200B Electromagnetism I

Course description

Graduate level electromagnetism course: 1st course covers electrostatics, boundary value problems, multiple expansion, magnetostatics, Maxwell's equations

Detailed syllabus

Overview of Maxwell's equations, boundary conditions, special relativity (1 lecture)

Electrostatics: Coulomb's law, Gauss law, scalar potential, electrostatic potential energy. (1-2 lectures) Poisson and Laplace equations and boundary conditions. Uniqueness of solutions for boundary value problems. (2 lectures) Sturm-Liouville theory, Frobenius method for ODEs. Examples with di.erent geometries. (3 lectures) Method of images, multipole expansion and spherical harmonics, Green's functions (2-3 lectures)

Electrostatics in media: dielectrics and polarization (1-2 lectures)

Magnetostatics: Biot-Savart and Ampere's Laws. Vector potential. Boundary value problems. Multipoles. Magnetism in media (3-4 lectures)

Resources:

J

D Jackson: Classical electrodynamics (2nd edition)

A

Zangwill: Modern electrodynamics

Landau, Lifshitz: Classical Theory of Fields (vol 2)