

### Lesson Plan

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| Discipline:<br>Electrical | Semester: 1ST                             | Name of the teaching faculty:<br>Sushrimayee Behera   |
| <b>Subject: Physics</b>   | No. of days/per week<br>Class Allotted: 4 | Semester from: 25/10/21 to 31/01/22<br>No. of weeks:15  |
| <b>Week</b>               | <b>Class day</b>                          | <b>Theory Topics</b>  |
| 1st                       | 1st                                       | UNITS AND DIMENSIONS 1.1 Physical quantities - (Definition).<br>1.2 Definition of fundamental and derived units, systems of units (FPS, CGS, MKS and SI units). |
|                           | 2nd                                       | Definition of dimension and Dimensional formulae of physical quantities.  |
|                           | 3rd                                       | Dimensional equations and Principle of homogeneity.<br>Checking the dimensional correctness of Physical relations.  |
|                           | 4th                                       | SCALARS AND VECTORS<br>Scalar and Vector quantities (definition and concept),<br>Representation of a Vector – examples, types of vectors.                       |
| 2nd                       | 1st                                       | Triangle and Parallelogram law of vector Addition (Statement only). Simple Numerical.   |
|                           | 2nd                                       | Resolution of Vectors – Simple Numericals on Horizontal and Vertical components.  |
|                           | 3rd                                       | 2.4 Vector multiplication (scalar product and vector product of vectors).   |
|                           | 4th                                       | KINEMATICS<br>Concept of Rest and Motion.   |
| 3rd                       | 1st                                       | 3.2 Displacement, Speed, Velocity, Acceleration & FORCE (Definition, formula, dimension & SI units).  |

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|     | 2nd | Equations of Motion under Gravity (upward and downward motion) - no derivation.  |
|     | 3rd | Circular motion: Angular displacement, Angular velocity and Angular acceleration.  |
|     | 4th | Relation between –(i) Linear & Angular velocity, (ii) Linear & Angular acceleration)   |
| 4th | 1st | Define Projectile, Examples of Projectile.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. |
|     | 2nd | WORK AND FRICTION<br>Work – Definition, Formula & SI units.  |
|     | 3rd | 4.2 Friction – Definition & Concept.   |
|     | 4th | 4.3 Types of friction (static, dynamic), Limiting Friction (Definition with Concept).  |
| 5th | 1st | 4.4 Laws of Limiting Friction (Only statement, No Experimental Verification  |
|     | 2nd | Coefficient of Friction – Definition & Formula, Simple Numericals. Methods to reduce friction.   |
|     | 3rd | UNIT 5 - GRAVITATION   |
|     | 4th | Newton's Laws of Gravitation – Statement and Explanation.  |
|     |     | Universal Gravitational Constant (G)- Definition, Unit and Dimension.  |
| 6th | 1st | Acceleration due to gravity (g)- Definition and Concept  |
|     | 2nd | Definition of mass and weight. Relation between g and G.Variation of g with altitude and depth (No derivation – Only Explanation)  |
|     | 3rd | UNIT 6 - OSCILLATIONS AND WAVES  |
|     | 4th | 6.1 Simple Harmonic Motion (SHM) - Definition & Examples.  |
| 7th | 1st | . 6.2 Expression (Formula/Equation) for displacement, velocity, acceleration of a body/ particle in SHM.   |

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|      | 2nd | 6.3. Wave motion – Definition & Concept 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. Ultrasonic – Definition, Properties & Applications.  |
| 8th  | 1st | - HEAT AND THERMODYNAMICS 7.1 Heat and Temperature – Definition & Difference  |
|      | 2nd | 7.2 Units of Heat (FPS, CGS, MKS & SI). 7.3 Specific Heat (concept, definition, unit, dimension and simple numerical)   |
|      | 3rd | 7.4 Change of state (concept), Latent Heat (concept, definition, unit, dimension and simple numerical)  |
|      | 4th | 7.5 Thermal Expansion – Definition & Concept 7.6 Expansion of Solids (Concept)  |
| 9th  | 1st | 7.7 Coefficient of linear, superficial and cubical expansions of Solids – Definition & Units.   |
|      | 2nd | 7.8 Relation between $\alpha$ , $\beta$ & $\gamma$ 7.9 Work and Heat - Concept & Relation.  |
|      | 3rd | 7.10 Joule's Mechanical Equivalent of Heat (Definition, Unit) 7.11 First Law of Thermodynamics (Statement and concept only).  |
|      | 4th | OPTICS 8.1 Reflection & Refraction – Definition. 8.2 Laws of reflection and refraction (Statement only)).   |
| 10th | 1st | 8.3 Refractive index – Definition, Formula & Simple numerical. 8.4 Critical Angle and Total internal reflection – Concept, Definition & Explanation                           |
|      | 2nd | 8.5 Refraction through Prism (Ray Diagram & Formula only – NO derivation  |
|      | 3rd | 8.6 Fiber Optics – Definition, Properties & Applications.   |
|      | 4th | 9. ELECTROSTATICS & MAGNETOSTATICS  |
| 11th | 1st | 9.1 Electrostatics – Definition & Concept. 9.2 Statement & Explanation of Coulombs laws, Definition of Unit charge.   |
|      | 2nd | 9.3 Absolute & Relative Permittivity ( $\epsilon$ ) – Definition, Relation & Unit. 9.4 Electric potential and Electric Potential difference (Definition, Formula & SI Units). |

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|      | 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 | 1st             | 9.8 Magnet, Properties of a magnet 9.9 Coulomb's Laws in Magnetism – Statement & Explanation, Unit Pole (Definition).  |
|      | 2 <sup>nd</sup> | 9.10 Magnetic field, Magnetic Field intensity (H) - (Definition, Formula & SI Unit). 9.11 Magnetic lines of force ( Definition and Properties) 9.12 Magnetic Flux ( $\Phi$ ) & Magnetic Flux Density (B) – Definition, Formula & Unit. |
|      | 3rd             | CURRENT ELECTRICITY 10.1 Electric Current – Definition, Formula & SI Units.  |
|      | 4th             | 10.2 Ohm's law and its applications.   |
| 13th | 1st             | 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 & Explanation with diagram).  |
|      | 3rd             | 10.5 Application of Kirchhoff's laws to Wheatstone bridge - Balanced condition of Wheatstone's Bridge – Condition of Balance (Equation).   |
|      | 4th             | ELECTROMAGNETISM & ELECTROMAGNETIC INDUCTION 11.1 Electromagnetism – Definition & Concept.   |
| 14th | 1st             | 11.2 Force acting on a current carrying conductor placed in a uniform magnetic field, Fleming's Left Hand Rule   |
|      | 2 <sup>nd</sup> | 11.3 Faraday's Laws of Electromagnetic Induction (Statement only)  |
|      | 3rd             | 11.4 Lenz's Law (Statement)  |
|      | 4th             | 11.5 Fleming's Right Hand Rule   |
| 15th | 1st             | 11.6 Comparison between Fleming's Right Hand Rule and Fleming's Left Hand Rule.  |
|      | 2 <sup>nd</sup> | UNIT 12 - MODERN PHYSICS 12.1 LASER & laser beam (Concept and Definition) 12.2 Principle of LASER (Population Inversion & Optical Pumping)   |
|      | 3rd             | 12.3 Properties & Applications of LASER  |
|      | 4th             | 12.4 Wireless Transmission – Ground Waves, Sky Waves, Space Waves ( Concept & Definition)  |

