Semester II

GENERIC ELECTIVES (GE-3): Engineering Physics II

Credit distribution, Eligibility and Pre-requisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre- requisite of the course	Department offering the course
		Lecture	Tutorial	Practical/ Practice			
Engineering Physics II, GE-3	**4**	**2**	**0**	**2**	**Class XII pass**	**Engineering Physics I**	**Physics Faculty of CIC**

Learning Objectives

This module intends to provide an understanding of the basics of electrostatics and electrodynamics. It emphasizes on learning of concepts of electric circuits, electromagnets and induction mechanism. Further it gives a day-to-day knowledge of transformers, motors and generators. Also, it provides learning of solar energy usage and its technology. The lab activities provide a hand on experiments on electricity and solar energy. It provides understanding of working of utility devices. It intends to promote projects on robotics and solar energy.

Learning outcomes

- Understanding of physics principles in devices.
- Ability to conceptualize and build electrical devices for real life use.
- Reverse engineering of electrical devices and redesigning of such objects.
- Practical hands-on skills and understanding of simple engineering concepts derived from Electricity & Magnetism.

SYLLABUS OF GE-3

Unit I: (16 Hour) Electricity

Basics of Electrostatics and Electrodynamics - Electric Circuit elements and function - Current, voltage, capacitance, resistance - Power and efficiency in

electrical appliances
Unit II: (16 Hour) Electromagnetism basics
Joule heating - Electrical safety devices - Basics of Electromagnetism - Electromagnets and induction - Transformers. DC motors and generators
Unit III: (16 Hour) Electromagnetism applications
AC motors - Using electromagnetic spectrum - Information transfer and broadcasting
Unit IV: (16 Hour) Alternate Energy
Use of Radiation energy and appliances - Photovoltaic cells and conversion of solar energy to electricity - Advantages, limitations and challenges of different solar cell technologies - Different forms of renewable energy and technology.

Practical component –
Engineering Kitchen Activities [Laboratory]

- Electric circuit, power requirement, cost of electricity, energy efficiency of sample appliances
- Potential divider, measurement of resistances of different scales
- Build a buzzer
- Conversion of solar power to electricity using photovoltaic cells: design, working principle, performance, application
- Build an autonomous robot
- Build a remote-controlled robot
- Understanding physics of devices – one implementation of "Tod-Phod-Jod" concept.
- Innovation project – designing instruments, devices, model & prototyping

Essential/recommended readings

1. *Introduction to Electrodynamics.* David. J. Griffiths, PHI Learning, 2012
2. *Textbook of Electrical Technology* – Volume I & II. B. L. Thareja, and A. K. Thareja, S. Chand Publishing, 2006

GENERIC ELECTIVES (GE-4): Engineering Chemistry II

Credit distribution, Eligibility and Pre-requisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course	Department offering the course
		Lecture	Tutorial	Practical/ Practice			