

# PHYSICS - PHY

## PHY 104 Seminar for Physics and Pre-engineering Majors 0 Credits

A key aspect of science is the communication of ideas. The seminar is one method of sharing scientific ideas and results. This course gathers Physics and Pre-engineering majors to learn about advances in their respective fields, about related careers, and about the research performed by the department faculty.

**Prerequisite:** None. **Corequisite:** None.

**Offered:** occasionally.

## PHY 131 Earthquakes: Seismology and Society 3 Credits

The science behind earthquakes: causes, locations, frequency and measurement; affects on geography, human structures and society.

**Fulfills College Core:** Field 6 (Natural Sciences), Global Awareness

**Offered:** once a year.

## PHY 201 College Physics I 3 Credits

This algebra-based, introductory course for health science majors covers mechanics, heat, and fluid dynamics. Topics include velocity and acceleration, Newton's laws of motion, work, energy, power momentum, torque, vibratory motion, elastic properties of solids, fluids at rest and in motion, properties of gases, and the transfer of heat.

**Prerequisites:** MAT 110 or MAT 111. **Corequisite:** PHY 201L.

**Offered:** every fall.

## PHY 201L College Physics I Laboratory 1 Credit

Laboratory for College Physics I. This lab course engages students in experimental measurements spanning the areas of mechanics, with the objective of training students in experimental measurements, data manipulation and analysis, error analysis, deductive thinking, and instrumentation, providing depth to students' understanding of the phenomena taught in PHY201.

**Prerequisite:** MAT 110 or MAT 111. **Corequisite:** PHY 201.

**Offered:** every fall.

## PHY 202 College Physics II 3 Credits

This continuation of PHY201 covers electricity and magnetism, light and optics. Topics include magnetism and electricity; simple electric circuits; electrical instruments; generators and motors; characteristics of wave motion; light and illumination; reflection; refraction, interference; polarization of light, color, and the spectrum.

**Prerequisite:** Minimum grade of C- in PHY 201 and PHY 201L. **Corequisite:** PHY 202L.

**Offered:** every spring.

## PHY 202L College Physics II Laboratory 1 Credit

This laboratory provides students with a greater understanding of electromagnetic phenomena, wave phenomena, and optics, and supports PHY202. Measurements of microscopic quantities, like the charge and mass of the electron, give students an opportunity to explore the structure of matter. Other experiments involve the physics of electrical currents, electric properties of bulk matter, magnetic fields and their effect on beams, wave phenomena, and the nature of light and its interaction with optical materials. This course trains students in experimental measurements, data manipulation and analysis, error analysis, deductive thinking, and instrumentation.

**Prerequisite:** min grade of C- in PHY 201 and 201L. **Corequisite:** PHY 202.

**Offered:** every spring.

## PHY 223 General Physics for Physical Science Majors I 3 Credits

Calculus-based general physics. Mechanics of rigid bodies.

**Prerequisite:** MAT 110 or MAT 111. **Corequisite:** PHY 223L.

**Fulfills College Core:** Field 6 (Natural Sciences)

**Offered:** every fall.

**PHY 223L General Physics for Physical Science Majors I Laboratory 1 Credit**  
Laboratory for calculus-based general physics I.

**Prerequisite:** MAT 110 or MAT 111 **Corequisite:** PHY 223.

**Offered:** every fall.

## PHY 224 General Physics for Physical Science Majors II 3 Credits

Calculus-based general physics. Electricity and magnetism, geometrical and physical optics.

**Prerequisite:** minimum grade of C- in PHY 223 and PHY 223L. **Corequisite:** PHY 224L.

**Offered:** every spring.

**PHY 224L General Physics for Physical Science Majors I Laboratory 1 Credit**  
Laboratory for calculus-based general physics II.

**Prerequisites:** min grade of C- in PHY 223 and PHY 223L **Corequisite:** PHY 224.

**Offered:** every spring.

## PHY 225 General Physics for Physical Science Majors III 3 Credits

Calculus-based general physics. Mechanics of fluids, mechanical waves, thermodynamics and kinetic theory, geometrical and physical optics, special theory of relativity.

**Prerequisite:** PHY 224 with a minimum grade of C-, and MAT 211 which may be taken concurrently. **Corequisite:** PHY 225L.

**Offered:** every fall.

**PHY 225L General Physics for Physical Science Majors III Laboratory 1 Credit**

Laboratory for calculus-based general physics III.

