NPTEL Video Course - Physics - NOC:Electromagnetism

Subject Co-ordinator - Prof. Nirmal Ganguli

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 30 - Tutorial on electrostatics
Lecture 31 - The curl of an electric field
Lecture 32 - Scalar potential
Lecture 33 - Calculation of electric potential from different approaches
Lecture 34 - Boundary conditions on electric field and potential
Lecture 35 - Work and energy of an assembly of point charges
Lecture 36 - General idea of energy in electrostatics
Lecture 37 - Electrostatics with conductors
Lecture 38 - Capacitors
Lecture 39 - Laplace equation
Lecture 40 - Boundary conditions and the uniqueness theorems
Lecture 41 - The method of images
Lecture 42 - Induced charge
Lecture 43 - Force and energy
Lecture 44 - Another example of the method of images
Lecture 45 - Electric dipoles
Lecture 46 - Multipole expansion, continuous charge distriution, and assembly of point charges
Lecture 47 - Electric field due to a dipole
Lecture 48 - Introduction to electric polarization in matter
Lecture 49 - Electric polarization and bound charges
Lecture 50 - Electric displacement vector and Gauss law
Lecture 51 - Boundary conditions on the displacement vector and linear dielectric materials
Lecture 52 - Parallel plate capacitors
Lecture 53 - Energy in dielectric materials
Lecture 54 - Force on dielectric materials
Lecture 55 - Motion of a charged particle in electromagnetic field
Lecture 56 - Work done by a magnetic field
Lecture 57 - Electric current
Lecture 58 - Surface and volume current
Lecture 59 - Biot Savart law
Lecture 60 - Biot Savart law with surface and volume currents
Lecture 61 - A tutorial on currents and magnetic field
Lecture 62 - Straight line current
Lecture 63 - Divergence and curl of a generic magnetic field
Lecture 64 - Ampere's law in integral form and its applications
Lecture 65 - Magnetic field in a long solenoid
Lecture 66 - A comparison between electrostatics nad magnetostatics
Lecture 67 - Magnetic vector potential
Lecture 68 - Tutorial on magnetic fields

Lecture 69 - Calculation of vector potential
Lecture 70 - Boundary conditions on magnetic field
Lecture 71 - Magnetic dipole
Lecture 72 - Multipole expansion of the vector potential
Lecture 73 - Magnetism, force and torque on magnetic dipole
Lecture 74 - Fringing magnetic field
Lecture 75 - Magnetization
Lecture 76 - A tutorial on the magnetic dipole moment
Lecture 77 - Ampere's law in magnetized materials
Lecture 78 - Electrodynamics
Lecture 79 - Electromagnetic induction
Lecture 80 - Laws of electromagnetism so far
Lecture 81 - Maxwell's correction to electromagnetism
Lecture 82 - Fictitious discussion about symmetry
Lecture 83 - Maxwell's equations in matter and the boundary conditions