# PHYSICS 220
# ELECTROMAGNETIC THEORY
## (3.0 ; 3 credits)

**Textbook:** Foundations of Electromagnetic Theory
By: J.R. Reitz, F.J. Milford, and R.W. Christy
(Addison-Wesley)

**Contents:**

**1. Electrostatics:**

Electric field, electrostatic potential, Gauss' Law, multipole expansion, Poisson's and Laplace's equations, electrostatic images, dielectrics, polarization, boundary conditions, electrostatic energy, coefficients of capacitance and inductance, forces and torques.

**2. Electric current:**

The equation of continuity, steady currents, resistance, Kirchhoff's laws.

**3. Magnetostatics**

magnetic induction, Biot and Savart law, Ampere's law, magnetic vector and scalar potentials, magnetization, magnetic intensity, magnetic susceptibility and hysterisis, boundary conditions.

**4. Electromagnetic induction:**

Faraday's law, self and mutual inductance, magnetostatic energy, forces and torques.

**5. Maxwell's equations:**

Displacement current, electromagnetic energy, the wave equation, boundary condition and propagation of electromagnetic waves.

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