PHYSICS

Courses

PHYS 100 - Special Introductory Topics in Physics (4 Credit Hours)
An introductory, general education science course. The topical focus of each iteration of this course is determined by the instructor. No previous training in physics is expected; mathematical preparation is assumed to include high school algebra and trigonometry.

PHYS 121 - General Physics I (4 Credit Hours)
A calculus-based course providing quantitative coverage of the foundations and concepts of physics and its approach toward understanding natural phenomena. Topics include Newtonian mechanics and dynamics, fluids, and thermal physics. Three lectures and one three-hour laboratory each week.
Prerequisite(s): MATH 130 or MATH 135 (or concurrent) or MATH 145 (or concurrent).

PHYS 122 - General Physics II (4 Credit Hours)
A calculus-based course providing quantitative coverage of the foundations and concepts of physics and its approach toward understanding natural phenomena. Topics include electricity, magnetism, waves, and optics. Three lectures and one three-hour laboratory each week.
Prerequisite(s): PHYS 121.

PHYS 125 - Physics I: Quarks to Cosmos (4 Credit Hours)
A course that introduces students to topics that are at the current frontiers of physics and astronomy, and helps students develop quantitative reasoning and analytical skills necessary for further study in these fields. Topics typically include special relativity, waves and interference, quantization of light and energy, the hydrogen atom, nuclear structure, radioactivity, and cosmology. This course satisfies the quantitative reasoning requirement. Three lectures and one three-hour laboratory per week.
Prerequisite(s): MATH 130 or MATH 135 or MATH 145 or concurrent.
Crosslisting: ASTR 125.

PHYS 126 - Physics II: Mechanics, Fluids, and Heat (4 Credit Hours)
The second course in a calculus-based sequence primarily designed for those interested in physics, astronomy, and engineering. This course quantitatively explores the principles of physics and its approach toward investigating natural phenomena and the universe around us. Topics include Newtonian mechanics and dynamics, vibrations, fluids, and thermal physics. Three lectures and one three-hour laboratory each week.
Prerequisite(s): PHYS 125 or ASTR 125, MATH 135 or MATH 145 or concurrent.

PHYS 127 - Physics III: Electricity, Magnetism, Waves, and Optics (4 Credit Hours)
The third course in a calculus-based sequence primarily designed for those interested in physics, astronomy, and engineering. This course quantitatively explores the principles of physics and its approach toward investigating natural phenomena and the universe around us. Topics include electricity, magnetism, waves, and optics. Three lectures and one three-hour laboratory each week.
Prerequisite(s): PHYS 126, MATH 145 or concurrent.

PHYS 199 - Introductory Topics in Physics (1-4 Credit Hours)
A general category used only in the evaluation of transfer credit.

PHYS 200 - Modern Physics (4 Credit Hours)
A quantitative study of topics in modern physics including relativistic kinematics and dynamics, interactions between light and matter, quantum mechanics, and atomic physics. Analytical techniques are emphasized throughout.
Prerequisite(s): PHYS 122 or PHYS 127, PHYS 201 or concurrent.

PHYS 201 - Applied Mathematics for Physical Systems (4 Credit Hours)
An overview of mathematics applied to physical systems, with extensive use of examples from introductory and intermediate physics. Topics covered will include operators, functions, vectors, complex numbers, integration, differentiation, geometry, differential equations, and linear algebra. The unity of linear systems will be emphasized. Students will develop both analytical and computational techniques.
Prerequisite(s): PHYS 122 or PHYS 127, MATH 145.

PHYS 220 - Optics, Photonics, and Lasers (4 Credit Hours)
A course on the physics of controlling and generating light. Topics typically include geometric optics, optical instruments, polarization, interference and diffraction, optical fibers, optical cavities, and lasers. Three class hours and one laboratory per week.
Prerequisite(s): PHYS 122 or PHYS 127.

