numerical).	3	
4	Thermal Expansion – Definition & Concept , Expansion of Solids (Concept).	4	
5	Coefficient of linear, superficial and cubical expansions of Solids – Definition & Units.	5	
6	Relation between α , β & γ .	6	
7	Work and Heat - Concept & Relation, Joule’s Mechanical Equivalent of Heat (Definition, Unit), First Law of Thermodynamics (Statement and concept only).	7	

UNIT 8 – OPTICS

SL.NO	TOPIC	DAY	DATE
1	Reflection & Refraction – Definition, Laws of reflection and refraction (Statement only).	1	
2	Refractive index – Definition, Formula & Simple numerical, Critical Angle and Total internal reflection – Concept, Definition & Explanation.	2	
3	Refraction through Prism (Ray Diagram & Formula only – NO derivation).	3	
4	Fiber Optics – Definition, Properties & Applications.	4	

UNIT 9 – ELECTROSTATICS & MAGNETOSTATICS

SL.NO	TOPIC	DAY	DATE
1	Electrostatics – Definition & Concept, Statement & Explanation of Coulombs laws, Definition of Unit charge.	1	
2	Absolute & Relative Permittivity (ϵ) – Definition, Relation & Unit, Electric potential.	2	
3	Electric Potential difference (Definition, Formula & SI Units), Electric field, Electric field intensity (E) – Definition, Formula & Unit.	3	
4	Capacitance - Definition, Formula & Unit, Series and Parallel combination of Capacitors (No derivation, Formula for effective/Combined/total capacitance & Simple numericals).	4	
5	Magnet, Properties of a magnet, Coulomb’s Laws in Magnetism –	5	

	Statement & Explanation, Unit Pole (Definition).		
6	Magnetic field, Magnetic Field intensity (H) - (Definition, Formula & SI Unit).	6	
7	Magnetic lines of force (Definition and Properties), Magnetic Flux (Φ) & Magnetic Flux Density (B) – Definition, Formula & Unit.	7	

UNIT 10 – CURRENT ELECTRICITY

SL.NO	TOPIC	DAY	DATE
1	Electric Current – Definition, Formula & SI Units.	1	
2	Ohm’s law and its applications.	2	
3	Series combination of resistors (No derivation, Formula for effective/ Combined/ total resistance & Simple numericals).	3	
4	Parallel combination of resistors (No derivation, Formula for effective/ Combined/ total resistance & Simple numericals).	4	
5	Kirchhoff’s laws (Statement & Explanation with diagram).	5	
6	Application of Kirchhoff’s laws to Wheatstone bridge - Balanced condition of Wheatstone’s Bridge – Condition of Balance (Equation).	6	

UNIT 11 – ELECTROMAGNETISM & ELECTROMAGNETIC INDUCTION

SL.NO	TOPIC	DAY	DATE
1	Electromagnetism – Definition & Concept.	1	
2	Force acting on a current carrying conductor placed in a uniform magnetic field, Fleming’s Left Hand Rule.	2	
3	Faraday’s Laws of Electromagnetic Induction (Statement only).	3	
4	Lenz’s Law (Statement), Fleming’s Right Hand Rule.	4	
5	Comparison between Fleming’s Right Hand Rule and Fleming’s Left Hand Rule.	5	

UNIT 12 - MODERN PHYSICS

SL.NO	TOPIC	DAY	DATE
1	LASER & laser beam (Concept and Definition), Principle of LASER (Population Inversion & Optical Pumping).	1	
2	Properties & Applications of LASER.	2	
3	Wireless Transmission – Ground Waves, Sky Waves, Space Waves (Concept & Definition).	3	