UTKAL GOURAV MADHUSUDAN INSTITUTE OF TECHNOLOGY, RAYAGADA

Academic Lesson Plan for 1st Semester – 2024 (Winter)

Name of the teaching faculty: Sri Bhabani Sankar Patnaik**,**
                                              Guest Faculty (Physics)

Discipline   : Common(Civil/Electrical/E&TC/Mechanical)
Dept.   : Department of Mathematics & Science
Semester   : 1st
Subject   : Theory 2 : Applied Physics-I
No of Periods per week: 4   Total Periods: 60,
End semester Exam.: 70 Marks,   Class test(I.A): 30 Marks,
Total Marks: 100 Marks

Week	Period	Unit / Chapter	Topics to be covered
1st	1st	**Unit-1 Units and Dimensions**	Introduction to physical quantities, Definition of fundamental and derived units, system of units (FPS,CGS,SI) with examples. Definition of dimension and dimensional formula of physical quantities, Dimensional equation and principle of homogeneity.
	2nd		Checking the correctness of the formula. Derivation of simple formula. Limitation of dimensional analysis. Measurement, Least count.
	3rd		Errors, Absolute and Relative error, Error propagation, Error estimation and Significant figures.
	4th	**Unit-2 Scalers and Vectors**	Introduction to scalers and vectors with definition and concepts, representation of vectors with examples
2nd	1st		Types of vectors , triangle and parallelogram law of vector addition (Statement only)
	2nd		Resolution of vectors , Horizontal and vertical components with its application to inclined plane and lawn roller, Vector multiplication(Scalar and vector product)

	3rd		Concept of force, momentum, Statement and derivation of conservation of linear momentum.
	4th		Application of conservation of linear momentum (recoil of gun, rocket) ,Impulse and its application.
3rd	1st		Circular motion , angular displacement, angular velocity and angular acceleration, frequency and time period.
	2nd		Relation between linear and angular velocity, linear and angular acceleration (related numericals).
	3rd		Centripetal and Centrifugal forces with live examples.
	4th		Expression and application of centripetal force such as banking of roads and bending of cyclist.
4th	1st	**Unit-3 Work , Power and Energy**	Work (definition, formula, dimension and SI units), Zero work, Positive work, and Negative work.
	2nd		Friction(definition and concepts), types of friction(static and dynamic friction)
	3rd		Law of limiting friction (definition, formula, with simple numerical)
	4th		Coefficient of friction (definition, formula, with simple numerical)
5th	1st		Method to reduce friction and its engineering application
	2nd		Work done in moving an object on horizontal and inclined plane for rough and plane surfaces and its applications.
	3rd		Energy: Kinetic energy, Gravitational potential energy(derivation), Mechanical energy.
	4th		Conservation of mechanical energy for freely falling bodies , Transformation of energy(examples).

6th	**1st**		Power (definition and unit), Power and work relationship, Calculation of of power (numericals) .
7th	**2nd**	**Unit-4 Rotational Motion**	Translational and rotational motion with examples, Definition of torque and angular momentum (with examples)
	3rd		Conservation of angular momentum (quantitative) and its application.
	4th		Moment of inertia and its physical significance, Radius of gyration for rigid body, Theorems of parallel and perpendicular axes(statement only)
	1st		Moment of inertia of a rod , disc, ring and sphere(hollow and solid);(formula only).
	2nd	**Unit-5 Properties of matter**	Elasticity: Definition of stress and strain, Moduli of elasticity.
	3rd		Hook's law and its significance.
	4th		Pressure: Definition and unit with some live examples.
8th	**1st**		Atmospheric pressure, Gauge pressure ,absolute pressure.
	2nd		Fortin barometer and its applications.
	3rd		Surface tension : Concept , formula and unit with examples.
	4th		Cohesive and adhesive forces with live examples.
9th	**1st**		Angle of contact, Ancle of accent formula (no derivation).
	2nd		Effect of temperature and impurity on surface tension.

	3rd		Viscosity and coefficient of viscosity(introduction)
10th	4th		Terminal velocity (derivation)
	1st		Stokes law (derivation and numericals)
11th	2nd		Effect of temperature on viscosity and application in hydraulic system.
	3rd		Hydrodynamics: Fulid motion (introduction with examples).
	4th		Streamline and turbulent flow with examples.
	1st		Reynold's number , Equation of continuity .
12th	2nd		Bernoulli's theorem (only formula and numericals) and its application.
	3rd	**UNIT -6 Heat and Thermometry**	Concept of heat and temperature (introduction).
	4th		Mode of heat transfer (conduction , convection and radiation with example).
	1st		Specific heat (concept , formula and unit).
	2nd		Scales of temperature and their relationship.
	3rd		Types of thermometer (mercury thermometer) and their uses.
	4th		Types of thermometer (bimetalic thermometer) and their uses.
13th	1st		Types of thermometer (platinum resistance thermometer) and their uses.
	2nd		Types of thermometer (pyrometer) and their uses.

	3rd		Numericals based on thermometry.
	4th		Expansion of solids (introduction with examples.).
14th	**1st**		Expansion of liquid and gases (introduction with examples.).
	2nd		Coefficient of linear expansion with examples and related numericals.
	3rd		Coefficient of surface expansion with examples and related numericals.
	4th		Coefficient of cubical expansion with examples and related numericals.
15TH	**1st**		Relation between coefficient of linear , surface and cubical expansions with related numericals.
	2nd		Co-efficient of thermal conductivity .
	3rd		Examples and numericals based on Co-efficient of thermal conductivity .
	4th		Engineering application of Co-efficient of thermal conductivity .

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