ACADEMIC LESSON PLAN OF ENGG.PHYSICS- 2022(WINTER)

Subject:Engg.Physics Theory

Department: Math & Sc.

Discipline	Name of the teaching faculty: Arundhati Behera Sashwata Sahoo	
Subject-Engg.Physics	Semester from : 25.10.2022 to 31.01.2023 No. of weeks:15 weeks	
WEEK	No.of days/per week class allotted. 4p/week.	Theory/Practical Topics
1st week	1st	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).
	2nd	1.3 Definition of dimension and Dimensional formulae of physical quantities. 1.4 Dimensional equations and Principle of homogeneity.
	3rd	1.5 Checking the dimensional correctness of Physical relations.
2nd week	1st	UNIT 2 - SCALARS AND VECTORS 2.1 Scalar and Vector quantities (definition and concept), Representation of a Vector – examples, types of vectors.
	2nd	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.
	3rd	2.4 Vector multiplication (scalar product and vector product of vectors).
	4th	UNIT 3 - KINEMATICS 3.1 Concept of Rest and Motion. 3.2 Displacement, Speed, Velocity, Acceleration & FORCE (Definition, formula, dimension & SI units).
3rd week	1st	3.3 Equations of Motion under Gravity (upward and downward motion) - no derivation.
	2nd	3.4 Circular motion: Angular displacement, Angular velocity

		and Angular acceleration (definition, formula & SI units).
	3rd	3.5 Relation between –(i) Linear & Angular velocity, (ii) Linear & Angular acceleration)
	4th	3.3 Equations of Motion under Gravity (upward and downward motion) - no derivation.
4th week	1st	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.
	2nd	4 – WORK AND FRICTION 4.1 Work – Definition, Formula & SI units .
	3rd	4.2 Friction – Definition & Concept. 4.3 Types of friction (static, dynamic), Limiting Friction (Definition with Concept).
	4th	4.4 Laws of Limiting Friction (Only statement, No Experimental Verification).
5th week	1st	4.5 Coefficient of Friction – Definition & Formula, Simple Numericals.
	2nd	4.6 Methods to reduce friction.
	3rd	UNIT 5 – GRAVITATION 5.1 Newton's Laws of Gravitation – Statement and Explanation.
	4th	5.2 Universal Gravitational Constant (G)- Definition, Unit and Dimension. 5.3 Acceleration due to gravity (g)- Definition and Concept.
6th week	1st	5.4 Definition of mass and weight. 5.5 Relation between g and G.
	2nd	5.6 Variation of g with altitude and depth (No derivation – Only Explanation).
	3rd	5.7 Kepler's Laws of Planetary Motion (Statement only).
	4th	UNIT 6 - OSCILLATIONS AND WAVES 6.1 Simple Harmonic Motion (SHM) - Definition & Examples.
7th week	1st	6.2 Expression (Formula/Equation) for displacement, velocity, acceleration of a body/ particle in SHM.6.3. Wave motion – Definition & Concept.
	2nd	6.4 Transverse and Longitudinal wave motion – Definition, Examples & Comparison .
	3rd	6.5 Definition of different wave parameters (Amplitude, Wavelength, Frequency, Time Period.
	4th	6.6 Derivation of Relation between Velocity, Frequency and Wavelength of a wave .

8th week	1st	6.7 Ultrasonics – Definition, Properties & Applications.
	2nd	UNIT 7 - HEAT AND THERMODYNAMICS 7.1 Heat and Temperature – Definition & Difference. 7.2 Units of Heat (FPS, CGS, MKS & SI).
	3rd	7.3 Specific Heat (concept, definition, unit, dimension and simple numerical).
	4th	7.4 Change of state (concept), Latent Heat (concept, definition, unit, dimension and simple numerical).
9th week	1st	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.
	2nd	7.8 Relation between α, β & ϒ.
	3rd	7.9 Work and Heat - Concept & Relation. 7.10 Joule's Mechanical Equivalent of Heat (Definition, Unit).
	4th	7.11 First Law of Thermodynamics (Statement and concept only).
10th week	1st	UNIT 8 – OPTICS 8.1 Reflection & Refraction – Definition. 8.2 Laws of reflection and refraction (Statement only).
	2nd	8.3 Refractive index – Definition, Formula &Simple numerical.
	3rd	8.4 Critical Angle and Total internal reflection – Concept, Definition & Explanation.
	4th	8.5 Refraction through Prism (Ray Diagram & Formula only – NO derivation).8.6 Fiber Optics – Definition, Properties & Applications.
11th week	1st	UNIT 9 – ELECTROSTATICS & MAGNETOSTATICS 9.1 Electrostatics – Definition & Concept. 9.2 Statement & Explanation of Coulombs laws, Definition of Unit charge.
	2nd	9.3 Absolute & Relative Permittivity (ε) – Definition, Relation & Unit. 9.4 Electric potential and Electric Potential difference (Definition, Formula & SI Units).
	3rd	9.5 Electric field, Electric field intensity (E) – Definition, Formula & Unit. 9.6 Capacitance - Definition, Formula & Unit.
	4th	9.7 Series and Parallel combination of Capacitors (No derivation, Formula for effective/Combined/total capacitance & Simple numericals).
12th week	1st	9.8 Magnet, Properties of a magnet. 9.9 Coulomb's Laws in Magnetism – Statement & Explanation, Unit Pole (Definition).
	2nd	9.10 Magnetic field, Magnetic Field intensity (H) - (Definition, Formula & SI Unit). 9.11 Magnetic lines of force (Definition and Properties).
	3rd	9.12 Magnetic Flux (Φ) & Magnetic Flux Density (B) – Definition, Formula & Unit.

	4th	UNIT 10 – CURRENT ELECTRICITY 10.1 Electric Current – Definition, Formula & SI Units.
13th week	1st	10.2 Ohm's law and its applications.
	2nd	10.3 Series and Parallel combination of resistors (No derivation, Formula for effective/ Combined/ total resistance & Simple numericals).
	3rd	10.4 Kirchhoff's laws(Statement & Explanantion with diagram).
	4th	10.5 Application of Kirchhoff's laws to Wheatstone bridge - Balanced condition of Wheatstone's Bridge – Condition of Balance (Equation).
14th week	1st	UNIT 11 – ELECTROMAGNETISM & ELECTROMAGNETIC INDUCTION 11.1Electromagnetism – Definition & Concept.
	2nd	11.2 Force acting on a current carrying conductor placed in a uniform magnetic field.
	3rd	Fleming's Left Hand Rule 11.3 Faraday's Laws of Electromagnetic Induction (Statement only).
	4th	11.4 Lenz's Law (Statement) 11.5 Fleming's Right Hand Rule.
15th week	1st	11.6 Comparison between Fleming's Right Hand Rule and Fleming's Left Hand Rule.
	2nd	UNIT 12 - MODERN PHYSICS 12.1 LASER & laser beam (Concept and Definition). 12.2 Principle of LASER (Population Inversion & Optical Pumping). 12.3 Properties & Applications of LASER .
	3rd	12.4 Wireless Transmission – Ground Waves, Sky Waves, Space Waves (Concept & Definition)..
	4th	Previous year question paper discussion and doubt clearing class.

Arundhati Behura Sashwata Sahoo

Signature of the faculty