# LESSON PLAN OF ENGINEERING PHYSICS

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| Discipline:- Civil & Mechanical Engineering | | Semester:- 1st |
| Subject:- Engg. Physics (Th.2a ) | | Name of the Teaching Faculty:- Chinmmaya Kumar Panda |
| No. of weeks: 15 | | No. of days per week class allotted:-04 |
| Semester    From Date: 25/10/2022 | | To Date:31/01/2023 |

| Week | Class/ day | Theory Topics |
|---|---|---|
| 1st | 1st | UNIT:1 UNIT & DIMENSIONS <br> Physical quantities - (Definition) Definition of fundamental and derived units, systems of   units (FPS, CGS, MKS and SIunits). |
| | 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 | UNIT:2 SCALARS & VECTORS <br> Scalar and Vector quantities (definition and concept}, Representation of a Vector – Examples, types of vectors. |
| 2nd | 1st | Triangle and Parallelogram law of vector Addition (Statement only). SimpleNumerical. Resolution of Vectors – Simple Numericals on Horizontal and Vertical components. |
| | 2nd | Vector multiplication (scalar product and vector product of vectors). |
| | 3rd | UNIT:3 KINEMATICS <br> Concept of Rest and Motion. |
| | 4th | Displacement, Speed, Velocity, Acceleration & FORCE (Definition, formula, dimension & SI units). <br> Equations of Motion under Gravity (upward and downward motion) - no derivation. |
| 3rd | 1st | Circular motion: Angular displacement, Angular velocity and Angular acceleration (definition, formula & SI units). |
| | 2nd | Relation between –(i) Linear & Angular velocity, (ii) Linear & Angular acceleration). |
| | 3rd | Define Projectile, Examples of Projectile |
| | 4th | 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. |
| | | CLASS TEST |
| 4th | 1st | UNIT:4 WORK & FRICTION <br> Work – Definition, Formula & SI units.Friction – Definition & Concept. |
| | 2nd | Types of friction (static, dynamic), Limiting Friction (Definition with Concept). |
| | 3rd | Laws of Limiting Friction (Only statement, No Experimental Verification). |
| | 4th | Coefficient of Friction – Definition & Formula, Simple Numericals. |
| 5th | 1st | Methods to reduce friction. |
| | 2nd | UNIT:5 GRAVITATION <br> Newton's Laws of Gravitation – Statement and Explanation. <br> Universal Gravitational Constant (G)- Definition, Unit and Dimension. |
| | 3rd | Acceleration due to gravity (g)- Definition and Concept. Definition of mass and weight. |
| | 4th | Relation between g and G. |

