# Department of Physics and Astronomy

**Ron Henderson, Chair**
**Wiser-Patten Science Building 219**

The Department of Physics and Astronomy offers a minor at the graduate level. The department also offers courses in the Ph.D. in Molecular Biosciences and the Ph.D. in Computational Science.

## Courses in Physics [PHYS]

Graduate standing and consent of instructor are prerequisites for graduate courses in physics.

**5310 Electricity and Magnetism.** Three credits. Topics including electric and magnetic fields, electrostatic potential, and potential energy and fields in matter discussed in a mathematically rigorous manner. A variety of good applications of mathematical methods in physics.

**5380 Introduction to Quantum Mechanics.** Three credits. Origin of quantum theory; wave packets and deBroglie waves; Heisenberg uncertainty principles. Schroedinger wave equation, operators, eigenfunctions, square well potential, the harmonic oscillator, the hydrogen atom, molecular binding and molecular spectra.

**6330 Principles of Modern Physics.** Three credits. Charged particles and their behaviors; electronic structures of the atoms; nuclear structures and processes; and radiation.

**6340 Fundamentals of Physics.** Six credits. Basic laws and principles of classical and modern physics. Lecture topics and laboratory experiences designed to advance student's knowledge of physics.

**7010 Principles of Molecular Biophysics.** Three credits. Prerequisite: PHYS 2021 or 2120 or permission of department. Reviews the structure of proteins, nucleic acids, carbohydrates, lipids, and the forces and interactions maintaining their structures in solution; thermodynamics and kinetics of protein folding; polymer chain statistics and helix-coil transitions in biopolymers; biopolymer dynamics; structural methods in biology; X-ray crystallography, NMR and fluorescence spectroscopy, electron and probe microscopy, single-molecule methods.

**7400 Computational Physics I.** Three credits. Prerequisites: COMS 6500 and 6100 and CSCI 6020 or consent of instructor. Expresses physical phenomena in mathematical form and then adapting these models for analysis using the techniques of computational physics. Covers a number of the computational standards of modern physics such as chaotic dynamics, spectral analysis, Monte Carlo methods, and optimization techniques such as genetic algorithms and simulated annealing.