PHYS 245 - Special Intermediate Topics in Physics (4 Credit Hours)
A course exploring a topic in physics at the intermediate level. The topical focus of each iteration of this course is determined by the instructor. In some cases, the course may be repeated for credit.
Prerequisite(s): PHYS 121 or PHYS 126.

PHYS 299 - Intermediate Topics in Physics (1-4 Credit Hours)
A general category used only in the evaluation of transfer credit.

PHYS 305 - Classical Mechanics (4 Credit Hours)
A course in classical mechanics with a focus on analytical techniques. Topics include an in-depth exploration of Newton's laws, oscillations, rotations, the calculus of variations, central forces, non-inertial frames, the Lagrangian-Hamiltonian formulation of mechanics, and modern-day applications.
Prerequisite(s): PHYS 122 or PHYS 127, PHYS 201.

PHYS 306 - Electricity and Magnetism (4 Credit Hours)
A course in the theory of electromagnetic interactions, including the sources and descriptions of electric and magnetic fields, Maxwell's equations, and electromagnetic radiation.
Prerequisite(s): PHYS 122 or PHYS 127, PHYS 201, PHYS 305.

PHYS 311 - Electronics (4 Credit Hours)
A course in digital and analog electronics with an emphasis on circuit design and lab work. Topics typically include binary encoding, combinational and sequential logic, microcontrollers, AC circuits, transistors, op-amps, and interfacing with scientific instruments.
Prerequisite(s): PHYS 122 or PHYS 127.

PHYS 312 - Experimental Physics (4 Credit Hours)
An advanced lab course focused on experimental design and techniques, applying statistical principles to analyze and interpret data, and communicating scientific results through writing. May be repeated once for credit as either PHYS 312 or ASTR 312.
Prerequisite(s): PHYS 122 or PHYS 127, PHYS 200 recommended.
Crosslisting: ASTR 312.

PHYS 320 - Statistical and Thermal Physics (4 Credit Hours)
A course in statistical mechanics and thermodynamics. Concepts such as free energy, entropy, chemical potential, and statistical ensembles are introduced and applied to a variety of both classical and quantum systems.
Prerequisite(s): PHYS 200, PHYS 201.

PHYS 330 - Quantum Mechanics (4 Credit Hours)
A course in quantum mechanics focusing on solutions of the Schrödinger equation for elementary systems, the mathematical formalism of quantum theory, the hydrogen atom, angular momentum, and perturbation theory.
Prerequisite(s): PHYS 200, PHYS 201, PHYS 305.

PHYS 345 - Special Advanced Topics in Physics (4 Credit Hours)
A course exploring a topic in physics at the advanced level. The topical focus of each iteration of this course is determined by the instructor. In some cases, the course may be repeated for credit.
Prerequisite(s): PHYS 122 or PHYS 127.

PHYS 361 - Directed Study (1-4 Credit Hours)
Prerequisite: Consent of chairperson.

PHYS 362 - Directed Study (1-4 Credit Hours)
Prerequisite: Consent of chairperson.

PHYS 363 - Independent Study (1-4 Credit Hours)

PHYS 364 - Independent Study (1-4 Credit Hours)

PHYS 399 - Advanced Topics in Physics (1-4 Credit Hours)
A general category used only in the evaluation of transfer credit.

PHYS 400 - Physics Seminar (1 Credit Hour)
Current topics in physics. May be repeated.
Prerequisite(s): PHYS 125 or ASTR 125 or above or concurrent.

PHYS 451 - Senior Research (4 Credit Hours)
Research under faculty supervision for qualified senior students. Prior consent of the instructor (faculty member advising the research) and the Department Chair required for registration.

PHYS 452 - Senior Research (4 Credit Hours)
Research under faculty supervision for qualified senior students. Prior consent of the instructor (faculty member advising the research) and the Department Chair required for registration.

PHYS 470 - Teaching Methods in Physics (1 Credit Hour)
In this course students will develop an understanding of methods and techniques used to teach physics.
Prerequisite(s): PHYS 121 and PHYS 122, or PHYS 126.