

PHYSICS (PHYSICS)

Courses

PHYSICS 130 Physics of Sports Credits: 3

A course intended for liberal arts students focusing on the physics involved in different sports. Physical laws and technological developments that impact sports will be studied.

PHYSICS 131L Backyard Physics Credit: 1

This laboratory course uses readily available ingredients to develop a conceptual understanding of the laws of nature and mathematics. Experiments can be conducted in the residence hall, apartment, park or home using everyday, inexpensive equipment and materials.

PHYSICS 140 How Things Work Credits: 3

A course intended for liberal arts students focusing on the principles of operations, histories, and relationships of objects from our daily environment. The areas of investigation include mechanical and thermal objects, electromagnetism, light, special materials and nuclear energy.

PHYSICS 140 - MOTR PHYS 100: Essentials in Physics



PHYSICS 140L How Things Work Laboratory Credit: 1

A course intended for liberal arts students focusing on the principles of operations, histories and relationships of objects from our daily environment. The areas of investigation include mechanical and thermal objects, electromagnetism, light, special materials and nuclear energy.

PHYSICS 210 General Physics I Credits: 4

Introduction to mechanics, wave motion and sound and heat and thermodynamics. Three hours lecture and two hours laboratory per week.

Co-requisites: MATH 110 or MATH 120 (or higher); ACT Math Sub-score of 28 or higher; or SAT Math Sub-score of 660 or higher.

PHYSICS 210 - MOTR PHYS 150L: Physics I with Lab



PHYSICS 220 General Physics II Credits: 4

Introduction to electricity and magnetism, light and optics and modern physics. Three hours lecture and two hours laboratory per week.

Prerequisites: PHYSICS 210.

PHYSICS 240 Physics For Scientists and Engineers I Credits: 5

Introduction to mechanics, wave motion and sound and heat and thermodynamics.

Co-requisites: MATH 210 or MATH 266.

PHYSICS 240 - MOTR PHYS 200L: Advanced Physics I with Lab



PHYSICS 250 Physics For Scientists and Engineers II Credits: 5

Introduction to electricity and magnetism, light and optics and modern physics. Four hours lecture and two hours laboratory per week.

Prerequisites: PHYSICS 240.

Co-requisites: MATH 220 or MATH 268.

PHYSICS 304 Scientific Research Preparation Credits: 3

Through completion of immersive and structured hands-on learning activities, students gain generalized practical and technical skills that are in demand for STEM (Science-Technology-Engineering-Math) internships and that are needed for dynamic careers in scientific, engineering, and Tech research and development sectors. Students learn transferable data analysis, critical thinking, problem-solving, coding, technical communication, and technological literacy skills through the realistic application of concepts, tools, and methods commonly employed in basic research. No previous experience with computer coding nor research methods is required.

Prerequisites: Math 120 and Physics 210 or 240, or consent of instructor

PHYSICS 310 Mechanics I Credits: 3

Advanced statics and dynamics of particles and rigid bodies including gravitation.

Prerequisites: PHYSICS 220 or PHYSICS 250; and MATH 250 or MATH 268.

PHYSICS 311 Mechanics II Credits: 3

Continuation of Mechanics I, including mechanics of continuous media, Lagrange's equations, tensor algebra and theory of small vibrations.

Prerequisites: PHYSICS 310.

PHYSICS 330 Methods Of Theoretical Physics I Credits: 3

Introduction to mathematical and numerical methods used in the theoretical modeling of physical systems. Treatments of linear systems in scientific and engineering applications will be emphasized.

Prerequisites: MATH 250 or MATH 268.

PHYSICS 342 Physics of Science Fiction Credits: 3

This course will quantitatively explore the representation of physics in science fiction books, movies and television shows. Many popular science fiction concepts will be explored, spanning centuries of physics from Galileo to string theory.

Prerequisites: PHYSICS 220 or PHYSICS 250; and MATH 120 or MATH 125.

PHYSICS 350 Modern Physics With Engineering Applications Credits: 3

An introduction to the theories that revolutionized science and technology in the twentieth century. Topics include special and general relativity, introductory quantum mechanics and atomic structure. Inventions and applications based on these are also examined.

Prerequisites: MATH 220 or MATH 268 and PHYSICS 220 or PHYSICS 250.

PHYSICS 353 Practical Astronomy Credits: 3

A practical overview of the basic methods of observational astronomy research, including the principles of telescopes, detectors and measurement theory.

