LESSON PLAN

ON

ENGINEERING PHYSICS

(THEORY)

1ST SEMESTER

SESSION: 2022-23

PREPARED BY

PRAJNA PRIYADRASHINEE ROUT

LECTURER IN PHYSICS

GOVERNMENT POLYTECHNIC, PURI

	GOVERNMENT POLYTECHNIC, PURIDEPARTMENTOFMECHANICALENGINEERING	
Discipline: CIVIL	Semester: 1ST	Name of the Teaching Faculty: **PRAJNA PRIYADARSHINEE ROUT, LECTURER IN PHYSICS**
Subject: ENGG. PHYSICS	No. of days/ per week class allotted:**04**	Semester From date: 25.10.2022 To Date: 31.01.2023 No. of Weeks: 14
PRE-REQUISITE	Basic knowledge about concept and application of Physics	
COURSE OUTCOMES	**CO1:Understand the basic concept of Kinematics, Friction, Gravitaion, Electromagnetism** **CO2: Understand the application of Physics in various Technologies.** **CO3: Can solve problems on complicated electrical circuit by applying Kirchoff's Law** **CO4: Understand the basic concepts of Heat & Thermodynamics, Magnetism, Electricity**	

Week	Class Day	Theory/Practical Topics	DELIVERY METHOD
1ST	1ST	Introduction to: **Engg. Physics (Th-4a) and its syllabus, Question paper pattern and motivation**	Whiteboard
	2ND	Unit-1: UNIT & DIMENSIONS **Physical quantities, Units, types of units and system of units**	Whiteboard
	3RD	Unit-1: UNIT & DIMENSIONS **Dimension and dimensional formulae of physical quantities**	Whiteboard
	4TH	Unit-1: UNIT & DIMENSIONS **Principle of homogeneity and application of dimensional analysis: Checking the correctness of physical relations and Numerical**	Whiteboard
2ND	1ST	Unit-2:SCALARS AND VECTORS **Concept of scalar and vector quantities with definition, types of vectors, Rules of vector addition: Statements of Triangle law of vector addition**	Whiteboard
	2ND	Unit-2: SCALARS AND VECTORS **Parallelogram law of vector addition and simple numericals, Concept on Resolution of vectors with simple numericals on Horizontal and vertical components**	Whiteboard
	3RD	Unit-2: SCALARS AND VECTORS **Vector multiplication: Dot product and Cross Product with simple numericals on dot and cross products**	Whiteboard
	4TH	Unit-3: KINEMATICS **Concept of Rest and Motion with examples, Fundamental ideas on distance, displacement, speed, velocity, acceleration and force, equations of motion under gravity**	Whiteboard

		both for upward and downward motion	
3RD	1ST	Unit-3: KINEMATICS **Circular motion: Conceptual idea on circular motion and terms related to circular motion such as angular displacement, angular velocity and angular acceleration.**	Whiteboard
	2ND	Unit-3: Kinematics **Derivations of Relation between- (i) Linear & angular velocity, (ii) Linear & Angular acceleration**	Whiteboard
	3RD	Unit-3: KINEMATICS **Projectile motion: Definition and examples, Expression for equation of Trajectory, Time of Flight, Maximum Height and Horizontal Range for a projectile fired at an angel, condition for maximum horizontal range with simple numericals**	Whiteboard
	4TH	Unit-4: WORK AND FRICTION **Definition of work, its formula and SI unit with simple numericals**	Whiteboard
4TH	1ST	Unit-4: WORK AND FRICTION **Concept of friction with definition and simple examples, Types of friction**	Whiteboard
	2ND	Unit-4: WORK AND FRICTION **Definition with concept on limiting friction, and laws of limiting friction (statement only)**	Whiteboard
	3RD	Unit-4: WORK AND FRICTION **Theory on Coefficient of Friction and simple numerical, Methods to reduce friction with practical examples**	Whiteboard
	4TH	**QUIZ & ASSIGNMENT-1**	Whiteboard
5TH	1ST	Unit-5: GRAVITATION **Introduction, a detail explanation on Newton's Laws of Gravitation (1st and 2nd law)**	PPT
	2ND	Unit-5: GRAVITATION **Definition and concept of acceleration due to gravity (g), Relation between 'g' and 'G' and definition of mass and weight**	Whiteboard
	3RD	Unit-5: GRAVITATION **Explanation (No derivation) on variation of 'g' with altitude and depth, statements on Kepler's Laws of Planetary motion**	Whiteboard
	4th	Unit-6: OSCILLATIONS AND WAVES **Definition and examples on Simple Harmonic Motion (SHM), expressions for displacement, velocity and acceleration of a body or particle in SHM**	Whiteboard & PPT
6TH	& 1st		
	2nd & 3rd	Unit-6: OSCILLATIONS AND WAVES **Wave Motion (Definition & Concept), Transverse and Longitudinal wave motion (Definition, examples and Comparison)**	Whiteboard
	4TH	Unit-6: OSCILLATIONS AND WAVES **Wave parameters and Establish a relation between velocity, frequency and Time period, Ultrasonics- Definition, properties & Applications**	Whiteboard
7TH	& 1ST		

