# PHYSICS (PHY)

**PHY 151 INTRODUCTION TO PHYSICS (3 Hours)**
An introduction to some of the basic concepts of physics, intended both for non-science majors seeking scientific literacy and also for students who desire some experience in physics before taking PHY 201 or 11. This course satisfies the Core II physical science requirement.

**PHY 198 PHYSICS STUDENT SEMINAR (0.5 Hours)**
Presentation and discussion of current physics topics and research by students, faculty and visiting speakers. All physics majors are expected to participate.

**PHY 199 PHYSICS STUDENT SEMINAR (0.5 Hours)**
Presentation and discussion of current physics topics and research by students, faculty and visiting speakers. All physics majors are expected to participate.

**PHY 201 BASIC PHYSICS I (3 Hours)**
Prerequisite: MATH 111 and 112, or MATH 118.
Introduction to mechanics, wave motion, sound, and heat, for science majors whose curricula may not include calculus.

**PHY 202 BASIC PHYSICS II (3 Hours)**
Prerequisite: PHY 201.
A continuation of PHY 201. Introduction to electricity, magnetism, optics, and modern physics.

**PHY 205 BASIC PHYSICS (3 Hours)**

**PHY 211 General Physics I (3 Hours)**
Prerequisite: Minimum grade of C in MATH 241.
Introduction to mechanics, wave motion, sound, and heat. Calculus-based and more intensive than PHY 201.

**PHY 212 General Physics II (3 Hours)**
Prerequisite: Minimum grade of C in MATH 241 and PHY/L 211.
A calculus-based continuation of PHY 211. Introduction to electricity, magnetism, optics, and modern physics.

**PHY 216 MODERN PHYSICS (3 Hours)**
Prerequisite: PHY 212.
An introduction to relativity and quantum effects including atomic structure and spectra, nuclear structure and reactions, and high-energy physics.

**PHY 241 INTRODUCTN TO ASTRONOMY (4 Hours)**
An introductory survey of the solar system, stars, nebulae, and galaxies, with discussion of cosmology, life in the universe, and the space program. Includes weekly observatory sessions. This course satisfies the Core II physical science requirement.

**PHY 251 COSMOLOGY FOR NON-SCIENTISTS (4 Hours)**
A study of the structure, origin, and evolution of the universe. Includes relevant basic astronomy and discussion of fundamental observations.

**PHY 297 Research Methods in Physics (2 Hours)**
Prerequisite: Sophomore or Junior and consent of instructor.
This course reinforces concepts learned in advanced science, technology, engineering, and mathematics (STEM) courses helping students to develop critical thinking, writing, research, presentation and analysis skills. The problems presented are analyzed by the class and solutions proposed. Both individual and team development of the solutions proceed.

**PHY 298 PHYSICS STUDENT SEMINAR (0.5 Hours)**
Presentation and discussion of current physics topics and research by students, faculty and visiting speakers. All physics majors are expected to participate.

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**PHY 311 THEORETICAL MECHANICS I (3 Hours)**
Prerequisite: PHY 211, and MATH 232.
A modern treatment of classical mechanics including single-particle dynamics, oscillations, gravitation, the calculus of variations. Lagrangian and Hamiltonian dynamics, and central-force motion.

**PHY 312 THEORETICAL MECHANICS II (3 Hours)**
Prerequisite: PHY 311.
A continuation of PHY 311 including study of systems of particles, noninertial reference frames, rigid-body dynamics, coupled oscillations, continuous systems, the wave equation, and the special theory of relativity.

**PHY 330 METHODS OF EXPERIMENTAL PHYICS (3 Hours)**
Prerequisite or Corequisite: PHY 216.
Primarily a laboratory course, comprised of lectures and advanced experiments in electronics, optics, modern physics, and astronomy. Satisfies writing across the curriculum requirements.

**PHY 342 OPTICS SPECTRA & LASERS (3 Hours)**
Prerequisite: PHY 216.
A lecture course in modern optics covering geometrical, wave, and quantum optics, and modern optical technology, with applications to atomic spectroscopy and lasers.

**PHY 351 THERMAL PHYSICS (3 Hours)**
Prerequisite: PHY 212.
A study of equations of state, the laws of thermodynamics, thermodynamic potentials, statistical thermodynamics, kinetic theory, and elementary statistical mechanics.

**PHY 361 MATH MET OF PHYSICS &CHEMISTRY (3 Hours)**
Prerequisite: PHY 212.
An introduction to advanced techniques of applied mathematics used in physics and chemistry, including applied linear algebra, ordinary differential equations, and Laplace¿s equation.

**PHY 362 MATH MET OF PHYSICS&CHEMISTRY (3 Hours)**
Prerequisite: PHY 361.
A continuation of PHY 361, including vector calculus, Fourier series and orthogonal expansions, Fourier integrals, complex variables and conformal mappings, complex integration, and the heat and wave equations.

**PHY 380 INDEPENDENT STUDY (1-6 Hours)**

**PHY 398 PHYSICS STUDENT SEMINAR (0.5 Hours)**
Presentation and discussion of current physics topics and research by students, faculty and visiting speakers. All physics majors are expected to participate.

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**PHY 411 ELECTROMAGNETIC THEORY I (3 Hours)**
Prerequisite: PHY 362.
A study of static electric and magnetic fields including Gauss¿ Law, Ampere¿s Law, and the solution of Laplace¿s equation.

**PHY 412 ELECTROMAGNETIC THEORY II (3 Hours)**
Prerequisite: PHY 411.
A continuation of PHY 411 including study of time-dependent fields, Maxell¿s equations, electromagnetic wave and radiation.

**PHY 422 QUANTUM MECHANICS (3 Hours)**
Prerequisite: PHY 216 and 362.
An introduction to quantum mechanics wave functions, and the Schrodinger equation, including solution of the Schrodinger equation for a box, barrier, square well, harmonic oscillator, and the hydrogen atom.

**PHY 431 ATOMIC & NUCLEAR PHYSICS (3 Hours)**
Prerequisite: PHY 422.
A lecture course comprising a study of the properties of atoms and nuclei, and review of classic experiments, and an investigation of related applications of quantum mechanics.

**PHY 433 SOLID STATE PHYSICS (3 Hours)**
Prerequisite: PHY 216 and 422.
An introduction to solid state physics including crystal structures, electron and mechanical waves in crystals, semiconductors, electric and magnetic properties of solids, and point defects in crystals.

**PHY 449 SPECIL TOPICS IN PHYSICS (3 Hours)**
Prerequisite: Approval of instructor.
Advanced specialized topic courses selected on the basis of faculty and student interest. This course may be repeated for credit.

**PHY 480 RESEARCH PROJECT (3 Hours)**
Prerequisite: Approval of instructor.
Supervised original research by the individual student on a problem selected in consultation with the faculty. This course may be repeated for credit.

**PHY 481 PHYS. SCI. FOR SEC. TEACHERS I (3 Hours)**

**PHY 482 PHY SCI FOR SEC TEACHERS II (3 Hours)**

**PHY 498 PHYSICS STUDENT SEMINAR (0.5 Hours)**
Presentation and discussion of current physics topics and research by students, faculty and visiting speakers. All physics majors are expected to participate.

**PHY 499 PHYSICS STUDENT SEMINAR (0.5 Hours)**
Presentation and discussion of current physics topics and research by students, faculty and visiting speakers. All physics majors are expected to participate.