

**ACADEMIC LESSON PLAN OF ENGG.PHYSICS-2023(SUMMER)****Subject:Engg.Physics Theory(Th 2a)****Department: Math & Sc.**

Discipline: Civil Engg. & Mech. Engg.	Name of the teaching faculty: Arundhati Behera Sashwata Sahoo	
Subject-Engg.Physics	Semester from : 20.03.2023 to 27.06.2023 No. of weeks:15 weeks	
WEEK	No.of days/per week class allotted. 4p/week.	Theory Topics
1 <sup>st</sup> week	1 <sup>st</sup>	UNIT 1 - UNITS AND DIMENSIONS 1.1 Physical quantities - (Definition). 1.2 Definition of fundamental and derived units, systems of units (FPS, CGS, MKS and SI units).
	2 <sup>nd</sup>	1.3 Definition of dimension and Dimensional formulae of physical quantities. 1.4 Dimensional equations and Principle of homogeneity.
	3 <sup>rd</sup>	1.5 Checking the dimensional correctness of Physical relations.
	4 <sup>th</sup>	UNIT 2 - SCALARS AND VECTORS 2.1 Scalar and Vector quantities (definition and concept), Representation of a Vector – examples, types of vectors.
2 <sup>nd</sup> week	1 <sup>st</sup>	2.2 Triangle and Parallelogram law of vector Addition (Statement only). Simple Numerical. 2.3 Resolution of Vectors – Simple Numericals on Horizontal and Vertical components.
	2 <sup>nd</sup>	2.4 Vector multiplication (scalar product and vector product of vectors).
	3 <sup>rd</sup>	UNIT 3 - KINEMATICS 3.1 Concept of Rest and Motion. 3.2 Displacement, Speed, Velocity, Acceleration & FORCE (Definition, formula, dimension & SI units).

	4 <sup>th</sup>	3.3 Equations of Motion under Gravity (upward and downward motion) - no derivation.
3 <sup>rd</sup> week	1 <sup>st</sup>	3.4 Circular motion: Angular displacement, Angular velocity and Angular acceleration (definition, formula & SI units).
	2 <sup>nd</sup>	3.5 Relation between –(i) Linear & Angular velocity, (ii) Linear & Angular acceleration)

	3 <sup>rd</sup>	3.6 Equations of Motion under Gravity (upward and downward motion) - no derivation.
	4 <sup>th</sup>	3.7 Expression for Equation of Trajectory, Time of Flight, Maximum Height and Horizontal Range for a projectile fired at an angle, Condition for maximum Horizontal Range.UNIT.
4 <sup>th</sup> week	1 <sup>st</sup>	4 – WORK AND FRICTION 4.1 Work – Definition, Formula & SI units .
	2 <sup>nd</sup>	4.2 Friction – Definition & Concept. 4.3 Types of friction (static, dynamic), Limiting Friction (Definition with Concept).
	3 <sup>rd</sup>	4.4 Laws of Limiting Friction (Only statement, No Experimental Verification).
	4 <sup>th</sup>	4.5 Coefficient of Friction – Definition & Formula, Simple Numericals.
5 <sup>th</sup> week	1 <sup>st</sup>	4.6 Methods to reduce friction.
	2 <sup>nd</sup>	UNIT 5 – GRAVITATION 5.1 Newton’s Laws of Gravitation – Statement and Explanation.
	3 <sup>rd</sup>	5.2 Universal Gravitational Constant (G)- Definition, Unit and Dimension. 5.3 Acceleration due to gravity (g)- Definition and Concept.
	4 <sup>th</sup>	5.4 Definition of mass and weight. 5.5 Relation between g and G.
6 <sup>th</sup> week	1 <sup>st</sup>	5.6 Variation of g with altitude and depth (No derivation – Only Explanation).
	2 <sup>nd</sup>	5.7 Kepler’s Laws of Planetary Motion (Statement only).
	3 <sup>rd</sup>	UNIT 6 - OSCILLATIONS AND WAVES 6.1 Simple Harmonic Motion (SHM) - Definition & Examples.
	4 <sup>th</sup>	6.2 Expression (Formula/Equation) for displacement, velocity, acceleration of a body/ particle in SHM.6.3. Wave motion – Definition & Concept.

7 <sup>th</sup> week	1 <sup>st</sup>	6.4 Transverse and Longitudinal wave motion – Definition, Examples & Comparison .
	2 <sup>nd</sup>	6.5 Definition of different wave parameters (Amplitude, Wavelength, Frequency, Time Period).
	3 <sup>rd</sup>	6.6 Derivation of Relation between Velocity, Frequency and Wavelength of a wave .
	4 <sup>th</sup>	6.7 Ultrasonics – Definition, Properties & Applications.

