

PHYSICS (PHYS)

PHYS 1101. Concepts of Physics (3)

A conceptual physics course that introduces some of the basic laws of physics. Topics range over the systems of units and conversion of units, vector algebra, Newtonian mechanics, and may include elements of fluids and thermodynamics, ideal gas laws, heat, optics, mechanical waves, electricity and magnetism, and modern physics.

Prerequisites: PHYS 1101L (may be taken concurrently) and (MATH 1101 or MATH 1103 or MATH 1111)

PHYS 1101L. Concepts of Physics Laboratory (1)

Laboratory accompanying PHYS 1101. The laboratory exercises for this course are drawn from the possible list of topics: systems of units and systems of measurement, Newtonian mechanics, fluids and thermodynamics, heat, light, optics, mechanical waves, electricity and magnetism, and modern physics.

Prerequisites: PHYS 1101 (may be taken concurrently)

PHYS 1111. Introductory Physics I (3)

An introductory course which will include mechanics (kinematics, dynamics, work and energy, momentum and collisions, and rotational motion and statics), and may also include thermodynamics and waves. Elementary algebra and trigonometry will be used.

Prerequisites: PHYS 1111L (may be taken concurrently) and (MATH 1112 or MATH 1113 or MATH 1501 (may be taken concurrently))

PHYS 1111L. Introductory Physics Lab I (1)

Laboratory accompanying PHYS 1111. The experiments performed will cover topics of mechanics (kinematics, dynamics, work and energy, momentum and energy conservation and rotational motion), and may also include hydrodynamics, thermodynamics and waves/oscillations.

Prerequisites: PHYS 1111 (may be taken concurrently)

PHYS 1112. Introductory Physics II (3)

An introductory course which will include electrostatics, electric current and circuits, and electromagnetism, and may also include optics and modern physics. Elementary algebra and trigonometry will be used.

Prerequisites: (PHYS 1111 PHYS 1112L (may be taken concurrently) and PHYS 1111L)

PHYS 1112L. Introductory Physics Lab II (1)

Laboratory accompanying PHYS 1112. The experiments performed will cover topics of electrostatics, electric current and circuits, and electromagnetism, and optics.

Prerequisites: PHYS 1112 (may be taken concurrently)

PHYS 2211. Principles of Physics I (3)

An introductory course which will include mechanics (kinematics, dynamics, work and energy, momentum and collisions, and rotational motion and statics), and may also include thermodynamics and waves. Elementary calculus will be used.

Prerequisites: PHYS 2211L (may be taken concurrently) and MATH 1501 (may be taken concurrently)

PHYS 2211K. Principles of Physics & LAB (4)

An introductory course which will include material from mechanics, thermodynamics and waves. Elementary differential calculus will be used. This course has a laboratory component that requires a lab kit.

Prerequisites: (MATH 1501 and ECOR with a score of C)

PHYS 2211L. Principles of Physics Lab I (1)

Laboratory accompanying PHYS 2211. The experiments performed will cover topics of mechanics (kinematics, dynamics, work and energy, momentum and energy conservation and rotational motion), and may also include hydrodynamics, thermodynamics and waves/oscillations.

Prerequisites: PHYS 2211 (may be taken concurrently)

PHYS 2212. Principles of Physics II (3)

An introductory course which will include electrostatics, electric current and circuits, and electromagnetism, and may also include optics and modern physics. Elementary calculus will be used. Calculus II course is strongly recommended to be taken concurrently or earlier.

Prerequisites: PHYS 2212L (may be taken concurrently) and MATH 1501 (may be taken concurrently) and (PHYS 2211 and PHYS 2211L)

PHYS 2212K. Principles of Physics II (4)

An introductory course that will include material from electromagnetism, optics, and modern physics. Elementary differential and integral calculus will be used. This course has a laboratory component that requires a lab kit.

Prerequisites: MATH 1151 and PHYS 2211K

PHYS 2212L. Principles of Physics Lab II (1)

Laboratory accompanying PHYS 2212. The experiments performed will cover topics of electrostatics, electric current and circuits, and electromagnetism, and optics.

Prerequisites: PHYS 2212 (may be taken concurrently) and (PHYS 2211 and PHYS 2211L)

PHYS 2454. Statics (3)

This is a pre-engineering/applied mathematics course that will cover the following topics: forces, moments, couples, equilibrium, equipollent systems, resultants, distributed forces, equilibrium analysis, free-body diagrams, practical examples, trusses, methods of joint and sections, multi-force members, shear-force and bending-moment diagrams, statics and structural design, coulomb friction, centroids and center-of-mass.

Prerequisites: PHYS 2211

PHYS 3141. Thermodynamics (3)

Introduction to the basic ideas and principles of thermodynamics such as thermodynamic properties, energy and mass conservation, entropy and the second law. Second-law applications to the analysis of thermodynamic systems, gas cycles and vapor cycles are discussed.

Prerequisites: PHYS 2211

PHYS 3213. Prin of Physics III - Modern (3)

A survey of 20th and 21st century physics. Topics include Special Theory of Relativity, Planck's Theory of Radiation, particle/wave duality, Schrodinger equation solution for simple potentials, and properties of one-electron atom. Applications of quantum principles to multi-electron atoms, solids, molecular and nuclear structures may also be discussed. Additional topics of General Theory of Relativity and Cosmology are often included.

