

PHYSICS (PHYS)

PHYS 101 Intro Topics in Physics: Motion (4)

This course provides an introduction to the concepts and applications of physics through an exploration of everyday motion. This course will involve discussions of conceptual models to facilitate analyzing and viewing the natural world. The lab component of the course introduces fundamental principles in scientific investigation and will utilize the scientific method.

PHYS 101L Intro Topics PHYS: Motion-Lab (0)

One two-hour laboratory per week. Corequisite: PHYS 101.

PHYS 102 Introductory Topics in Physics: Energy (3)

An introduction to concepts, and applications of physics through the lens of energy. This course deals with the science of national and global energy concerns. The laboratory introduces fundamental principles of scientific investigation via experimental exploration. This course is intended for students not majoring in science. (Three hours lecture and a two-hour laboratory). Prerequisite: None.

PHYS 105 Astronomy (3)

A study of stars and galaxies within the Universe from our Earth based perspective. Scientific techniques and the history of scientific observation are included in addition to the properties of light and gravity. This course is intended for students not majoring in science or mathematics. (Three hours lecture). Prerequisite: None.

PHYS 107 Artificial Intelligence in Science and Everyday Life (3)

This course is an introduction to concepts and applications of Artificial Intelligence (AI) in Science and everyday life. It aims to give an understanding of the use and interpretation of available data and more particularly the STEM scientific data to recover accurate information using prediction techniques. This course will be based on the use of AI interactively with the students to solve real problems and predict solutions.

PHYS 111 College Physics I: Mechanics (4)

An introduction to mechanics. This is the first semester of a two-part algebra-based physics sequence designed primarily for students in life-sciences (biology, and neuroscience), speech language and pathology, and environmental studies. (Three hours of lecture and two hours laboratory.) Prerequisite: MATH 103.

PHYS 111L College Physics I Laboratory (0)

One two-hour laboratory per week. Corequisite: PHYS 111.

PHYS 112 College Physics II: Waves, Temperature, and Electricity (4)

An introduction to waves, thermodynamics, electricity, magnetism, and optics. This is the second semester of a two-part algebra-based physics sequence designed primarily for students in life-sciences (biology, and neuroscience), speech language and pathology, and environmental studies. (Three hours of lecture per week and a two-hour laboratory.) Prerequisite: PHYS 111.

PHYS 112L College Physics II Lab (0)

One two-hour laboratory per week. Corequisite: PHYS 112.

PHYS 121 General Physics I: Mechanics and Waves (4)

An introduction to mechanics, and waves. This is the first semester of a two-part calculus-based physics sequence designed for students in science, math, and engineering. (Three hours of lecture and two hours laboratory.) Prerequisite or corequisite: either MATH 131, MATH 132, or MATH 133. (High school physics strongly recommended)

PHYS 121L General Physics I Lab (0)

One two-hour laboratory per week. Corequisite: PHYS 121.

PHYS 122 General Physics II: Temperature, Electricity, and Light (4)

An introduction to thermodynamics, electricity, magnetism, and optics. This is the second semester of a two-part calculus-based physics sequence designed for students in science, math, and engineering. (Three hours of lecture per week and a two-hour laboratory.) Prerequisite: PHYS 121; and corequisite OR prerequisite either MATH 132 or MATH 133

PHYS 122L General Physics II Laboratory (0)

One two-hour laboratory per week. Corequisite: PHYS 122.

PHYS 205 Nuclear Science (3)

Nuclear science of the interplay between mathematics, science and ethics. This course contains a discussion of multiple facets of introductory nuclear science including applications such as nuclear power, nuclear weapons, nuclear medicine and food irradiation. Basic nuclear structure will be discussed as well as nuclear reactions and nucleosynthesis. Mathematical themes including algebra, statistics, probability and differential equations (exponential decay) will be introduced and used at various points in the course.

PHYS 253 General Physics III: Modern Physics (3)

An introduction to the conceptual and mathematical foundations of elementary quantum physics, and the historical framework and methodology of twentieth century physics, including contributions of women scientists. Special relativity and atomic physics are also discussed. (Three hours lecture). Prerequisite: PHYS 112 or PHYS 122; Corequisite MATH 231.

