

Course Name : All Branches of Diploma in Engineering / Technology.

**Course Code : EJ/EN/ET/EX/EV/IC/IE/IS/MU/DE/ ME/PG/PT/AE/ CE/CS/CR/
CO/CM/IF/ EE/EP/CH/CT/PS/CD/ED/EI/CV/MH/FE/IU/MD**

Semester : First

Subject Title : Basic Physics

Subject Code : 9001

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
03	--	02	03	80	20	50@	--	--	150

RATIONALE:

Engineering is entirely meant for comfort of mankind. It includes varieties of disciplines like Mechanical Engg., Electrical Engg., Civil Engg., Electronics Engg., Computer Engg., etc. The overall growth of these disciplines is based on developments in fundamental sciences and their conceptual learning too.

For sustainable socio-economic development of the country, comprehensive research techniques in science and engineering are required. Regarding any problem to identify, understand and solve, the decision based on scientific facts and results is must.

Engineering, being the science of measurement and design, has been offspring of Physics that plays the primary role in all professional disciplines of engineering. The different streams of Physics like Optics, Acoustics, Dynamics, Semiconductor Physics, Surface Physics, Nuclear physics, Energy Studies, Materials Science, etc provide **Fundamental Facts, Principles, Laws, and Proper Sequence of Events** to streamline Engineering Problems.

OBJECTIVES:

Student will be able to:

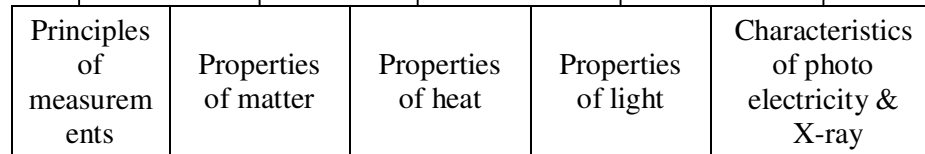
- Measure given dimensions by using appropriate instruments accurately.
- Select proper measuring instrument on the basis of range, least count & precision required for measurement.
- Select proper material for intended purpose by studying properties of materials.
- Identify good & bad conductors of heat.
- Analyze relation among pressure, volume and temperature of gas & to interpret the results
- Identify the effect of interference between light waves.
- Identify properties of laser light and photo electric effect for engineering applications.
- Identify, analyze, discriminate and interpret logical sequence of field problems with the study of physics.

Learning Structure:

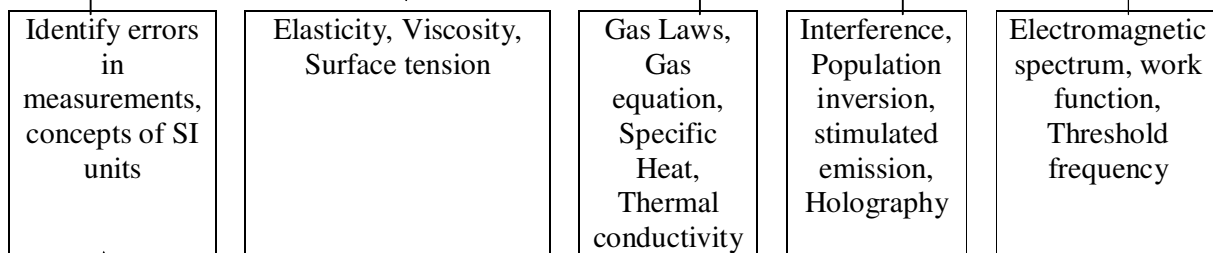
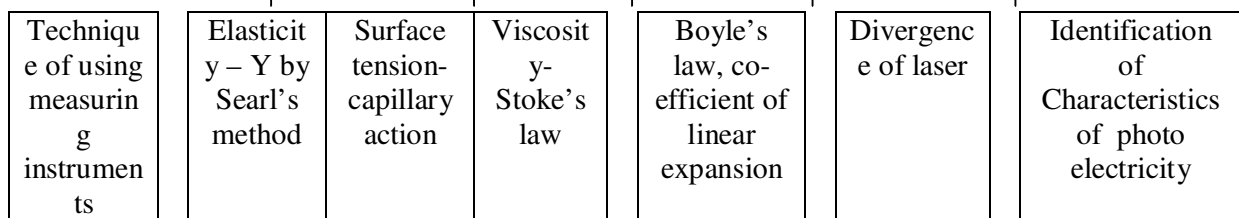
Applications

Enable to understand principles, laws, and concepts of Physics from nature and implement them to identify, analyze, discriminate, and interpret the logical sequence of events which further form basis for study of different Engineering work.

