Electromagnetic Field Theory

Code	Credit Hours
EE-241	3-0

Course Description

This course is designed to acquaint the students with fundamental concepts of Maxwell's equations and their various forms for both static and dynamic fields. To develop an understanding of various boundary value problems and determination of their solution.

Text Book:

Mathew N. O. Sadiku, "Elements of Electromagnetics ", 7th Edition, Oxford University Press

Reference Book:

1. David K Cheng, "Fundamentals of Engineering Electromagnetics ", Addison Wesley
2. William H Hayt, John A Buck, "Engineering Electromagnetics", McGraw Hill

Prerequisites

PHY-102 Applied Physics

ASSESSMENT SYSTEM FOR THEORY

Quizzes	5-10%
Assignments	10-15%
Mid Terms	25-35%
Final Exam	40-50%
Project	0-20%

Teaching Plan

Week No	Topics	Learning Outcomes
1-3	Vector Analysis	Review of Vector Algebra, Review of Coordinate Systems and Transformation, Review of Vector Calculus

4-8, 9-10	Electrostatics	Charge density, Coulomb's law and electric field, Electric flux density, Gauss's law and its applications, Maxwell's equation, Electric potential, energy density in electrostatics , Current density, Conductor in electrostatic fields, Polarization in dielectrics, Dielectric strength, Continuity equation and electric boundary conditions, Capacitance
9	**MID TERM EXAM**	
11-12	Electrostatic Boundary-Value Problems	General procedure for solving 1D Laplace and Poisson's equations, Method of images (opt)
13-16	Magnetostatics	Biot-Savart's Law, Ampere's law and its applications, Magnetic flux density ,Maxwell equations for static EM fields, Energy stored in magnetic field, Magnetization in materials and magnetic boundary conditions, Inductance
16-17	Maxwell's Equations	Faraday's Law, Displacement current, Maxwell's Equations in final form, Time-Harmonic fields
18	**FINAL EXAM**	