| Week | Class/day | Theory Topics |
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| 6th | 1st | Variation of g with altitude and depth (No derivation – Only Explanation). |
| | 2nd | Kepler's Laws of Planetary Motion (Statement only). |
| | 3rd | UNIT:6 OSCILLATIONS & WAVES<br>Simple Harmonic Motion (SHM) - Definition & Examples. |
| | 4th | Expression (Formula/Equation) for displacement, velocity, acceleration of a body/particle in SHM |
| 7th | 1st | Wave motion – Definition & Concept.<br>Transverse and Longitudinal wave motion – Definition, Examples & Comparison |
| | 2nd | Definition of different wave parameters (Amplitude, Wavelength, Frequency, Time Period. |
| | 3rd | Derivation of Relation between Velocity, Frequency and Wavelength of a wave |
| | 4th | Ultrasonics – Definition, Properties & Applications. |
| 8th | 1st | *INTERNAL EXAMINATION* |
| | 2nd | UNIT:7 HEAT & THERMODYNAMICS<br>Heat and Temperature – Definition & Difference, Units of Heat (FPS, CGS, MKS & SI).<br>Specific Heat (concept, definition, unit, dimension and simple numerical)<br>Change of state (concept), |
| | 3rd | Latent Heat (concept, definition, unit, dimension andsimple numerical)Thermal Expansion – Definition & Concept, Expansion of Solids (Concept) |
| | 4th | Coefficient of linear, superficial and cubical expansions of Solids – Definition & Units. |
| 9th | 1st | Relation between $\alpha$, $\beta$ & $\gamma$, Work and Heat - Concept & Relation. |
| | 2nd | Joule's Mechanical Equivalent of Heat (Definition, Unit)<br>First Law of Thermodynamics (Statement and concept only) |
| | 3rd | UNIT:8 OPTICS<br>Reflection & Refraction – Definition. Laws of reflection and refraction (Statement only) |
| | 4th | Refractive index – Definition, Formula &Simple numerical. |
| 10th | 1st | Critical Angle and Total internal reflection – Concept, Definition & Explanation<br>Refraction through Prism (Ray Diagram & Formula only – NO derivation) |
| | 2nd | Fiber Optics – Definition, Properties & Applications. |
| | 3rd | UNIT: 9 ELECTROSTATICS & MAGNETOSTATICS<br>Electrostatics – Definition & Concept.<br>Statement & Explanation of Coulombs laws, Definition of Unit charge. |
| | 4th | Absolute & Relative Permittivity ($\varepsilon$) – Definition, Relation & Unit.<br>Electric potential and Electric Potential difference (Definition, Formula & SI Units). |
| 11th | 1st | Electric field, Electric field intensity (E) – Definition, Formula & Unit.<br>Capacitance - Definition, Formula & Unit. |
| | 2nd | Series and Parallel combination of Capacitors (No derivation, Formula for effective/Combined/total capacitance & Simple numericals) |
| | 3rd | Magnet, Properties of a magnet.<br>Coulomb's Laws in Magnetism – Statement & Explanation, Unit Pole (Definition) |
| | 4th | Magnetic field, Magnetic Field intensity (H) - (Definition, Formula & SI Unit).<br>Magnetic lines of force ( Definition and Properties) |

| Week | Class/day | Theory Topics |
|------|-----------|---------------|
| 12th | 1st | Magnetic Flux ($\Phi$) & Magnetic Flux Density (B) – Definition, Formula & Unit. |
| | | *CLASS TEST* |
| | 2nd | UNIT: 10 CURRENT ELECTRICITY<br>Electric Current – Definition, Formula & SI Units. |
| | 3rd | Ohm's law and its applications |
| | 4th | Series combination of resistors (No derivation, Formula for effective/Combined/ total resistance & Simple numericals) |
| 13th | 1st | Parallel combination of resistors (No derivation, Formula for effective/Combined/ total resistance & Simple numericals) |
| | 2nd | Kirchhoff's laws (Statement & Explanation with diagram). |
| | 3rd | Application of Kirchhoff's laws to the Wheatstone Bridge - Balanced condition of Wheatstone Bridge – Condition of balanced (Equation) |
| | 4th | UNIT: 11 ELECTROMAGNETISM & ELECTROMAGNETIC INDUCTION<br>Electromagnetism – Definition & Concept. |
| 14th | 1st | Force acting on a current carrying conductor placed in a uniform magnetic field, Fleming's Left Hand Rule |
| | 2nd | Faraday's Laws of Electromagnetic Induction (Statement only) |
| | 3rd | Lenz's Law (Statement), Fleming's Right Hand Rule |
| | 4th | Comparison between Fleming's Right Hand Rule and Fleming's Left Hand Rule. |
| 15th | 1st | UNIT: 12 MODERN PHYSICS<br>LASER & laser beam (Concept and Definition)<br>Principle of LASER (Population Inversion & Optical Pumping) |
| | 2nd | Properties & Applications of LASER |
| | 3rd | Wireless Transmission – Ground Waves, Sky Waves, Space Waves( Concept & Definition) |
| | 4th | Revision & Doubt Clearing |

*Panda* 16.09.2022

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