8 <sup>th</sup> week	1 <sup>st</sup>	UNIT 7 - HEAT AND THERMODYNAMICS 7.1 Heat and Temperature – Definition & Difference. 7.2 Units of Heat (FPS, CGS, MKS & SI).
	2 <sup>nd</sup>	7.3 Specific Heat (concept, definition, unit, dimension and simple numerical).
	3 <sup>rd</sup>	7.4 Change of state (concept), Latent Heat (concept, definition, unit, dimension and simple numerical).
	4 <sup>th</sup>	7.5 Thermal Expansion – Definition & Concept 7.6 Expansion of Solids (Concept) 7.7 Coefficient of linear, superficial and cubical expansions of Solids – Definition & Units.
9 <sup>th</sup> week	1 <sup>st</sup>	7.8 Relation between $\alpha$ , $\beta$ & $\gamma$ .
	2 <sup>nd</sup>	7.9 Work and Heat - Concept & Relation. 7.10 Joule's Mechanical Equivalent of Heat (Definition, Unit).
	3 <sup>rd</sup>	7.11 First Law of Thermodynamics (Statement and concept only).
	4 <sup>th</sup>	UNIT 8 – OPTICS 8.1 Reflection & Refraction – Definition. 8.2 Laws of reflection and refraction (Statement only).
10 <sup>th</sup> week	1 <sup>st</sup>	8.3 Refractive index – Definition, Formula & Simple numerical.
	2 <sup>nd</sup>	8.4 Critical Angle and Total internal reflection – Concept, Definition & Explanation.
	3 <sup>rd</sup>	8.5 Refraction through Prism (Ray Diagram & Formula only – NO derivation). 8.6 Fiber Optics – Definition, Properties & Applications.
	4 <sup>th</sup>	UNIT 9 – ELECTROSTATICS & MAGNETOSTATICS 9.1 Electrostatics – Definition & Concept. 9.2 Statement & Explanation of Coulombs laws, Definition of Unit charge.
11 <sup>th</sup> week	1 <sup>st</sup>	9.3 Absolute & Relative Permittivity ( $\epsilon$ ) – Definition, Relation & Unit. 9.4 Electric potential and Electric Potential difference (Definition, Formula & SI Units).
	2 <sup>nd</sup>	9.5 Electric field, Electric field intensity (E) – Definition, Formula & Unit. 9.6 Capacitance - Definition, Formula & Unit.
	3 <sup>rd</sup>	9.7 Series and Parallel combination of Capacitors (No derivation, Formula for effective/Combined/total capacitance & Simple numericals).
	4 <sup>th</sup>	9.8 Magnet, Properties of a magnet. 9.9 Coulomb's Laws in Magnetism – Statement & Explanation, Unit Pole (Definition).
12 <sup>th</sup> week	1 <sup>st</sup>	9.10 Magnetic field, Magnetic Field intensity (H) - (Definition, Formula & SI Unit). 9.11 Magnetic lines of force ( Definition and Properties).

	2 <sup>nd</sup>	9.12 Magnetic Flux ( $\Phi$ ) & Magnetic Flux Density (B) – Definition, Formula & Unit.
	3 <sup>rd</sup>	UNIT 10 – CURRENT ELECTRICITY 10.1 Electric Current – Definition, Formula & SI Units.

	4 <sup>th</sup>	10.2 Ohm's law and its applications.
13 <sup>th</sup> week	1 <sup>st</sup>	10.3 Series and Parallel combination of resistors (No derivation, Formula for effective/ Combined/ total resistance & Simple numericals).
	2 <sup>nd</sup>	10.4 Kirchhoff's laws(Statement & Explanantion with diagram).
	3 <sup>rd</sup>	10.5 Application of Kirchhoff's laws to Wheatstone bridge - Balanced condition of Wheatstone's Bridge – Condition of Balance (Equation).
	4 <sup>th</sup>	UNIT 11 – ELECTROMAGNETISM & ELECTROMAGNETIC INDUCTION 11.1Electromagnetism – Definition & Concept.
14 <sup>th</sup> week	1 <sup>st</sup>	11.2 Force acting on a current carrying conductor placed in a uniform magnetic field.
	2 <sup>nd</sup>	Fleming's Left Hand Rule 11.3 Faraday's Laws of Electromagnetic Induction (Statement only).
	3 <sup>rd</sup>	11.4 Lenz's Law (Statement) 11.5 Fleming's Right Hand Rule.
	4 <sup>th</sup>	11.6 Comparison between Fleming's Right Hand Rule and Fleming's Left Hand Rule.
15 <sup>th</sup> week	1 <sup>st</sup>	UNIT 12 - MODERN PHYSICS 12.1 LASER & laser beam (Concept and Definition). 12.2 Principle of LASER (Population Inversion & Optical Pumping).
	2 <sup>nd</sup>	12.3 Properties & Applications of LASER .
	3 <sup>rd</sup>	12.4 Wireless Transmission – Ground Waves, Sky Waves, Space Waves ( Concept & Definition)..
	4 <sup>th</sup>	Previous year question paper discussion and doubt clearing class.

*Arundhati Behera*

Sashwata Sahoo

Signature of the faculty