EEE264 Electromagnetic Theory (4-0)4
2024-2025 Spring Semester

Main Reference
David K. Cheng, Fundamentals of Engineering Electromagnetics, 1st Edition, Addison Wesley

Lecturers: Prof. Dr. Uğur Cem HASAR
Assist. Prof. Musa BUTE

Major Aims: Students will be able to use vector calculus efficiently to solve electromagnetic problems, and comprehend and understand the electrostatic, steady current, magnetostatic, and electromagnetic induction phenomena, and finally be able to solve static electric field Students will comprehend the electrostatic phenomena and be able to solve problems problems related to these phenomena.

Course Content: Review of vector analysis. Electrostatic fields in vacuum and material bodies. Dielectric properties of materials. Electrostatic energy and forces. Steady electric current and conductors. Static magnetic fields in vacuum and in materials. Magnetic energy and forces. Quasistatic fields and electromagnetic induction. Prerequisite: EP104, MATH152.

Supplementary References:
1. M. Sadiku, Elements of Electromagnetics, 3rd Edition, Oxford Univ. Press
2. S.V. Marshall, R. E. DuBroff, Electromagnetic Concepts and Applications, 4th Edition, Prentice Hall
3. J. D. Krauss, Electromagnetics, 4th Edition, McGraw Hill
4. P. Lorrain and D.Corson, Electromagnetic Fields and Waves, 2nd Edition, Freeman

Exams and Grading:
Two Midterm Exams (30% + 30%) and Final Exam (40%).

Course Outline:

Week	Subject
1	*(Chapter 2) Vector Analysis-1, vector addition and subtraction, vector and cross product, and orthogonal coordinate systems*
2	*(Chapter 2) Vector Analysis-2, gradient of a scalar field, divergence of a vector field, and divergence theorem*
3	*(Chapter 2) Vector Analysis-3, curl of a vector field, Stokes's theorem, null identities, and Helmholtz's theorem*
4	*(Chapter3) Fundamentals postulates and Coulomb's law*
5	*(Chapter3) Gauss's law and applications and Electric potential*
6	*(Chapter3) Material media in static electric field, and electric flux density and dielectric constant*
7	*(Chapter3) Boundary conditions for electrostatic fields, and capacitances and capacitors*
8	*(Chapter3) Electrostatic energy and forces and solution of electrostatic boundary-value problems, and Poisson's and Laplace's equations*
9	*(Chapter3) Boundary-value problems in Cartesian (cylindrical and spherical) coordinates, and method of images*
10	*(Chapter 4) Steady electric currents*
11	*(Chapter 5) Fundamental postulates, vector magnetic potential, and Biot-Savart law and applications*
12	*(Chapter 5) The magnetic dipole, magnetization and equivalent current densities, magnetic field intensity and relative permeability, and behavior of magnetic materials*
13	*(Chapter 5) Boundary conditions for magnetostatic fields, and inductances and inductors*
14	*(Chapter 5) Magnetic energy, and magnetic forces and torques*