Faculty of Science and Humanities
B.Sc. (Physics) (Semester - 6)
In Effect from Academic Year 2023-24

Branch Name:	Physics
Program Code:	SC105
Course Name:	Physics 603
Course Code:	**2SC1050603**
Pre-requisite Course:	Basic knowledge of Electromagnetism and Energy Technology.

Course Objectives:

- To develop an actual understanding of the Electromagnetic.
- To know the basic concept of Energy Technology.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
				Theory (Marks)		Practical (Marks)		
Lecture (L)	Tutorial (T)	Practical (P)	Credit	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	Total (Marks)
3	--	--	3	70	30	--	--	100

Subject Contents:

Sr. No	Topic	Total Hours	Weight (%)
1	**ELECTROMAGNETICS** **Boundary Value Problems in Electrostatic Fields :Special Techniques** Laplace's Equation, Introduction, Laplace's Equation in two dimensions, Laplace's Equation in three dimensions, Boundary conditions and Uniqueness theorems, The method of images, The classic image problem, Induced surface charge, Force and energy, other image problems, Separation of variables, Cartesian Coordinates, Spherical coordinates, Multipole Expansion, Approximate Potential at large distances, The monopole and dipole terms, Origin of Coordinates in Multipole Expansions.	15	33
2	**ELECTROMAGNETICS** Maxwell's equations in matter, Continuity equation, Poynting theorem – Momentum conservation, Maxwell's stress tensor – Angular momentum. Electromagnetic Waves in Vacuum: Wave equation for E and B fields, Monochromatic plane waves – Energy & momentum in electromagnetic waves, Polarization of electromagnetic waves: linear and circular polarization. Electromagnetic waves in matter: Propagation in linear media- Boundary conditions Reflection and Refraction – Snell's law. Reflection and Transmission at normal and oblique incidence – Fresnel's equations.	15	33
3	**ENERGY TECHNOLOGY** **(a) Fundamentals and Applications of Solar Energy** Introduction, Applications, Essential subsystems in a Solar energy plant, Solar energy chains (routes) and their prospects, Terms and definitions of some basic entities, Units of solar power and solar energy, Merits and Limitations of Solar energy conversion and utilization. Energy from the Sun, Solar constant. **(b) Solar energy conversion systems and thermal power plants:**	15	34

	Solar thermal power supply system for space station, Solar energy from satellite station through microwaves to Earth station, Solar thermoelectric power, Solar photovoltaic systems: V-I characteristics of a solar cell, Inter connections of solar cell, Efficiency of solar cell.		

Reference Books:

1. 1. Introduction to Electrodynamics by David J. Griffths. 3rd EditionPearson Education Asia.
2. Energy Technology by S. Rao and Dr. B. B. Parulekar. Khanna Publisher, Delhi. 1st edition 1985.
3. Electromagnetics by B. B. Laud. Willley Eastern Ltd.

List of Open Source Software/learning website:

1. https://www.youtube.com/watch?v=TQ-RNp1iiu8
2. https://www.youtube.com/watch?v=p5JKz5qsluU

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Describe the Laplace's Equation in two dimensions.	1 Remembering
CLO2	Discuss the Cartesian Coordinates and Spherical coordinates.	2 Understanding
CLO3	Solve the Continuity equation	3 Applying
CLO4	Explain Poynting theorem.	4 Analyzing
CLO5	Justify the use of solar and thermal energy.	5 Evaluating
CLO6	Explain Fundamentals and Applications of Solar Energy.	4 Analyzing

Mapping of CLOs with POs & PSOs

Course Learning Outcomes	Programme Outcomes (POs)									Programme Specific Outcome (PSOs)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2
CLO1		H									
CLO2										H	
CLO3			M								
CLO4					H					M	
CLO5								H		H	
CLO6	L										

H: High, M: Medium, L: Low