

### Lesson Plan for Engineering Physics (Th. 2a) 2022-23

Discipline: Electrical Engineering	Semester: 2nd	Name of the teaching faculty:- Shri Chinmaya Kumar Panda
Subject: Engg. Physics(Th.2a)	No. of days/week class allotted: 04	Semester From date: 20/03/2023 To date:27/06/2023 No. of weeks:16
Week	Class Day	Theory Topics
1 <sup>st</sup>	1 <sup>st</sup>	Introduction to: <b>Engineering Physics (Th.2a) and its syllabus, Question paper pattern and motivation</b>
	2 <sup>nd</sup>	
	3 <sup>rd</sup>	Unit-1: UNIT & DIMENSIONS <b>Physical quantities, Units, types of units and system of units</b>
	4 <sup>th</sup>	Unit-1: UNIT & DIMENSIONS <b>Dimension and dimensional formulae of physical quantities</b>
2 <sup>nd</sup>	1 <sup>st</sup>	Unit-1: UNIT & DIMENSIONS <b>Principle of homogeneity and application of dimensional analysis: Checking the correctness of physical relations and Numerical</b>
	2 <sup>nd</sup>	Unit-2: SCALARS AND VECTORS <b>Concept of scalar and vector quantities with definition, types of vectors, Rules of vector addition: Statements of Triangle law of vector addition</b>
	3 <sup>rd</sup>	Unit-2: SCALARS AND VECTORS <b>Parallelogram law of vector addition and simple numerical, Concept on Resolution of vectors with simple numerical on Horizontal and vertical components</b>
	4 <sup>th</sup>	Unit-2: SCALARS AND VECTORS <b>Vector multiplication: Dot product and Cross Product with simple numerical on dot and cross products</b>
3 <sup>rd</sup>	1 <sup>st</sup> & 2 <sup>nd</sup>	Unit-3: KINEMATICS <b>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</b>
	3 <sup>rd</sup>	Unit-3: KINEMATICS <b>Circular motion: Conceptual idea on circular motion and terms related to circular motion such as angular displacement, angular velocity and angular acceleration.</b>
	4 <sup>th</sup>	Unit-3: Kinematics <b>Derivations of Relation between- (i) Linear &amp; angular velocity, (ii) Linear &amp; Angular acceleration</b>
4 <sup>th</sup>	1 <sup>st</sup> & 2 <sup>nd</sup>	Unit-3: KINEMATICS <b>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 numerical</b>
	3 <sup>rd</sup>	Unit-4: WORK AND FRICTION <b>Definition of work, its formula and SI unit with simple numerical</b>
	4 <sup>th</sup>	Unit-4: WORK AND FRICTION <b>Concept of friction with definition and simple examples, Types of friction</b>

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

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11 <sup>th</sup>	2 <sup>nd</sup>	Unit-8: OPTICS Concept and Explanation of Total Internal Reflection and Critical angle
	3 <sup>rd</sup>	Unit-8: OPTICS Definition, Properties and Applications on Fiber Optics
	4 <sup>th</sup> &	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),
12 <sup>th</sup>	1 <sup>st</sup>	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 numerical
	2 <sup>nd</sup> &3 <sup>rd</sup>	Unit-9: ELECTROSTATICS AND MAGNETOSTATICS Fundamental idea on magnet, Coulomb's law in magnetism and definition of Unit pole
	4 <sup>th</sup>	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
13 <sup>th</sup>	1 <sup>st</sup>	Unit-9: ELECTROSTATICS AND MAGNETOSTATICS Magnetic flux( $\phi$ ) and Magnetic flux density (B)
	2 <sup>nd</sup>	Unit-10: CURRENT ELECTRICITY Introduction to Electric Current, Ohm's law and its applications
	3 <sup>rd</sup> & 4 <sup>th</sup>	Unit-10: CURRENT ELECTRICITY Series and parallel combination of resistors: Formula for equivalent resistance and simple numerical
14 <sup>th</sup>	1 <sup>st</sup> & 2 <sup>nd</sup>	Unit-10: CURRENT ELECTRICITY Kirchhoff's laws: Statements & Explanation with diagram
	3 <sup>rd</sup>	Unit-10: CURRENT ELECTRICITY Application of Kirchhoff's law- Derivation of condition of balance of Wheatstone bridge
	4 <sup>th</sup>	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
15 <sup>th</sup>	1 <sup>st</sup> &2 <sup>nd</sup>	Unit-11: ELECTROMAGNETISM AND ELECTROMAGNETIC INDUCTION Statement on Faraday's Laws of Electromagnetic Induction & Lenz's law
	3 <sup>rd</sup> & 4 <sup>th</sup>	Unit-11: ELECTROMAGNETISM AND ELECTROMAGNETIC INDUCTION Fleming's Right Hand Rule, Comparison between Fleming's Right hand rule & Left hand rule
16 <sup>th</sup>	1 <sup>st</sup>	Unit-12: MODERN PHYSICS Introduction to LASER and laser beam, its principle: Population inversion & Optical Pumping
	2 <sup>nd</sup> & 3 <sup>rd</sup>	

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	4 <sup>th</sup>	Unit-12: MODERN PHYSICS Concept on Wireless Transmission- Ground waves, Sky waves & Space Waves
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20.03.2023

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