

Physics

Physics majors and minors must earn a minimum grade of C- in all physics courses.

LOWER DIVISION

PHYX 100. From Stars to Rocks: Being a Scientist in the 21st Century (3). Introduction to the impact of astronomy, chemistry, physics, and geology on student life and society, practical aspects of the study of the disciplines and associated careers from different perspectives. [GE.]

PHYX 104. Descriptive Astronomy (4). Understand and appreciate astronomy/planet Earth. Methods of obtaining facts and formulating principles. Labs: naked-eye star/planet observation, movement of moon and celestial sphere, constellations, galaxies, star clusters, light and spectroscopy, telescopes. For nonmajors. [Prereq: ELM score of 42 or higher. Weekly: 3 hrs lect, 3 hrs lab/field trips. GE.]

PHYX 104B. Descriptive Astronomy (3). Same as 104 without the lab. [Prereq: ELM score of 42 or higher.]

PHYX 106. College Physics: Mechanics & Heat (4). Noncalculus, for science majors. Mechanics, fluids, heat, sound. [Prereq: MATH 114 or MATH 115. Weekly: 3 hrs lect, 3 hrs lab. GE.]

PHYX 107. College Physics: Electromagnetism & Modern Physics (4). Noncalculus, for science majors. Geometric optics, electricity, magnetism, electromagnetic waves, AC circuits, physical optics, relativity. [Prereq: PHYX 106 with a grade of C or higher. Weekly: 3 hrs lect, 3 hrs lab. GE.]

PHYX 109. General Physics I: Mechanics (4). Calculus-based, for science/engineering students. Offered Fall only. [Prereq: MATH 109 (C). Weekly: 2 hrs lect, 2 hrs activ, 3 hrs lab. GE.]

PHYX 110. General Physics II: Electricity, Heat (4). Calculus-based, for science/engineering students. [Prereq: MATH 110 (C) and PHYX 109 (or ENGR 211 for engineering majors) with grades of C or higher. Weekly: 2 hrs lect, 2 hrs activ, 3 hrs lab.]

PHYX 111. General Physics III: Thermodynamics and Waves (4). Calculus-based, for science/engineering students. [Prereq: MATH 210 (C) PHYX 110 (C) with a grade of C or higher; or an approved physics series. Weekly: 2 hrs lect, 2 hrs activ, 3 hrs lab.]

PHYX 118. College Physics: Biological Applications (1). Geometrical optics, simple DC circuits. [Prereq: PHYX 106 (C). Weekly: 2 hrs lect; half semester.]

PHYX 198. Supplemental Instruction (1). Collaborative work for students enrolled in introductory physics. [Rep. CR/NC.]

PHYX 295. Selected Topics in Physics (1-5). [Prereq: IA. Rep. CR/NC.]

PHYX 299. Supplemental Work in Physics (1-3). Directed study.

UPPER DIVISION

PHYX 303. Life in the Universe (3). Scholarly discussion of the probability that there are planets with life elsewhere in the universe, starting from current ideas about the origin and evolution of our solar system and life. [Not intended for Physics majors. GE.]

PHYX 304. Cosmos (4). Grand picture in astronomy. Galaxies; general and special relativity; quantum gravity; cosmology; birth, present structure, and death of stars. For nonmajors. [Weekly: 3 hrs lect, 2 hrs disc. GE.]

PHYX 310. Spacetime & Relativity (3). Einstein's ideas on space-time curvature, geometry of space-time, and physics of gravitational collapse. Offered alternate years. [Prereq: MATH 210 and PHYX 109. Rec: MATH 311 or MATH 315, and PHYX 111.]

PHYX 315. Introduction to Electronics & Electronic Instrumentation (3). Devices and circuits, both analog and digital, in science instrumentation. Construct amplifiers and digital circuits. [Prereq: PHYX 110 with a grade of C or higher. Weekly: 2 hrs lect, 3 hrs lab.]

PHYX 316. Electronic Instrumentation & Control Systems (4). Design/build electronic instruments. Direct interfacing of computers. [Prereq: PHYX 315. Weekly: 2 hrs lect, 6 hrs lab.]