**Corequisite:** PHY 225.

**Offered:** every fall.

## PHY 226 Basic Electronics 3 Credits

Circuit analysis, power supplies, semiconductor physics, operational amplifiers, digital electronics. Integrated circuit techniques. Includes laboratory work each week.

**Prerequisite:** minimum grade of C- in PHY 224. **Corequisite:** PHY 226L.

**Offered:** spring.

## PHY 226L Basic Electronics Laboratory 1 Credit

Laboratory for basic electronics course.

**Corequisite:** PHY 226.

**Offered:** every spring.

## PHY 330 Electrodynamics I 3 Credits

Static and time-varying classical electric and magnetic fields in free-space and matter. Prior completion of or concurrent registration for PHY 335 is strongly encouraged.

**Prerequisite:** Minimum of C- in PHY 224.

**Offered:** fall of odd-numbered years.

## PHY 331 Electrodynamics II 3 Credits

Primary topic: electromagnetic waves in free-space and matter, beginning with the Maxwell equations. Additional topics: radiation and special relativity.

**Prerequisite:** PHY 330.

**Offered:** spring of even-numbered years.

## PHY 332 Statistical and Thermal Physics 3 Credits

Develops statistical concepts and methods used to relate macroscopic to microscopic descriptions of many particle systems.

**Prerequisite:** PHY 225.

**Offered:** spring of odd-numbered years.

**PHY 335 Mathematical Analysis for Physicists****4 Credits**

Theory and applications of infinite series, Fourier series, Green's functions, Fourier integrals, vector calculus, linear algebra, partial differential equations, and complex variable.

**Prerequisite:** MAT 222 or permission of instructor.

**Offered:** fall of odd-numbered years.

**PHY 350 Modern Physics Laboratory****1 Credit**

This course covers the basic principles of 20th century modern physics. The topics include blackbody radiation, particle/wave duality, x-ray diffraction, Bohr's model of the atom, quantum tunneling, and the Schrodinger equation.

**Prerequisite:** PHY 225.

**Fulfills College Core:** Advanced Writing-Intensive

**Offered:** every fall.

**PHY 351 Advanced Laboratory****1 Credit**

This course emphasizes advanced experiments and experimental technique.

Topics include, but are not restricted to, dosimetry, radiation detection, gamma-ray spectroscopy, Rutherford scattering, atomic spectroscopy, thin-film deposition, and magnetic resonance.

**Prerequisite:** PHY 225.

**Fulfills College Core:** Oral Communication

**Offered:** every spring.

**PHY 443 Classical Mechanics****3 Credits**

One, two, and three dimensional motion of a particle, non-inertial systems, classical scattering, rigid-body motion. Lagrange and Hamilton equations, calculus of variations, oscillations.

**Prerequisite:** PHY 225 & MAT 222.

**Offered:** fall of even-numbered years.

**PHY 445 Special Topics in Physics****1 Credit**

This course will cover model formation and development using archival journal articles in physics. The subject material will rotate by semester among topics such as astrophysics, quantum theory, and thermodynamics. Students will be expected to read and critique journal articles, lead discussions on journal articles, and trace the development of an area of physics through assigned readings.

**Prerequisite:** permission of instructor. **Restriction:** must be physics major or minor with senior standing.

**Offered:** spring of odd-numbered years.

**PHY 446 Quantum Mechanics I****4 Credits**

Experimental basis of quantum mechanics, state functions, operators.

Review of linear algebra techniques and introduction of the Dirac notation.

**Corequisite:** PHY 225 & MAT 222.

**Offered:** fall of even-numbered years.

**PHY 447 Quantum Mechanics II****3 Credits**

Application of Schrodinger's equation, Hamiltonian mechanics, angular momentum, intrinsic spin, parity, and time-dependent quantum mechanics. PHY 446 is highly recommended.

**Prerequisite:** PHY 446.

**Offered:** spring of odd-numbered years.

**PHY 498 Senior Project****1-3 Credits**

A one-semester research project done under the supervision of a faculty member.

**Prerequisite:** permission of department chair. **Restriction:** senior standing in physics.

**Offered:** spring.

**PHY 499 Independent Study****1-3 Credits**

An independent study with a faculty member of the Physics Department. Independent studies require an application and approval by the associate dean.

**Prerequisite:** permission of the instructor, department chair, & associate dean. **Restriction:** permission of the chair.

**Offered:** fall & spring.