

Name of Faculty	:	Faculty of Engineering & Technology
Name of Program	:	Diploma Engineering (DE)
Course Code	:	1DAP01
Course Title	:	Applied Physics
Type of Course	:	Basic Science (BS)
Year of Introduction	:	2023-24

Prerequisite	:	To study this course, students should have knowledge of school level Physics and Mathematics which includes basic scientific principles, algebra and trigonometry.
Course Objective	:	Students able to assess and contribute to the solution of the technical and engineering problems that are based on broad principles of Physics.
Course Outcomes	:	At the end of this course, students will be able to:
	CO1	Use relevant instruments with precision to measure the dimension of given physical quantities in various engineering situations.
	CO2	Solve various engineering problems by the concept of linear momentum and circular motion.
	CO3	Apply the concepts of electrostatics and capacitance for engineering applications.
	CO4	Apply the basic concepts of heat transfer and thermometric properties to provide solutions for various engineering problems.
	CO5	Use the concepts of LASER and Fiber optics for various engineering applications

Teaching and Examination Scheme

Teaching Scheme (Contact Hours)			Credits	Examination Marks				
L	T	P		Theory Marks		Practical Marks		Total Marks
			C	SEE	CIA	SEE	CIA	
3	0	2	4	70	30	30	20	150

Legends: **L**-Lecture; **T**-Tutorial/Teacher Guided Theory Practice; **P**- Practical, **C** - Credit, **SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

Course Content

Unit No.	Topics	Teaching Hours	Weightage	Mapping with CO
1	Unit and Measurement: Measurement and units in engineering and science, Physical quantities, fundamental and derived quantities, Systems of units: CGS, MKS and SI, definition of units (only for information and not to be asked in examination), interconversion of units MKS to CGS and vice versa, Requirements of standard unit, Vernier caliper, Micro meter screw gauge, Accuracy, precision and error, estimation of errors - absolute error, relative error and percentage error, error propagation, significant figures	8	19%	CO1
2	Kinematics: Linear motion, Force, momentum, law of conservation of linear momentum, its applications such as recoil of gun, rocket propulsion, impulse and its applications, Circular motion, angular displacement, angular velocity, angular acceleration and their interrelation, Centripetal and centrifugal forces, banking of roads	8	19%	CO2
3	Electrostatics: Charge, unit of charge, Coulomb's law, Electric field, electric field lines and its properties, Electric flux, electric potential and potential difference (point charge only), Capacitor and its capacitance, Working of the parallel capacitor, formula, Equivalent capacitance of capacitors in series and in parallel combinations, Effect of dielectric material on the capacitance of parallel plate capacitor.	8	21%	CO3
4	Heat & Thermodynamics: Heat and Temperature, Modes of Heat transfer: Conduction, Convection and Radiation, Temperature measurement scales: Kelvin, Celsius and Fahrenheit and interconversion between them Heat Capacity and Specific Heat, Types of thermometers (Mercury thermometer, Bimetallic thermometer, Pyrometer) and their uses, Coefficient of thermal conductivity and its engineering applications, Expansion of solids, coefficient of linear expansion.	9	19%	CO4
5	Wave: Waves, wave motion, and types of waves: longitudinal and transverse waves Optics:	9	22%	CO5

	Reflaction, Refraction, refractive index and Snell's law, Total internal reflection, Critical angle and necessary conditions for total internal reflection. Modern Physics: LASER, characteristics of LASER, differences between LASER and ordinary light Applications of LASER in engineering and medical field, introduction to Optical fiber			
--	--	--	--	--

Suggested Distribution of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application	Analyse	Evaluate	Create
Weightage	28	36	36	-	-	-

NOTE: This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Suggested List of Experiments/Tutorials

Sr. No.	Name of Experiment/Tutorial	Teaching Hours
1	Use Vernier calipers to measure the dimensions of a given object.	2
2	Use micrometer screw gauge to measure diameter of a given wire and determine volume of a given metallic piece.	2
3	Use sonometer to find the frequency of given tuning fork.	2
4	Use a parallel plate capacitor to investigate the dependence of capacitance of a parallel plate capacitor on various factors.	2
5	Determine the refractive index of given semi-circular glass block using TIR.	2
6	Find thermal conductivity of a given metallic rod by sear's method.	2
7	Aim of this experiment is to measure the equivalent capacitance of sevra capacitors connected in series and parallel.	2
8	Use different types of thermometers to measure temperature of a hot bath and convert it into different scales.	2

Major Equipment/ Instruments and Software Required

Sr. No.	Name of Major Equipment/ Instruments and Software
1	Vernier calliper analog - least count- 0.02 mm
2	Micrometer screw gauge analog (0-25 mm) - least count 0.01mm
3	Parallel plate capacitor (variable plate distance and area)
4	Digital capacitance meter
5	Hot water bath
6	Mercury filled glass thermometer 0-110 °C, Mercury filled glass thermometer 0-250 °C., digital food thermometer, bimetallic thermometer, Clamp with stand.
7	Linear expansion apparatus, steam generator, rubber tubing, metal rods of aluminium,

	iron, copper, brass, and steel.
8	A Sonometer with a tuning fork set and two sharp edge wedges and a weight box.

Suggested Learning Websites

Sr. No.	Name of Website
1	https://www.williamson-labs.com
2	https://www.nptel.ac.in
3	https://www.olabs.edu.in
4	https://www.vlabs.iitb.ac.in
5	https://www.khanacademy.com
6	https://www.sciencing.com
7	https://www.compadre.org/student
8	https://www.compadre.org/osp
9	https://www.datasheetcafe.com
10	https://www.vlab.co.in

Reference Books

Sr. No.	Name of Reference Books
1	Text Book of Physics for Class XI (Part-I, Part-II), N.C.E.R.T., Delhi
2	Text Book of Physics for Class XII (Part-I, Part-II), N.C.E.R.T., Delhi
3	Concept of Physics (volume I & II) by H C Verma, Bharti Bhawan Ltd. New Delhi.
4	Physics for Scientists and Engineers with Modern Physics, John W. Jewett & Raymond A. Serway
5	University Physics (Volume I, II & III) (OpenSource Material) by William Moebs, Samuel J. Ling & Jeff Sanny
6	PHYSICS for SCIENTISTS & ENGINEERS with Modern Physics by Douglas C. Giancoli
7	Principles of Physics by Jearl Ealker, David Halliday, Robert Resnick
8	SEARS and ZEMANSKY'S University Physics with modern Physics by Hugh D. Young & Roger A. Freedman
9	Engineering Physics by DK Bhattacharya
10	Principles of Physics by Jearl Ealker, David Halliday, Robert Resnick