



# RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

## OUTCOME BASED CURRICULUM

NAME OF THE PROGRAMME: ELECT, E&TC, EEE, ELECT&INST, OPTO-ELECT., CIVIL, CTM, REF&PETROCHEMICAL, PLASTIC, PRINTING, AND TEXT TECH

Name of Scheme : OCBC 19

COURSE CODE :6802

COURSE TITLE : Physics

SEMESTER: FIRST

### COURSE OUTCOMES

C102.1	Have an understanding of the fundamental concepts and techniques in the various topics related to engineering physics and students should be able to apply the knowledge analytically
C102.2	To apply practical skill on the basis of theoretical knowledge imparted , identify analyse , differentiate and interpret logical sequence of field problems with the study of physics
C102.3	The students should be able to measure given dimensions by using appropriate instruments accurately and should be able to select proper measuring instrument on the basis of range, least count and precision
C102.4	Enable to understand principles, laws, facts, concepts, using mathematical techniques and experimental determination of values of different physical properties of materials by studying physics.
C102.5	Apply the principles of physics and its significance in engineering system and technological advances
C102.6	Equip the students with skills of taking ethical responsibility in scientific thinking , problem solving and laboratory techniques

### CO-PO MAPPING

Course Outcomes	P01	P02	P03	P04	P05	P06	P07
C0102.1	3		2	2	1		2
C0102.2	3	1	2	3			1
C0102.3	3	1	2				3
C0102.4	1	3		2	2	1	1
C0102.5	3	3	2	1	3	2	2
C0102.6	1	1			2	2	1

	Content (Theory)	Hrs/Unit	Mapped CO'S
Unit – 1  UNITS, DIMENSIONS & MEASUREMENTS	<b>1.1 Measurement</b> - Need of Measurement in engineering and science, unit of a physical quantity, requirements of standard unit, systems of units  <b>1.2 Accuracy</b> - Accuracy, Precision of instruments, Errors in measurement, Estimation of errors  <b>1.3 Instruments</b> - Basic Measuring instruments- Vernier Caliper, Micrometer screw gauge, ammeter, voltmeter with their least count, range, accuracy and precision	15	C102.1, C102.2, C102.3, C102.4



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<p>Unit – 2</p> <p>GENERAL PROPERTIES OF MATTER</p>	<p><b>2.1 Elasticity</b> : 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.</p> <p><b>2.2 Surface Tension:</b> 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><b>2.3 Viscosity</b> : 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 &amp; adulteration on viscosity of liquid.</p>	<p>20</p>	<p>C102.1, C102.2, C102.3</p>
<p>Unit – 3</p> <p>HEAT AND THERMODYNAMICS</p>	<p><b>3.1 Transmission of heat and expansion of solids</b> - Transmission of heat-conduction, convection and radiation, law of thermal conductivity, coefficient of thermal conductivity (simple problems),</p> <p><b>3.2 Gas laws and specific heats of gases</b> Boyle's law, Charle'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 &amp; equation only), isothermal, isobaric, isochoric &amp; adiabatic processes (difference among these processes and equations of state) (simple problems).Second law of thermodynamics -Kelvin &amp; Plank (statement &amp; example)</p>	<p>20</p>	<p>C102.1, C102.3, C102.4,</p>
<p>Unit – 4</p> <p>LIGHT</p>	<p><b>4.1 Properties of light</b> Reflection and, refraction, Snell's law, physical significance of refractive index (simple problems), Total internal reflection, dispersion, diffraction and polarization of light (only introduction)</p> <p><b>4.2 Wave theory of light &amp; Interference</b> 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.</p> <p><b>4.3 Laser</b> Light amplification by stimulated emission of radiation,</p>	<p>20</p>	<p>C102.1, C102.3, C102.3, C102.5</p>



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	properties of laser, spontaneous and stimulated emission, population inversion, pumping methods, He-Ne laser- construction, working and application		
Unit – 5 MODERN PHYSICS	<b>5.1 Photo electricity</b> 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 <b>5.2 X-rays</b> 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.	15	C102.1, C102.3, C102.4, C102.3
	TOTAL	90	100

### SUGGESTED SPECIFICATION FOR QUESTION PAPER DESIGN

UNIT NO	TITLE	TEACHING HRS	TENTATIVE DISTRIBUTION OF MARKS			
			R LEVEL	U LEVEL	A LEVEL	TOTAL
1	DIMENSIONS & MEASUREMENTS	15	5	4	5	14
2	GENERAL PROPERTIES OF MATTER	20	8	3	3	14
3	HEAT AND THERMODYNAMICS	20	6	4	4	14
4	LIGHT	20	7	3	4	14
5	MODERN PHYSICS	15	8	3	3	14
	TOTAL	90	34	17	19	70

### PRACTICAL SKILLS

Sl. No.	Skills to be developed
1.	<ul style="list-style-type: none"> <li>● <b>Intellectual skills-</b> <ul style="list-style-type: none"> <li>○ Proper selection of measuring instruments on the basis of range, least count, precision and accuracy required for measurement.</li> <li>○ Analyze properties of matter &amp; their use for the selection of material.</li> <li>○ To verify the principles, laws, using given instruments under different conditions.</li> <li>○ To read and interpret the graph.</li> <li>○ To interpret the results from observations and calculations.</li> </ul> </li> </ul>



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2.	<ul style="list-style-type: none"><li>● <b>Motorskills-</b><ul style="list-style-type: none"><li>○ Proper handling of instruments.</li><li>○ Measuring physical quantities accurately.</li><li>○ To observe the phenomenon and to list the observations in proper tabular form.</li><li>○ To adopt proper procedure and precautions while performing the experiment.</li><li>○ To plot the graphs</li></ul></li></ul>
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### Laboratory Experiments :

Sl. No.	Any 10 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.	Verification of laws of refraction of light and determination of refractive index of glass slab
4.	Calculation of refractive index of refractive index of Glass of prism by $i-\delta$ method
5.	Determine of focal length of a convex lens by U-V method.
6.	Determination of the Young's modulus of steel by Searl's method.
7.	Determination of the surface tension of water by capillary rise method
8.	Plot characteristics of photoelectric cell (Photoelectric current verses intensity of light and voltage applied).
9.	Determine of focal length of a convex lens by Displacement method.
10.	Coefficient of Thermal conductivity by Searl's method.
11.	Verification of Boyle's law.
12.	Measurement of unknown temperature using thermocouple.
13.	Determine coefficient of viscosity of given oil using stoke's method.

### Text and reference books:

Sl. No.	Title of the Book	Name of Authors	Publisher
1.	Physics – I & II	Resnik & Halliday	Wiley Eastern Ltd.
2.	Physics. Part – I & II		NCERT
3.	Applied Physics	Arthur Beiser	Tata McGraw- Hill
4.	Physics - I	V. Rajendram	Tata McGraw- Hill Publication
5.	Engineering Physics	Avadhanulu, Kshirsagar	S. Chand Publication
6.	Concept of Physics. Vol.- I & II	H. C. Verma	Bharati Bhavan Pub. & Distribution
7.	Engineering Physics	JOSHI	Tata McGraw- Hill
8.	अनुप्रयुक्त भौतिकी	Y. P. Singh and A. S. Tomar	Satya Prakashan, New Delhi
9.	पोली0 भौतिक विज्ञान	डा0 अमित जैन	संजय पब्लिकेशन जयपुर ।