	2ND	Unit-7: HEAT AND THERMODYNAMICS **Heat & temperature-Definition and difference, Units of Heat (FPS, CGS, MKS & SI)**	Whiteboard
	3RD	Unit-7: HEAT AND THERMODYNAMICS **Fundamental ides on Specific heat, Change of State and Latent Heat with simple numericals**	Whiteboard
8TH	4TH & 1ST	Unit-7: HEAT AND THERMODYNAMICS **Concept on Thermal expansion and Coefficient of linear (α), superficial (β) and cubical (γ) expansions of Solids, Relation between α, β and γ**	Whiteboard
	2ND	Unit-7: HEAT AND THERMODYNAMICS **Definition and Relation between Work and Heat, Joule's Mechanical Equivalent of Heat, Statement and explanation on 1st law of thermodynamics**	PPT
	3RD	Unit-8: OPTICS **Concept of Reflection and laws of Reflection, Concept of Refraction and laws of Refraction**	Whiteboard
	4TH	**Refractive index (Definition, formula and Simple numericals)**	Whiteboard
9TH	1ST	Unit-8: OPTICS **Concept and Explanation of Total Internal Reflection and Critical angle**	Whiteboard
	2ND	Unit-8: OPTICS **Definition, Properties and Applications on Fiber Optics**	Whiteboard
	3RD & 4TH	Unit-9: ELECTROSTATICS AND MAGNETOSTATICS **Concept of Electric field and Electric field intensity, Statement and Explanation of Coulomb's law and definition of Unit charge, Absolute & Relative Permittivity (Definition, Relation & Unit),**	Whiteboard
10TH	1ST & 2ND	Unit-9: ELECTROSTATICS AND MAGNETOSTATICS **Electric potential & Electric potential difference (Definition, formula & SI units), Concept of capacitor and capacitance, Series and parallel combination of capacitors: Formula for equivalent capacitance and simple numericals**	Whiteboard
	3RD	Unit-9: ELECTROSTATICS AND MAGNETOSTATICS **Fundamental idea on magnet, Coulomb's law in magnetism and definition of Unit pole**	Whiteboard
	4TH	Unit-9: ELECTROSTATICS AND MAGNETOSTATICS **Definition of magnetic field and Magnetic field Intensity (H) with its formula and SI unit, Magnetic lines of force-Definition and Properties**	Whiteboard
11TH	1ST	Unit-9: ELECTROSTATICS AND MAGNETOSTATICS **Magnetic flux(ϕ) and Magnetic flux density (B)**	Whiteboard
	2ND	Unit-10: CURRENT ELECTRICITY **Introduction to Electric Current, Ohm's law and its applications**	Whiteboard
	3RD	Unit-10: CURRENT ELECTRICITY **Series and parallel combination of resistors: Formula for**	Lecture notes

		equivalent resistance and simple numericals	
	4TH	Unit-10: CURRENT ELECTRICITY **Kirchhoff's laws: Statements & Explanation with diagram**	Whiteboard
12TH	1ST	Unit-10: CURRENT ELECTRICITY **Application of Kirchhoff's laws to Wheatstone bridge-Derivation of balance condition of Wheatstone bridge**	Whiteboard
	2ND	Unit-11: ELECTROMAGNETISM AND ELECTROMAGNETIC INDUCTION **Introduction, Force acting on current carrying conductor placed in a uniform magnetic field, Fleming's left hand rule**	Whiteboard
	3RD & 4TH	Unit-11: ELECTROMAGNETISM AND ELECTROMAGNETIC INDUCTION **Statement on Faraday's Laws of Electromagnetic Induction & Lenz's law**	Whiteboard
13TH	1ST	Unit-11: ELECTROMAGNETISM AND ELECTROMAGNETIC INDUCTION **Fleming's Right Hand Rule, Comparison between Fleming's RHR & LHR**	Whiteboard
	2ND & 3RD	Unit-12: MODERN PHYSICS **Introduction to LASER and laser beam, its principle:Population inversion & Optical Pumping**	Whiteboard & PPT
	4TH	**Properties and Applications of LASER**	Whiteboard
14TH	1ST	Unit-12: MODERN PHYSICS **Concept on Wireless Transmission- Ground waves**	Whiteboard
	2ND	**Sky waves & Space Waves**	Whiteboard
	3RD	**DOUBT CLEARING CLASS**	Whiteboard
	4TH	**REVISION & PREVIOUS YEAR QUESTION DISCUSSION**	Whiteboard

LEARNINGRESOUCES:

1. **Text Book of Physics for Class XI (Part-I, Part-II) N.C.E.R.T**
2. **Text Book of Physics fot Class XII (Part-I, Part-II) N.C.E.R.T**
3. **Text Book of Engineering Physics by Barik, Das, Sharma Kalyani Publisher**
4. **Concept in Physics by H. C. Verma, Vol. I & II , Bharti Bhawan Ltd. New Delhi**

26/10/22 (P.P. Rout) — **Signature of concerned lecturer**

26/10/22 (P.P. Rout) — **Signature of the H.O.D**

Signature of Principal