

# Physics Core Courses

- **210A. Electromagnetic Theory**

Units: 4

Boundary value problems in electrostatics and magnetostatics. Multipole expansions; dielectrics and macroscopic media. Maxwell equations and conservation laws. Wave guides and resonators; simple radiating systems.

- **210B. Electromagnetic Theory**

Units: 4

Electromagnetic potentials and Hertz vectors. Cylindrical waves. Spherical waves. Debye potentials. Multipole radiation. Classical relativistic electrodynamics. Radiation from moving charges.

- **220. Classical Mechanics**

Units: 4

Lecture, three hours. Lagrangian formulation, action, symmetries, conservation laws; Hamiltonian formulation, canonical structure, symmetries. Applications: harmonic oscillators, rotating solids. Special relativistic mechanics, Maxwell field, and dynamics of charged particles. Nonlinear dynamics and global behavior. S/U or letter grading.

- **221A. Quantum Mechanics**

Units: 4

Lecture, three hours. Fundamentals of quantum mechanics, operators and state vectors, equations of motion. S/U or letter grading.

- **221B. Quantum Mechanics**

Units: 4

Lecture, three hours. Requisite: course 221A. Rotations and other symmetry operations, perturbation theory. S/U or letter grading.

- **215A. Statistical Physics**

Units: 4

Lecture, three hours. Microstates and macrostates, statistical ensembles, entropy and other thermodynamic functions, equilibrium, variational principles, functional integration methods. Applications: ideal gas, oscillators, rotors, elasticity, paramagnetism. Indistinguishable particles, Fermi/Dirac and Bose/Einstein

distributions. Applications: electron gas, neutron stars, white dwarfs, Bose/Einstein condensation. Kinetics. S/U or letter grading.