Semester:	1			
Course Code:	EE1010			
Course Name:	Electricity			
Credit Value:	3 (Notional hours:150)			
Prerequisites:	None			
Core/Optional	Core			
Hourly Breakdown	Lecture hrs.	Practical hrs.	Tutorial hrs.	Independent Learning
	29	24	4	93

Course Aim: To equip the learners with fundamentals of physics of electricity which will enable them to model and analyze natural phenomena of electricity and perceive the art of scientific problem solving.

Intended Learning Outcomes:

On successful completion of the course, the students should be able to;

- **model** electrical phenomena using fundamentals of field theory.
- **apply** fundamental laws in electric and magnetic fields to solve basic electromagnetic problems.
- **analyze** electrical circuits under steady state and transient conditions.
- **build** engineering systems based on fundamentals.
- **use** state of the art tools for analyzing electric/magnetic field applications and electrical circuits.

Course Content:

- **Introduction:** Field theory as a tool to understand the universe, Fundamentals of Fields, Introduction to field theory
- **Electrostatics:** Electric Charge and Coulomb's Law, Permittivity, Electric field, Gauss law, Electric flux, Electric potential, Energy stored in a static electric field, Dielectric polarization, boundary conditions, Capacitance
- **Magnetism:** Magnetic flux and Flux density (B), Permeability, Magnetic field intensity (H), Biot-Savart law , Ampere’s law, Gauss law for magnetic fields, Magnetic force and torque, , Self and mutual inductance, Faraday’s law of Induction, Lenz’s law, Stored energy in the magnetic field, Magnetic properties of materials, B-H curve, Reluctance and magnetic circuits, eddy current, hysteresis and iron losses
- **Linear Electrical Circuit Analysis: Steady state analysis:** Charge flow - ohm's law,

current and current density (J), resistance and resistivity, impedance and admittance, Mesh and nodal analysis, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem

- **Linear Electrical Circuit Analysis: Transient analysis:** Analysis of RC, RL and RLC circuits under dc excitation
- **Advances in modeling techniques:** Recent developments in modeling electrical phenomena
- **Introduction to the state of the art analysis tools:** Modern tools for electrical and magnetic field analysis, electrical circuit analysis
- **Electrical Engineering Mini Project**

Teaching /Learning Methods:
Classroom lectures, tutorial discussions and practical classes

Assessment Strategy:

Continuous Assessment 60%	Final Assessment 40%		
Details: Tutorials - 10% Quizzes - 4% Assignment / Project - 26% Labs - 20%	Theory (%) 40%	Practical (%) -	Other (%) -

Recommended Reading:

- Hughes, E. and Smith, I.M. (1995), *Huges Electrical Technology*. Longman Scientific & Technical, Pennsylvania, USA.
- Mehta, V.K., (2006). *Principles of Electrical Engineering and Electronics.*
- Powell, R. G., (1990). *Electromagnetism.* MacMillan Press Ltd., London