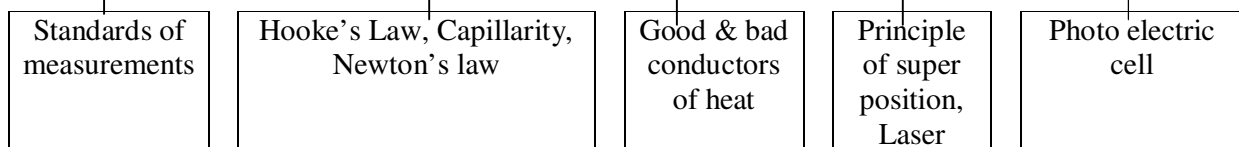
Procedures



Concept



Fact



CONTENTS: Theory

CHAPTER	CONTENT	HOURS	MARKS
1.	<p>UNITS AND MEASUREMENTS</p> <p>1.1 Need of Measurement in engineering and science, unit of a physical quantity, requirements of standard unit, systems of units-CGS,MKS and SI, classification of physical quantities-Fundamental and Derived with their units</p> <p>1.2 Accuracy, Precision of instruments, Errors in measurement, Estimation of errors-Absolute error, Relative error and percentage error, significant figures. (Simple Problems)</p> <p>1.3 Basic Measuring instruments-Vernier Caliper, Micrometer screw gauge, inner & outer caliper thermometer, spherometer, ammeter, voltmeter with their least count, range, accuracy and precision.</p> <p>1.4 Standard reference surfaces used in engineering measurements- surface plate, angle plate, V- block, Engineer's square.</p>	06	08
2.	<p>GENERAL PROPERTIES OF MATTER</p> <p>2.1 Elasticity Deforming force, Restoring force, Elastic and plastic body, Stress and strain with their types, Hooke's law, Stress strain diagram, Young's modulus, Bulk modulus, Modulus of rigidity and relation between them(no derivation), (simple problems). (Simple problems) Stress strain diagrams of H.T. Steel, Cast iron, Aluminium and Concrete, Ultimate and breaking stress, Factor of safety.</p> <p>2.2 Surface Tension. Forces—cohesive and adhesive, , angle of contact, shape of liquid surface in a capillary tube, capillary action with examples, relation between surface tension , capillary rise and radius of capillary (no derivation)(simple problem),effect of impurity and temperature on surface tension</p> <p>2.3 Viscosity Velocity gradient, Newton's law of viscosity, coefficient of viscosity ,streamline and turbulent flow, critical velocity, Reynold's number,(simple problems), Stokes law and terminal velocity(no derivation) ,buoyant (up thrust) force, effect of temperature & adulteration on viscosity of liquid.</p>	04	08
		03	04
		03	04

CHAPTER	CONTENT	HOURS	MARKS
3	HEAT 3.1 Transmission of heat and expansion of solids Three modes of transmission of heat- conduction, convection and radiation, good and bad conductor of heat with examples, law of thermal conductivity, coefficient of thermal conductivity (simple problems), expansion of solids-linear, aerial and cubical and relation between them.	03	08
	3.2 Gas laws and specific heats of gases Boyle's law, Charle's law, Gay Lussac's law, absolute temperature, Kelvin scale of temperature, general gas equation(no derivation)(simple problems),molar or universal gas constant, universal gas equation, standard or normal temperature and pressure (N.T.P.), specific heat of gases, relation between two specific heat (simple problems), thermodynamic variables, first law of thermodynamics (statement & equation only), isothermal, isobaric, isochoric & adiabatic processes (difference among these processes and equations of state) (simple problems).	06	08
4	LIGHT 4.1 Properties of light Reflection and, refraction, Snell's law, physical significance of refractive index (simple problems), Total internal reflection, dispersion, diffraction and polarization of light (only introduction)	04	06
	4.2 Wave theory of light & Interference Newton's corpuscles theory of light, Huygen's wave theory, wave front, Types of wave front- spherical, cylindrical and plane Huygen's principle of propagation of wave front, Principle of superposition of waves, Interference of light, constructive and destructive interference, Young's experiment. Analytical treatment of interference, conditions for stationary interference pattern.	05	08
	4.3 Laser Light amplification by stimulated emission of radiation, properties of laser, spontaneous and stimulated emission, population inversion, pumping methods, He-Ne laser- construction & working, recording and reconstructing of hologram by using He-Ne laser.	06	08

CHAPTER	CONTENT	HOURS	MARKS
5	MODERN PHYSICS.	04	10
	5.1 Photo electricity Plank's hypothesis, properties of photons, photo electric effect, laws and characteristics of photoelectric effect, Einstein's photoelectric equation,(simple problems), construction and working of photoelectric cell, applications of photoelectric cell 5.2 X-rays Production of X-rays, types of X-ray spectra-continuous and characteristics, X-ray wavelength (simple problems), properties of X-rays, applications of X-rays-engineering, medicine and scientific research work.	04	08
TOTAL		48	80

Practical:

Skills to be developed

1) Intellectual skills-

- Proper selection of measuring instruments on the basis of range, least count, precision and accuracy required for measurement.
- Analyze properties of matter & their use for the selection of material.
- To verify the principles, laws, using given instruments under different conditions.
- To read and interpret the graph.
- To interpret the results from observations and calculations.
- To use these results for parallel problems.

2) Motor skills-

- Proper handling of instruments.
- Measuring physical quantities accurately.
- To observe the phenomenon and to list the observations in proper tabular form.
- To adopt proper procedure while performing the experiment .
- To plot the graphs.

Laboratory Experiments(Any ten experiments to be performed)

1. Use of vernier calipers for the measurement of dimensions of given object.
2. Use of micrometer screw gauge for the measurement of dimensions of given object
3. Determine the Young's modulus of material of wire using Searle's apparatus.
4. To observe rise in water level through capillaries of different bores.
5. Determine coefficient of viscosity of given oil using Stoke's Method.
6. Verification of Boyle's law.
7. Measurement of unknown temperature using thermocouple.
8. Determine the coefficient of linear expansion of given material of rod using Pullinger's apparatus.
9. To observe the divergence of laser light with respect to distance.
10. Plot characteristics of photoelectric cell (Photoelectric current verses intensity of light and voltage applied).

References:

Sr. No.	Name of book	Author	Publisher & Address
1.	Physics-I	V. Rajendran	Tata McGraw- Hill Publication, New Delhi
2.	Applied physics	Arthur Beiser	Tata McGraw- Hill Publication, New Delhi
3.	Engineering Physics	by R.K.Gaur and S.L.Gupta	Dhanpat Rai Publication, New Delhi.
4.	Physics	Resnick and Halliday.	--