PHYS 272L Computational Physics Laboratory (1)

Computational methods in physics are explored. This course covers computational topics in physics, primarily in astrophysics, biophysics, and quantum mechanics. Offered in the fall on a three-year rotation. (Three hours laboratory). Prerequisite: PHYS 122.

PHYS 282L Modern Experimental Laboratory (1)

Experimental methods in modern physics are explored. This course covers experimental topics primarily from modern physics and materials science. Offered in the fall on a three-year rotation. (Three hours laboratory). Prerequisite: PHYS 122.

PHYS 292L Wave Mechanics Laboratory (1)

Laboratory methods in physics are explored. This course covers experimental and computational topics related to wave mechanics in both mechanical phenomenon and circuit analysis. Offered in the fall on a three-year rotation. (Three hours laboratory). Prerequisite: PHYS 122.

PHYS 321 Lagrangian Mechanics (1)

This course will cover topics in classical mechanics including wave motion. The primary focus is the Lagrange formalism which is used to setup simple differential equations and solve for equations of motion. This course covers the same material as PHYS 323 but only lasts for the first third of the semester. This course is intended for students who are also required to take additional courses in mechanics. Typically offered fall of even-numbered years. (Three hours lecture). Prerequisite: PHYS 122 and Corequisite: MATH 231

PHYS 323 Classical Mechanics (3)

A detailed study of classical mechanics including Newton's laws, and conservation laws. Equations of motion are derived based on the Lagrange and Hamiltonian formalisms. Typically offered fall of even-numbered years. (Three hours lecture). Prerequisite: PHYS 122 and Corequisite: MATH 231.

PHYS 341 Statistical Mechanics (1)

This course will cover topics in thermodynamics from a statistical mechanics viewpoint. Systems containing large numbers of particles will be analyzed using Boltzmann statistics. This course covers the same material as PHYS 343 but only lasts for the first third of the semester. This course is intended for students who are also required to take additional courses in Thermodynamics. Typically offered fall of odd-numbered years. (Three hours lecture). Prerequisite: PHYS 122 and Corequisite: MATH 231.

PHYS 343 Thermodynamics (3)

A detailed study of statistical mechanics and thermodynamics. Systems containing large numbers of particles will be analyzed using Boltzmann statistics. The laws of thermodynamics will be introduced. Cyclic processes and other thermodynamic concepts will be developed. Typically offered fall of even-numbered years. (Three hours lecture). Prerequisite: PHYS 122 and Corequisite: MATH 231.

PHYS 373 Fundamentals of Astrophysics (3)

The course will include an introduction to astrophysics. The night sky and coordinate systems, Kepler's law, observational astrophysics, magnitudes, and telescope types will all be discussed. The course will also introduce students to stellar physics and the evolution of stars.

PHYS 424 Quantum Mechanics (3)

A detailed physical and mathematical study of quantum mechanics including wave mechanics. Physical applications of quantum mechanics are also discussed. Typically offered spring of odd-numbered years. (Three hours lecture). Prerequisites: PHYS 253 and MATH 326.

PHYS 444 Electricity and Magnetism (3)

A detailed physical and mathematical study of electricity and magnetism focusing on applications from vector calculus. Interactions between electric and magnetic fields are explored including the use of Maxwell's equations. Typically offered spring of even-numbered years. (Three hours lecture). Prerequisites: PHYS 122 and MATH 426.

PHYS 485 Research (1-3)

Participation in original experimental or theoretical investigation in collaboration with a member of the faculty. Prerequisite: Permission of the department chair. May be repeated.

PHYS 490 Special Topics in Physics (1-5)

Topics in Physics not covered in the regular department offerings and selected according to the interests of the students and the instructor. Offered according to student demand. (Two or three lectures per week) Prerequisite: Permission of the instructor. May be repeated for credit with a different topic.

PHYS 495 Senior Seminar (1)

A professional development course for Physics majors. The course will cover various topics with a focus on writing, presentation and critical thinking skills as used in the physical sciences.

PHYS 497 Independent Study (1-3)

Enables properly qualified students to carry out independent study under the guidance of an instructor. Content dependent on student need and interest. Elective with permission of the department chair. Generally graded S/U; may be letter graded. May be repeated with a different topic.