PHYX 320. Modern Physics (3). Atomic, solid state, nuclear, and particle physics. [Prereq: PHYX 111. Weekly: 2 hrs lect, 3 hrs lab.]

PHYX 324. Analytical Mechanics (4). Principles and foundations of mechanics, from classical to modern ideas. [Prereq: PHYX 110; MATH 311 (C) or MATH 315(C); MATH 313 (C). Rec: PHYX 111.]

PHYX 325. Thermal Physics (4). Elements of classical and statistical thermodynamics. [Prereq: PHYX 320 (C).]

PHYX 340. Mathematical and Computational Methods (2). Numerical, symbolic and graphical programming and simulations, mathematical applications important to physicists. [Prereq: MATH 241 and PHYX 110.]

PHYX 360. Physics of Stars & Planets (4). Stellar structure and evolution, including black holes, white dwarfs, and neutron stars. Formation of solar systems, celestial mechanics. Physics of planetary interiors and atmospheres. Phenomena and techniques of optical astronomy. [Prereq: PHYX 111. Weekly: 3 hrs lect, 3 hrs lab. Offered alternate years.]

PHYX 361. Galaxies & Cosmology (4). Structure and morphology of galaxies, active galactic nuclei, and quasars; dynamics of galaxies; interstellar medium; techniques of radio astronomy; the cosmic distance ladder and the expanding universe; the Big Bang. [Prereq: PHYX 360.]

PHYX 399. Supplemental Work in Physics (1-3). Directed study. [Prereq: IA. Rep.]

PHYX 420. Optical Systems Design (4). Geometrical and physical theories. Gaussian optics, interference, diffraction, polarization, lasers, holography. Lab: design, set up, and test optical sys-

tems; make holograms. Offered alternate years. [Prereq: PHYX 111 and MATH 241. Weekly: 3 hrs lect, 3 hrs lab.]

PHYX 430. Computerized Instrumentation (3). Experiment with computer interfacing, data acquisition, reduction. Assumes familiarity with some computer language. Use IBM PCs and Turbo Pascal. [Prereq: PHYX 316. Weekly: 1 hr lect, 6 hrs lab. Offered occasionally.]

PHYX 441. Electricity & Magnetism I (3). Vector analysis, electrostatics, magnetostatics & electrodynamics. [Prereq: PHYX 324 (C) and MATH 313 (C). Rec: MATH 314.]

PHYX 442. Electricity & Magnetism II (3). Conservation laws, electromagnetic waves, potentials & fields, radiation and relativity. [Prereq: PHYX 441.]

PHYX 450. Quantum Physics I (4). Quantum mechanics; introductory atomic physics. [Prereq: PHYX 320, PHYX 324 (C), MATH 313.]

PHYX 451. Quantum Physics II (2). Selected topics including: Identical Particles, Time-Independent Perturbation Theory, The WKB Approximation and Scattering. [Prereq: PHYX 450.]

PHYX 462. Senior Lab (2). Experiments for senior physics majors. Bridge gap between carefully structured lower division lab experiences and truly independent research and development. [Prereq: PHYX 315 and PHYX 320. Rep.]

PHYX 480. Selected Topics in Physics for Seniors (1-5). Offered as demand warrants. [Prereq: IA. Rep with different topics.]

PHYX 485. Physics Seminar (.5-1). Seminar presentations by physics majors, faculty, and guest speakers. Capstone course. All physics majors are encouraged to attend. Students need to enroll both fall and spring semesters. [Prereq: PHYX 324 (C). CR/NC. Rep.]

PHYX 490. Senior Thesis I (1-3). Based on theoretical or experimental investigation. Consult with department to choose subject. File approved proposal with department prior to semester(s) in which work will be done. [Prereq: consent of faculty member. Rep.]

PHYX 491. Senior Thesis II (2). Continue senior thesis project if more time required. [Prereq: PHYX 490. Rep.]

PHYX 495. Undergraduate Research (1-3). Individual investigation of selected problem. [Rep. For students showing outstanding ability. Prereq: IA.]

PHYX 499. Directed Study (1-3). Individual study on selected problems. [Prereq: IA. Rep.]