Program :	**Diploma in Engineering and Technology**
Course Code : **1003**	Course Title: **Applied Physics-I**
Semester : **1**	Credits: **3**
Course Category: **Basic Science**	
Periods per week: **3 (L:3 T:0 P:0)**	Periods per semester: **45**

Course Objectives:

- To provide students with a broad understanding of physical principles of the universe to help them develop critical thinking and quantitative reasoning skills
- To help the diploma engineers in applying the basic concepts of physics to solve broad-based engineering problems

Course Prerequisites:

Topic	Program/Course Name
Basic knowledge in Physics	Secondary School

Course Outcomes

On completion of the course, the student will be able to:

COn	Description	Duration (Hours)	Cognitive Level
CO1	Apply laws of mechanics in rocket propulsion and recoil of gun.	9	Applying
CO2	Apply concepts of circular motion and rotational motion	9	Applying
CO3	Make use the concepts of energy, power, work, temperature and friction to solve problems	13	Applying
CO4	Use the theorems of fluid dynamics in atomiser and airfoil	12	Applying
	Series Test	2	

CO-PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3						
CO2	3						
CO3	3						
CO4	3						

3-Strongly mapped, 2-Moderately mapped, 1- Weakly mapped

Course Outline

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	**Apply laws of mechanics in rocket propulsion and recoil of gun**		
M1.01	Discuss various physical quantities and their units.	1	Understanding
M1.02	Identify types of errors in measurements and apply it to calculate errors in laboratory experiments.	2	Applying
M1.03	Differentiate a physical quantity into scalar and vector and discuss various methods of vector addition.	2	Understanding
M1.04	Apply Newton's laws of motion and law of conservation of linear momentum to describe rocket propulsion and recoil of gun.	4	Applying

Module 1:

Physical quantities - Fundamental and derived, Units and systems of units (CGS, MKS and SI units),

Measurements - Errors in measurements- systematic and random errors (qualitative idea only), absolute error, relative error, percentage error, numerical problems

Scalar and Vector quantities - Representation of vector, Collinear vectors, Coplanar vectors, equal vectors, unit vectors. Addition and Subtraction of Vectors, Triangle and Parallelogram law of addition, Resolution of a Vector.

Equations of motion (elementary idea), Newton's laws of motion (no derivation), Force, Momentum, Statement and derivation of conservation of linear momentum, its applications - recoil of gun and rocket propulsion, Impulse and its examples (numerical problems related to force and momentum).

CO2	**Apply concepts of circular motion and rotational motion**		
M2.01	Describe basic concepts of circular motion and its application in the case of banking of roads and railway tracks.	4	Applying
M2.02	Explain rotational motion and theorems of moment of inertia.	3	Understanding
M2.03	Discuss the conservation of angular momentum and torque in rotational motion.	2	Understanding
Series Test – I		1	

Module 2:

Circular motion, angular displacement, angular velocity, angular acceleration, Relation between linear and angular velocity, linear acceleration and angular acceleration. Centripetal acceleration and Centripetal force (qualitative idea only). Application-banking of roads and railway tracks (numerical problems related to circular motion)

Moment of inertia and its physical significance, radius of gyration for rigid body, Theorems of parallel and perpendicular axes, Moment of inertia of rod, disc, ring and sphere (hollow and solid)- (Formulae only)

Definition of angular momentum and torque, Conservation of angular momentum (quantitative).

CO3	**Make use the concepts of energy, power, work, temperature and friction to solve problems**		
M3.01	Explain the concept of work and friction.	3	Understanding
M3.02	Describe conservation of energy and transformation of energy into various forms	2	Understanding
M3.03	Discuss the concept of power and apply it to solve engineering problems.	4	Applying
M3.04	Discuss the concepts of heat and measurement of temperature using mercury thermometer and pyrometer	4	Applying

Module 3:

Definition of work and unit, Work done in moving an object on horizontal plane, Friction: definition, static friction, kinetic friction, laws of friction, methods of reducing friction and examples.

Energy and its units, kinetic energy, potential energy with examples. conservation of energy for freely falling bodies, Various forms of energy, transformation of energy (mention examples), Power- definition, power and work relationship, calculation of power (numerical problems related to energy and power).

Concept of heat and temperature, scales of temperature and their relationship (numerical problems relating various temperature scales), modes of heat transfer (conduction, convection and radiation with examples), specific heat of solids, measurement of temperature - Mercury thermometer and Pyrometer.

CO4	Use the theorems of fluid dynamics in atomiser and airfoil		
M4.01	Explain the basic concepts of elasticity and apply it to calculate various elastic modulii of materials	4	Applying
M4.02	Discuss properties of fluids such as surface tension and pressure.	2	Understanding
M4.03	Define the term coefficient of viscosity and explain Stoke's law	2	Understanding
M4.04	Apply theorems of fluid dynamics to explain the working of atomiser and air foil	4	Applying
Series Test – II		1	

Module 4:

Elasticity - definition of stress and strain, Hooke's law, modulii of elasticity (numerical problems).

Pressure - definition and units, atmospheric pressure, gauge pressure and absolute pressure.

Surface tension - concept, units, cohesive and adhesive forces, angle of contact, Ascent Formula (No derivation), mention two applications of surface tension, effect of temperature and impurity on surface tension.

Viscosity and coefficient of viscosity - Terminal velocity, Stoke's law. Hydrodynamics: Fluid motion, stream line and turbulent flow, Reynold's number (qualitative idea only), Equation of continuity (numerical problems of equation of continuity), Bernoulli's Theorem and its applications (air foil, atomizer).

Text /Reference:

T/R	Book Title / Author
T1	Text Book of Physics for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi
R2	Applied Physics, Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, Delhi
R3	Concepts of Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi
R4	Fundamentals of Physics, Halliday/Resnick/Walker, Wiley India Pvt. Ltd
R5	Modern approach to Applied Physics-I and II, AS Vasudeva, Modern Publishers.