| Discipline: **MECHANICAL** | Semester: 1ST | Name of the teaching faculty: **Ms. S.S PANDA** |
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| Subject: **Engg. Physics(Th.2a)** | No. of days/week class allotted: 04 | Semester fromdate: No. of weeks:15 |
| Week | Class Day | Theory Topics |
| 1st | 1st | Introduction to: **Engg. Physics (Th-4a) and its syllabus, Question paper pattern and motivation** |
| | 2nd | |
| | 3rd | Unit-1: UNIT & DIMENSIONS **Physical quantities, Units, types of units and system of units** |
| | 4th | Unit-1: UNIT & DIMENSIONS **Dimension and dimensional formulae of physical quantities** |
| 2nd | 1st | Unit-1: UNIT & DIMENSIONS **Principle of homogeneity and application of dimensional analysis: Checking the correctness of physical relations and Numerical** |
| | 2nd | Unit-2:SCALARS AND VECTORS **Conceptofscalarandvectorquantitieswithdefinition,types of vectors, Rules of vector addition: Statements of Triangle law of vectoraddition** |
| | 3rd | Unit-2: SCALARS AND VECTORS **Parallelogram law of vector addition and simplenumericals, Concept on Resolution of vectors with simple numerical on Horizontal and verticalcomponents** |
| | 4th | Unit-2: SCALARS AND VECTORS **Vector multiplication: Dot product and Cross Product with simple numericals on dot and cross products** |
| 3rd | 1st & 2nd | 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** |
| | 3rd | 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.** |
| | 4th | Unit-3: Kinematics **Derivations of Relation between- (i) Linear & angular velocity, (ii) Linear & Angular acceleration** |
| 4th | 1st & 2nd | 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** |
| | 3rd | Unit-4: WORK AND FRICTION **Definition of work, its formula and SI unit with simple numericals** |
| | 4th | Unit-4: WORK AND FRICTION **Concept of friction with definition and simple examples, Types of friction** |

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| 5th | 1st | Unit-4: WORK AND FRICTION<br>**Definition with concept on limiting friction, and laws of limiting friction (statement only)** |
| | 2nd | Unit-4: WORK AND FRICTION<br>**Theory on Coefficient of Friction and simple numericals** |
| | 3rd | Unit-4: WORK AND FRICTION<br>**Methods to reduce friction with practical examples** |
| | 4th | Unit-5: GRAVITATION<br>**Introduction, a detail explanation on Newton's Laws of Gravitation (1st and 2nd law)** |
| 6th | 1st | Unit-5: GRAVITATION<br>**A detail explanation on Newton's Laws of Gravitation (3rd law) and Definition of Universal Gravitational Constant (G) with its unit and dimensions** |
| | 2nd & 3rd | Unit-5: GRAVITATION<br>**Definition and concept of acceleration due to gravity (g), Relation between 'g' and 'G' and definition of mass and weight** |
| | 4th & 1st | Unit-5: GRAVITATION<br>**Explanation (No derivation) on variation of 'g' with altitude and depth, statements on Kepler's Laws of Planetary motion** |
| 7th | 2nd & 3rd | Unit-6: OSCILLATIONS AND WAVES<br>**Definition and examples on Simple Harmonic Motion (SHM), expressions for displacement, velocity and acceleration of a body or particle in SHM** |
| | 4th & 1st | Unit-6: OSCILLATIONS AND WAVES<br>**Wave Motion (Definition & Concept), Transverse and Longitudinal wave motion (Definition, examples and Comparison)** |
| 8th | 2nd & 3rd | Unit-6: OSCILLATIONS AND WAVES<br>**Wave parameters and Establish a relation between velocity, frequency and Time period, Ultrasonics-Definition, properties &Applications** |
| | 4th | Unit-7: HEAT AND THERMODYNAMICS<br>**Heat & temperature-Definition and difference, Units of Heat (FPS, CGS, MKS & SI)** |
| 9th | 1st & 2nd | Unit-7: HEAT AND THERMODYNAMICS<br>**Fundamental ides on Specific heat, Change of State and Latent Heat with simple numericals** |
| | 3rd, 4th & 1st | Unit-7: HEAT AND THERMODYNAMICS<br>**Concept on Thermal expansion and Coefficient of linear ($\alpha$), superficial ($\beta$) and cubical ($\gamma$) expansions of Solids, Relation between $\alpha$, $\beta$ and $\gamma$** |
| 10th | 2nd & 3rd | Unit-7: HEAT AND THERMODYNAMICS<br>**Definition and Relation between Work and Heat, Joule's Mechanical Equivalent of Heat, Statement and explanation on 1st law of thermodynamics** |
| | 4th & 1st | Unit-8: OPTICS<br>**Concept of Reflection and laws of Reflection, Concept of Refraction and laws of Refraction and Refractive index (Definition, formula and Simple numericals)** |

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| 11th | 2nd | Unit-8: OPTICS<br>**Concept and Explanation of Total Internal Reflection and Critical angle** |
| | 3rd | Unit-8: OPTICS<br>**Definition, Properties and Applications on Fiber Optics** |
| | 4th<br>&<br>1st | Unit-9: ELECTROSTATICS AND MAGNETOSTATICS<br>**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),** |
| 12th | 2nd<br>&<br>3rd | Unit-9: ELECTROSTATICS AND MAGNETOSTATICS<br>**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** |
| | 4th | Unit-9: ELECTROSTATICS AND MAGNETOSTATICS<br>**Fundamental idea on magnet, Coulomb's law in magnetism and definition of Unit pole** |
| 13th | 1st | Unit-9: ELECTROSTATICS AND MAGNETOSTATICS<br>**Definition of magnetic field and Magnetic field Intensity (H) with its formula and SI unit, Magnetic lines of force- Definition and Properties** |
| | 2nd | Unit-9: ELECTROSTATICS AND MAGNETOSTATICS<br>**Magnetic flux($\phi$) and Magnetic flux density (B)** |
| | 3rd<br>&<br>4th | Unit-10: CURRENT ELECTRICITY<br>**Introduction to Electric Current, Ohm's law and its applications** |
| 14th | 1st<br>&<br>2nd | Unit-10: CURRENT ELECTRICITY<br>**Series and parallel combination of resistors: Formula for equivalent resistance and simple numericals** |
| | 3rd | Unit-10: CURRENT ELECTRICITY<br>**Kirchhoff's laws: Statements & Explanation with diagram** |
| | 4th | Unit-10: CURRENT ELECTRICITY<br>**Application of Kirchhoff's laws to Wheatstone bridge- Derivation of balance condition of Wheatstone bridge** |
| 15th | 1st<br>&<br>2nd | Unit-11: ELECTROMAGNETISM AND ELECTROMAGNETIC INDUCTION<br>**Introduction, Force acting on a current carrying conductor placed in a uniform magnetic field, Fleming's left hand rule** |
| | 3rd<br>&<br>4th | Unit-11: ELECTROMAGNETISM AND ELECTROMAGNETIC INDUCTION<br>**Statement on Faraday's Laws of Electromagnetic Induction & Lenz's law** |
| | 4th | Unit-12: MODERN PHYSICS<br>**Concept on Wireless Transmission- Ground waves, Sky waves & Space Waves** |

**RECOMMENDED BOOKS**
1. Text Book of Physics for Class XI (Part-I, Part-II) N.C.E.R.T
2. Text Book of Physics for Class XII (Part-I, Part-II) N.C.E.R.T