Prerequisites: PHYS 2212 and MATH 3303 (may be taken concurrently)

PHYS 3214. Classical Mechanics (3)

Course topics include an extended review of vector algebra, Newtonian mechanics, many body systems, motion in central fields, small oscillations, rotation of rigid bodies, Lagrangian equations, canonical equations of motion and non-inertial reference frames.

Prerequisites: (PHYS 2212 and MATH 3303 and MATH 2503 (may be taken concurrently))

PHYS 3220. On-Campus Internship I (3)

This is an internship program for selected students who will perform supervised work related to physics and/or pedagogy in conjunction with physics faculty at Clayton State University. Students will be assigned a grade for this course based on an evaluation by the faculty supervisor.

Prerequisites: (PHYS 1112 and PHYS 1112L) or (PHYS 2212 and PHYS 2212L)

PHYS 3221. On-Campus Internship II (3)

This is an internship program for selected students who will perform supervised work related to physics and/or pedagogy in conjunction with physics faculty at Clayton State University. Students will be assigned a grade for this course based on an evaluation by the faculty supervisor.

Prerequisites: (PHYS 1112 and PHYS 1112L) or (PHYS 2212 and PHYS 2212L)

PHYS 3230. Introductory Research I (3)

This course is a supervised introductory research experience with Physics faculty at Clayton State University. Students must articulate clear project goals and objectives. Students will learn to demonstrate use of scientific literature, and document their progress using a research notebook. The project will be summarized in a written research paper and an oral presentation to the department faculty. Students will be assigned a grade for this course based on evaluation by the supervisor and other Clayton State University faculty.

Prerequisites: (PHYS 1112 and PHYS 1112L) or (PHYS 2212 and PHYS 2212L)

PHYS 3231. Introductory Research II (3)

This course is a supervised introductory research experience with Physics faculty at Clayton State University. Students must articulate clear project goals and objectives. Students will learn to demonstrate use of scientific literature, and document their progress using a research notebook. The project will be summarized in a written research paper and an oral presentation to the department faculty. Students will be assigned a grade for this course based on evaluation by the supervisor and other Clayton State University faculty.

Prerequisites: (PHYS 1112 and PHYS 1112L) or (PHYS 2212 and PHYS 2212L)

PHYS 3454. Statics (3)

This is a pre-engineering/applied mathematics course that will cover the following topics: forces, moments, couples, equilibrium, equipollent systems, resultants, distributed forces, equilibrium analysis, free-body diagrams, practical examples, trusses, methods of joint and sections, multi-force members, shear-force and bending-moment diagrams, statics and structural design, coulomb friction, centroids and center-of-mass.

Prerequisites: PHYS 2211

PHYS 3455. Dynamics-Particles & Bodies (3)

Topics include kinematics and kinetics of particles and rigid bodies using force, energy and momentum methods in one, two, and three dimensions.

Prerequisites: PHYS 3454

PHYS 3650. Modern Physics (3)

An introductory course to Modern Physics which includes material from relativity, quantum mechanics, models of the atom, lasers, solid state physics, nuclear physics, and elementary particles. Study is focused on contemporary applications including those to biology and medicine, such as the physical basis for MRI, PET and others.

Prerequisites: PHYS 1111

PHYS 3650L. Modern Physics Laboratory (1)

This is a laboratory accompanying PHYS 3650 / PHYS 3213.

Prerequisites: PHYS 3650 (may be taken concurrently) or PHYS 3213 (may be taken concurrently)

PHYS 3651. Principles of Medical Devices (3)

This course covers the physical aspects that underline the functionality of the commonly used medical devices. The overview of physics behind the devices from a simple optical microscope to defying the optical limits is presented in the course, as well as the principles behind common modern devices such as MRI, X-Ray, PET-Scan and others. Additional topics that may be explored include latest technology advances available, including the overview of data processing methods used in the modern technology.

Prerequisites: PHYS 1112

PHYS 4215. Electricity and Magnetism I (3)

A survey of electro and magnetostatics. Topics include Coulomb's Law, Ampere's Law, scalar and vector potentials, and Laplace's equation.

Prerequisites: (PHYS 2212 and MATH 2503)

PHYS 4216. Methods of Mathematical Phys (3)

A survey of the mathematical techniques required for the description of physical systems and their analytical and/or numerical solutions.

Prerequisites: (PHYS 2212 and MATH 2503 and MATH 3303)

PHYS 4217. Intro to Quantum Mechanics (3)

Introduction to the fundamentals of quantum mechanics. Topics covered are Schrodinger's formulation of quantum mechanics and its application to simple systems, perturbation theory, one-electron atoms, spin, identical particles, multi-electron atoms and introduction to operators.

Prerequisites: PHYS 3213 and PHYS 3214

PHYS 4230. Physics Research Practicum I (3)

Research experience for students in Physics. Practicum assignments must be approved by the student's major advisor and the Physics faculty.

Prerequisites: (PHYS 1112 and PHYS 1112L) or (PHYS 2212 and PHYS 2212L)

PHYS 4231. Physics Research Practicum II (3)

Research experience for students in Physics. Practicum assignments must be approved by the student's major advisor and the Physics faculty.

Prerequisites: (PHYS 1112 and PHYS 1112L) or (PHYS 2212 and PHYS 2212L)