

Name of Programme : CE / EE / ~~ME~~ / MT
 Programme code : 01 / 02 / 04 / 05
 Name of Course : Engineering Physics
 Course Code : SC 164

Teaching Scheme :

	Hours/Week	Total Hours
Theory	04	64
Term Work/Practical	02	32

Evaluation:

	Progressive Assessment	Semester End Examination			Term Work
		Theory	Practical	Oral	
Duration	Three Class Test of 60 Minutes	3 Hrs	3 Hrs	---	---
Marks	20	80	50	--	---

Course Aim:

1. To understand various Phenomena, Principles and Concepts
2. To understand the Applications of Basic Physics
3. To solve the applied numerical problems.

Course Aim:

1. To appreciate the role of fundamentals of Physics in different branches of Engineering.
2. To think in scientific manner and apply the knowledge gained in different situations.

Course Content:

Sr. No	Topic / Sub topic	Hrs	Weightage
1.	General Physics		
	1.1 Units and Measurement : Need of measurement, Unit of Physical Quantity, Requirements of standard unit, systems of unit, classification of physical quantities into fundamental and derived. Examples of conversion of unit.	2	4
	1.2 Errors : Instrumental, systematic and random error. Definition, Explanation, Examples and estimation of errors.	2	

	<p>1.3 Motion :</p> <p>a) Introduction to Rectilinear motion, $v = u + at$, $S = u + \frac{1}{2} at^2$, $v^2 = u^2 + 2as$</p> <p>b) Circular Motion : Types of motion, uniform circular motion, angular displacement, radial velocity, tangential velocity, periodic time, frequency, relation between linear and angular velocity, definition and explanation of centripetal and centrifugal force, applications of circular motion, banking of road – definition and expression. Problems on banking and velocity limit on curved road.</p> <p>c) Simple Harmonic Motion: Definition of SHM as a projection of UCM on the diameter. Equation of SHM, Graphical representation. Displacement, velocity and acceleration of particle in SHM from mean and extreme position, problems.</p>	7	8
2.	<p>Properties of Matter :</p> <p>2.1 Surface Tension : Molecular theory of surface tension, Cohesive and adhesive forces. Angle of contact, Shape of liquid surface in capillary tube. Capillary action (Examples). Relation between surface tension and capillary and radius of capillary tube (no derivation), simple problem. Effect of impurity and temperature on surface tension</p> <p>2.2 Viscosity: Explanation, Definition, Velocity gradient, Newton's & Stokes' law of viscosity, terminal velocity (No derivations). Type of flow of liquid – stream line flow, turbulent flow, Reynolds's number (significance), applications and simple problems.</p> <p>2.3 Elasticity: Elastic and plastic bodies. stress and strain. Hook's law, type of elasticity modulus, problems. Behavior of wire under continuously increasing load.</p>	3	10
3	<p>Sound :</p> <p>3.1 Wave motion. Transverse and longitudinal waves, free and forced vibrations, Resonance –explanation and example. Revision on reflection of sound, explanation of echo and reverberation of sound, absorption, reflection and transmission of sound, reverberation time (Sabine's formula), Acoustics factors affecting acoustical planning of building, requirements of good acoustics, unit of audibility, decibel, simple problems.</p>	4	5
4	<p>Heat :</p> <p>4.1 Explanation of Gas laws. Boyle's law, Charles's law, Gay Lussac's law, General Gas Equation, Problems on gas laws, Absolute scale of temperature. Modes of heat transfer, Conduction, convection and radiation. Expansion of substance- linear, aerial and cubical expansion- Definition and problems. Black body radiation- concept. $a + r + t = 1$.</p>	4	5
5	<p>Light :</p> <p>5.1 Introduction to reflection and refraction of light, Snell's law, physical significance of refractive index, Total internal refraction of light, critical angle, simple problems.</p> <p>5.2 Fiber optics : Propagation of light through optical fiber, numerical aperture, types of optical fibers, methods of production, applications and comparison with electrical cable</p> <p>5.3 LASER : Definition, <u>spontaneous and stimulated emission</u>, <u>population inversion</u>, He-Ne laser, construction and working, applications of LASER.</p>	2	10

