Name of Programme : **E&TC/CM/IT**

Programme code : **03 / 06 / 07**

Name of Course : **Applied Physics**

Course Code : **SC 163**

Teaching Scheme :

	Hours/Week	Total Hours
Theory	03	48
Term Work/Practical	02	32

Evaluation Scheme:

	Progressive Assessment	Semester End Examination			
		Theory	Practical	Oral	Term Work
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 in Physics.

2. To understand the applications of Basic Physics

3. To solve the applied numerical problems.

Course Objectives :

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	Weigh tage
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.	2	
2	**Sound :**		
	2.1 Wave motion, Transverse and longitudinal waves ree and Forced vibrations, Resonance –explanation and example. Revision on reflection of sound, explanation of echo a nd 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.	4	6
3	**Heat :**		
	3.1 Temperature measurements: Thermometers- Mercury, Bimetallic, Pyrometer, Thermocouple, Platinum resistance and Thermister thermometers- **their principle and working**	3	6
4	**Light :**		
	4.1 Introduction to reflection and refraction of light, Snell's law, physical significance of refractive index, Total internal refraction of light, critical angle, simple problems.	2	12
	4.2 **Fiber optics** : Propagation of light through optical fiber, numerical aperture, types of optical fibers, methods of production, applications and comparison with electrical cable	2	
	4.3 **LASER :** Definition, spontaneous and stimulated emission, population inversion, He-Ne laser, construction and working, applications of LASER.	2	
	4.4 **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	
5	**Electrostatics:**		
	5.1 **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	12
	5.2 **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	
	5.3 **Electric condenser:** Concept, capacity of condenser, unit, Principle of condenser, series law and parallel law of condenser, simple problems. Applications of condensers.	3	
6	**Current Electricity :**		
	6.1 **Concept of resistance**, Specific resistance, Whetstone's network, meter bridge, balancing condition of meter bridge, measurement of unknown resistance using meter bridge.	3	12

	Problems. 6.2 **Potential**, Potential drop along the length of wire, principle of potentiometer, potential gradient, E.M.F. unit, comparison of E.M.F. using potentiometer.. 6.3 **Electric work**, electric power, energy, units and calculations of electric bill,	3 2	
7	**Thermo electricity:**		
	7.1 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
8	**Electromagnetism :**		
	8.1 Magnetic effect of electric current, Ampere's rule, Intensity of magnetic field, magnetic Induction, relation between B and H, Biot and SavertLaw (Laplace's Law), Fleming's left hand rule, Force Experienced by current carrying straight conductor placed in magnetic field. Principle of galvanometer. Problems.	4	8
9	**Magnetism :**		
	9.1 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.	2	4
10	**Modern Physics :**		
	10.1 **Semiconductors**- intrinsic, extrinsic, doping, p and n type semiconductors, electrical conduction through p and p semiconductors **Band theory** of solids, semiconductor, metal and insulator, temperature effect on the conductivity of semiconductors. 10.2 **X- ray's**; production, properties and industrial applications. 10.3 **Ultrasonic** and infrasonic waves, properties and industrial applications.. 10.4 **Nondestructive testing** methods - M.P.T., L.P.T (advantages and disadvantages), X rays, radiographic, ultrasonic 10.5 Introduction to **Nanotechnology**, methods and applications. 10.6 introduction to **superconductivity** - properties and uses.	7	14
	TOTAL	48	80

List of Practicals:

Sr. No.	Name of Experiment
1	Use of vernier calliper to measure the dimensions of different objects. (1)
2	To understand the concept of error in instrument and to measure the dimensions of different objects using micrometer screw gauge. (2)
3	To understand the concept of resonance and to determine the velocity of sound using resonance tube method. (3)
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. (4)
8	To understand the concept of Wheatstone's network and to determine the specific resistance using the meter bridge. (5)
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 determine the forbidden gap in semiconductors.
12	To verify series/parallel law of condensers.

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	2(3)	1(2)	1(1)	4(6)
3	Sound	3(4)	2(3)	1(2)	6(9)
4	Heat	3(4)	2(3)	1(2)	6(9)
5	Light	6(9)	4(6)	2(3)	12(18)
6	Electrostatic	6(9)	4(6)	2(3)	12(18)
7	Current Electricity	6(9)	4(6)	2(3)	12(18)
8	Thermoelectricity	1(2)	---	1(1)	2(3)
9	Electromagnetism	3(5)	3(5)	2(2)	8(12)
10	Magnetism	2(3)	1(2)	1(1)	4(6)
11	Modern Physics	5(8)	5(8)	4(5)	14(21)
		37	26	17	80

( ) (Prof.S.B.Kulkarni) (Prof.)
Prepared by CDC In-charge Chairman PBOS