


Discipline: Math & Sc	Semester: 1 ST /2 ND	Name of the teaching faculty: Satya Narayan Tripathy (Sr Lect. In Physics)
Subject: Engg. Physics (Th.2a)	No. of days/week class allotted: 04	Semester from date: 16.8.2023 To date: 11.12.2023 No. of weeks: 15
Subject Course Outcomes		CO 1: Identify physical quantities & represent them as scalars & vectors to solve related problems.
		CO 2: Understand the concepts of kinetic friction & hence solve related problems.
		CO 3: Define & use the concepts of gravitation, wave motion, heat & optics to solve real life problems
		CO 4: Explain the concepts of electrostatics, magnetostatics, current & magnetism in the context of engineering.
		CO 5: Understand LASER & its Applications.
Week	Class Day	Theory Topics
1 st	1 st	Unit-1: UNITS & DIMENSIONS Physical quantities, Units, types of units and system of units
	2 nd & 3 rd	Unit-1: UNITS & DIMENSIONS Dimension and dimensional formulae of physical quantities Principle of homogeneity and application of dimensional analysis; Checking the correctness of physical relations
	4 th	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
2 nd	1 st	Unit-2: SCALARS AND VECTORS Parallelogram law of vector addition and simple numericals, Concept on Resolution of vectors with simple numerical on Horizontal and vertical components
	2 nd	Unit-2: SCALARS AND VECTORS Vector multiplication: Dot product and Cross Product with simple numericals on dot and cross products
	3 rd & 4 th	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 both for upward and downward motion
3 rd	1 st	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.
	2 nd	Unit-3: KINEMATICS Derivations of Relation between- (i) Linear & angular velocity, (ii) Linear & Angular acceleration
	3 rd & 4 th	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 angle, condition for maximum horizontal range with simple numericals

4 th	1 st	Unit-4: WORK AND FRICTION Definition of work, its formula and SI unit with simple numericals
	2 nd	Unit-4: WORK AND FRICTION Concept of friction with definition and simple examples, Types of friction
	3 rd	Unit-4: WORK AND FRICTION Definition with concept on limiting friction, and laws of limiting friction (statement only)
	4 th	Unit-4: WORK AND FRICTION Theory on Coefficient of Friction and simple numericals
5 th	1 st	Unit-4: WORK AND FRICTION Methods to reduce friction with practical examples
	2 nd & 3 rd	Unit-5: GRAVITATION Introduction, a detail explanation on Newton's Laws of Gravitation and definition of Universal Gravitational Constant (G) with its unit and dimensions
	4 th	Unit-5: GRAVITATION Definition and concept of acceleration due to gravity (g), Relation between 'g' and 'G' and definition of mass and weight
6 th	1 st & 2 nd	Unit-5: GRAVITATION Explanation (No derivation) on variation of 'g' with altitude and depth, statements on Kepler's Laws of Planetary motion
	3 rd & 4 th	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
7 th	1 st	Unit-6: OSCILLATIONS AND WAVES Wave Motion (Definition & Concept), Transverse and Longitudinal wave motion (Definition, examples and Comparison)
	2 nd & 3 rd	Unit-6: OSCILLATIONS AND WAVES Wave parameters and Establish a relation between velocity, frequency and Time period, Ultrasonics-Definition, properties & Applications
	4 th	Unit-6: OSCILLATIONS AND WAVES Wave parameters and Establish a relation between velocity, frequency and Time period, Ultrasonics-Definition, properties & Applications
8 th	1 st	Unit-7: HEAT AND THERMODYNAMICS Heat & temperature-Definition and difference, Units of Heat (FPS, CGS, MKS & SI)
	2 nd & 3 rd	Unit-7: HEAT AND THERMODYNAMICS Fundamental ideas on Specific heat, Change of State and Latent Heat with simple numericals
	4 th	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
9 th	1 st & 2 nd	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
	3 rd	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
	4 th	Unit-8: OPTICS Concept of Reflection and laws of Reflection, Concept of Refraction and laws of Refraction and Refractive index (Definition, formula and Simple numericals)
10 th	1 st	Unit-8: OPTICS Concept of Reflection and laws of Reflection, Concept of Refraction and laws of Refraction and Refractive index (Definition, formula and Simple numericals)
	2 nd	Unit-8: OPTICS Concept and Explanation of Total Internal Reflection and Critical angle
	3 rd	Unit-8: OPTICS Definition, Properties and Applications on Fiber Optics

	4 th	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
11 th	1 st	
	2 nd & 3 rd	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
	4 th	Unit-9: ELECTROSTATICS AND MAGNETOSTATICS Fundamental idea on magnet, Coulomb's law in magnetism and definition of Unit pole
12 th	1 st	Unit-9: ELECTROSTATICS AND MAGNETOSTATICS Definition of magnetic field and Magnetic field Intensity (H) its formula and SI unit, Magnetic lines of force-Definition and Properties
	2 nd	Unit-9: ELECTROSTATICS AND MAGNETOSTATICS Magnetic flux(ϕ) and Magnetic flux density (B)
	3 rd & 4 th	Unit-10: CURRENT ELECTRICITY Introduction to Electric Current, Ohm's law and its applications
13 th	1 st & 2 nd	Unit-10: CURRENT ELECTRICITY Series and parallel combination of resistors: Formula for equivalent resistance and simple numericals
	3 rd	Unit-10: CURRENT ELECTRICITY Kirchhoff's laws: Statements & Explanation with diagram
	4 th	Unit-10: CURRENT ELECTRICITY Application of Kirchhoff's laws to Wheatstone bridge-Derivation of balance condition of Wheatstone bridge
14 th	1 st & 2 nd	Unit-11: ELECTROMAGNETISM AND ELECTROMAGNETIC INDUCTION Introduction, Force acting on a current carrying conductor placed in a uniform magnetic field, Fleming's left hand rule
	3 rd & 4 th	Unit-11: ELECTROMAGNETISM AND ELECTROMAGNETIC INDUCTION Statement on Faraday's Laws of Electromagnetic Induction & Lenz's law
15 th	1 st	Unit-11: ELECTROMAGNETISM AND ELECTROMAGNETIC INDUCTION Fleming's Right Hand Rule, Comparison between Fleming's RHR & LHR
	2 nd & 3 rd	Unit-12: MODERN PHYSICS Introduction to LASER and laser beam, its principle: Population inversion & Optical Pumping
	4 th	Unit-12: MODERN PHYSICS Concept on Wireless Transmission- Ground waves, Sky waves & Space Waves


 16/8/23
 HOD (Math & Sc)


 16/8/23
 Submitted by
 Satya Narayan Tripathy
 Sr Lect. Physics GP Kraput