Prerequisites: PHYSICS 250 and MATH 210 or MATH 220.

PHYSICS 355 Stellar Astrophysics Credits: 3

A mathematical and conceptual overview of the observed properties of stars and the fundamental astrophysics of radiative transfer, hydrostatic equilibrium, atomic processes and thermonuclear energy production that govern their structure, atmospheres and remnants.

Prerequisites: PHYSICS 240 and MATH 210.

PHYSICS 356 Galaxies Credits: 3

A mathematical and conceptual overview of the observed properties and astrophysics of galaxies highlighting star formation and evolution, the interstellar medium, the Milky Way, galaxy populations and demographics, active galactic nuclei, and galaxy formation and evolution.

Prerequisites: PHYSICS 240 and MATH 210.

PHYSICS 385L Physics of Electronics Credits: 3

An introduction to the solid state physics of basic electronic components and their operation through both theory and practical labwork.

Prerequisites: PHYSICS 220 or PHYSICS 250.

PHYSICS 395L Computer Interfacing Laboratory Credits: 3

An introduction to data acquisition and automation by computer interfacing transduction and control equipment through the serial and parallel buses. The course is multidisciplinary, balancing the physics of transduction to the computer science of automation programming to the electrical engineering of bus protocols. Both high- and low-level programming are taught within the context of automating an experimental procedure. Digital-to-analog and analog-to-digital conversion is also covered.

Prerequisites: PHYSICS 385L.

PHYSICS 410 Thermal Physics Credits: 3

A study of the laws of thermodynamics and their applications, with an introduction to kinetic theory. Statistical methods are emphasized.

Prerequisites: PHYSICS 220 or PHYSICS 250; and MATH 250 or MATH 268.

PHYSICS 420 Optics Credits: 3

Geometrical optics, physical optics and introduction to selected topics in modern optics.

Prerequisites: PHYSICS 220 or PHYSICS 250 and MATH 210 or MATH 266.

PHYSICS 437 Particle Physics Credits: 3

Essential aspects of modern physics are examined in a historical context, and also in terms of the standard model describing concisely the fundamental interactions among particles. Conservation laws are discussed, and recent developments such as String Theory are considered. Physics 437 is also offered as Physics 5537.

Prerequisites: PHYSICS 240, PHYSICS 250, PHYSICS 350 or PHYSICS 472.

PHYSICS 450 Introduction To Solid State Physics Credits: 3

Crystal structure and binding, elementary lattice dynamics and energy band theory. Free electron models, theory of semiconductors and metals.

Prerequisites: PHYSICS 310 or PHYSICS 410.

PHYSICS 460 Electricity And Magnetism I Credits: 3

Static electric fields in free space and material media; Kirchoff's laws and direct current circuits; static magnetic fields.

Prerequisites: PHYSICS 220 or PHYSICS 250; and MATH 250 or MATH 268.

PHYSICS 461 Electricity And Magnetism II Credits: 3

Magnetostatics; alternating current circuits; Maxwell's equations and radiation; special relativity; topics in electromagnetism.

Prerequisites: PHYSICS 460.

PHYSICS 465 Cosmology Credits: 3

This course provides a foundation in both physical and observational cosmology. Students will acquire both a mathematical and conceptual understanding of the formation and dynamics of the Universe.

Prerequisites: PHYSICS 220 or PHYSICS 250, and MATH 250 or MATH 268.

PHYSICS 472 Introduction To Quantum Mechanics Credits: 3

Introduction to the theory and applications of quantum mechanics with emphasis on the mathematical treatment of modern physics.

Prerequisites: PHYSICS 350.

PHYSICS 476LW Advanced Laboratory Credits: 3

This course offers a selection of important experiments in physics, performed with modern instrumentation. It is designed to give students a deeper understanding of physics and help them develop experimental abilities and improve their communication skills.

PHYSICS 490 Special Problems Credits: 1-3

The kind of problem and the amount of credit to be given by arrangement with the department.

PHYSICS 499 Undergraduate Research Credits: 1-3

Independent student research on a physics/astrophysics project under the supervision of a faculty member. Projects will engage students in aspects of the scientific process including data collection and analysis, research methods and strategies, scientific discussion and written/oral communication. Requires a minimum of 3-4 hours of research per week for each credit hour.