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	5.4 Electro magnetic spectrum: spectrum, origin of spectrum, electromagnetic spectral range, type of spectra, line, band and continuous spectra and their significance, applications of spectra.	2	A
6	Electrostatics:		
	6.1 Electric charge, Coulomb's law of charges, unit charge, electric field, intensity of electric field, electric lines of forces (properties) electric flux, flux density.	2	10
	6.2 Electric potential: explanation, definition, potential due to a point charge, potential due to a charged sphere, absolute electric potential, expression for potential difference between two points. Simple problems.	2	
	6.3 Electric condenser: Concept, capacity of condenser, unit, Principle of condenser, series law and parallel law of condenser, simple problems. Applications of condensers.	3	
7	Current Electricity :		
	7.1 Concept of resistance, Specific resistance, Whetstone's network, meter bridge, balancing condition of meter bridge. measurement of unknown resistance using meter bridge. Problems.	3	10
	7.1 Potential, Potential drop along the length of wire, principle of potentiometer, potential gradient, E.M.F. unit, comparison of E.M.F. using potentiometer..	3	
	7.2 Electric work, electric power, energy, units and calculations of electric bill.	2	
8	Thermo-electricity:		
	8.1 Thermo couple, materials for thermocouples, Seeback effect, Peltier effect, variation of thermo e.m.f. with temperature. Thermo electric series, Law of intermediate temp. Uses of thermocouple.	1	2
9	Electromagnetism :		
	9.1 ✓ Magnetic effect of electric current, Ampere's rule, Intensity of magnetic field, magnetic Induction, relation between B and H, Biot and Savart Law (Laplace's Law), Fleming's left hand rule. 9.2 ✓ Force Experienced by current carrying straight conductor placed in magnetic field. Principle of galvanometer. Problems.	4	5
10	Magnetism :		
	10.1 Domain theory of magnetism, Intensity of magnetic field. Magnetic lines of forces (properties). Type of magnetic materials, para, dia and ferromagnetic substances – their properties and applications, Curie Temperature.	2	4
11	Modern Physics :		
	✓ 11.1 X- ray's; production, properties and industrial applications.		
	✓ 11.2 Ultrasonic and infrasonic waves, properties and industrial applications.	6	7
	11.3 Nondestructive testing methods - M.P.T., L.P.T. (advantages and disadvantages), X rays, radiographic, ultrasonic		
	11.4 Introduction to Nanotechnology, methods and applications.		
	11.5 Introduction to superconductivity - properties and uses.		
	TOTAL	64	80

List of Practicals:

Sr. No.	Name of Experiment
1	Use of vernier calliper to measure the dimensions of different objects.
2	To understand the concept of error in instrument and to measure the dimensions of different objects using micrometer screw gauge.
3	To understand the concept of resonance and to determine the velocity of sound using resonance tube method.
4	Measurement of unknown temperature using thermocouple.
5	Measurement of unknown temperature using platinum resistance thermometer.
6	To determine the refractive index using spectrometer.
7	To determine the specific resistance using Ohm's law.
8	To understand the concept of Whetstone's network and to determine the specific resistance using the meter bridge.
9	To study the principle of potentiometer.
10	To verify Ampere's rule using Orested experiment and find the variation of intensity of magnetic field with current and distance.
11	To observe the rise in liquid level in capillary (Jurine's Law)
12	To verify Boyle's law
13	To understand the concept of viscosity and hence to determine the coefficient of viscosity using Stokes' method.

Reference Books:

Author/s	Title	Publisher
R.K. Gaur and S. L. Gupta	Engineering Physics	Dhanpal Rai and Sons Publications
Manikpure, Prakash Deshpande and Dagwar	Basic Aplied Physics.	S. Chand and Co. New Delhi.
Modern Physics	Text book in Physics for diploma Engg. Student.	Sony Publications Pvt. Ltd.
Applid Physics	Schum's Series.	
Kshirsagar, Avdhanalu-	Engineering Physics	

Learning Recourses :

1. Chart 2. Black Board, 3. Television, 4. Internet 5. Educational
CD's 6. Models 7. Experimentation 8. Diagram Demonstration

Specification Table :

Note: Figures in the bracket indicate the marks for which question will be set to account for internal options.

Sr. no.	Topic	Cognitive Level Knowledge	Comprehension	Applications	Total
1	General Physics	5(9)	4(6)	2(3)	11(18)
2	Properties of matter	5(7)	3(5)	2(3)	10(15)
3	Sound	2(3)	2(3)	1(1)	5(7)
4	Heat	2(3)	2(3)	1(1)	5(7)
5	Light	4(7)	3(5)	2(3)	9(15)
6	Electrostatic	5(7)	3(5)	2(3)	10(15)
7	Current Electricity	5(7)	2(5)	2(3)	9(15)
8	Thermoelectricity	2(3)	2(3)	1(1)	5(4)
9	Electromagnetism	2(3)	2(3)	1(1)	5(7)
10	Magnetism	2(3)	1(2)	1(1)	4(6)
11	Modern Physics	3(5)	2(3)	2(3)	7(11)
	Total	39	27	17	80

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