

COURSE DESCRIPTIONS

- PHYS 151 Principles of Physics I and Lab 4 CREDITS**
A one-year algebra and trigonometry-based introductory physics course using the workshop method. This method combines inquiry-based cooperative learning with the comprehensive use of computer tools for data acquisition, data analysis and mathematical modeling. Kinematics, Newton's Laws of motion, conservation laws (energy, linear momentum, and angular momentum), rotational motion, and oscillations are studied during the first semester. In the second semester, topics in electricity, magnetism, dc circuits, thermodynamics, and geometric optics are covered. Recommended for life science and pre-med students.
- PHYS 152 Principles of Physics II & Lab 4 CREDITS**
A one-year algebra and trigonometry-based introductory physics course using the workshop method. This method combines inquiry-based cooperative learning with the comprehensive use of computer tools for data acquisition, data analysis and mathematical modeling. Kinematics, Newton's Laws of motion, conservation laws (energy, linear momentum, and angular momentum), rotational motion, and oscillations are studied during the first semester. In the second semester, topics in electricity, magnetism, dc circuits, thermodynamics, and geometric optics are covered. Recommended for life science and pre-med students.
- PHYS 211 Physics Scientists and Engineers I & Lab 4 CREDITS**
A one-year calculus-based introductory physics course using the workshop method. This method combines inquiry-based cooperative learning with the comprehensive use of computer tools for data acquisition, data analysis and mathematical modeling. Kinematics, Newton's Laws of motion, conservation laws (energy, linear momentum, and angular momentum), rotational motion, and oscillations are studied during the first semester. In the second semester topics in electricity, magnetism, dc circuits, thermodynamics, and chaos dynamics are covered. Recommended for physical science, mathematics, computer science, and 3+2 engineering students and for biology majors preparing for graduate study. Three two-hour sessions per week.
- PHYS 212 Physics Scientists Engineers II & Lab 4 CREDITS**
The physics 211/212 sequence is a one-year calculus-based introductory physics course using the workshop method. This method combines inquiry-based cooperative learning with the comprehensive use of computer tools for data acquisition, data analysis and mathematical modeling. Kinematics, Newton's Laws of motion, conservation laws (energy, linear momentum, and angular momentum), rotational motion, and oscillations are studied during the first semester. In the second semester topics in electricity, magnetism, dc circuits, thermodynamics, and chaos dynamics are covered. Recommended for physical science, mathematics, computer science, and 3+2 engineering students and for biology majors preparing for graduate study. Three two-hour sessions per week.
- PHYS 301 Introduction to Modern Physics 4 CREDITS**
Elementary concepts of modern physics. Topics include: special relativity, elementary quantum theory, atomic and molecular spectra, X-rays, introduction to solid state, nuclear and laser physics. The curriculum will be problem-based with an integrated lab.
- PHYS 305 Optics 4 CREDITS**
This class is intended to give students a background in practical optics. Topics studied include lenses and mirrors, systems of lenses and mirrors and aberrations in lenses and mirrors, polarizers and filters, interference and diffraction. Ray diagrams and Fermat's Principle of least time are treated along with waves, and the electromagnetic basis for understanding polarization.
- PHYS 309 Mathematical Methods for Physics 4 CREDITS**
Specifically designed to introduce physical science students to the elements of mathematics that are useful in the upper division course work. This course is a prerequisite for most of the upper division physics classes and should be taken as early as possible.
- PHYS 311 Analytical Mechanics 4 CREDITS**
Intermediate problems in Newtonian mechanics, system of particles, dynamics of rigid bodies, gravitation, moving coordinate systems, mechanics of continuous media, Lagrangian and Hamiltonian dynamics, and the theory of small vibrations.
- PHYS 315 Electronics and Electric Circuits 4 CREDITS**
This is an integrated lab-lecture course in electronics and electric circuits for physics and engineering majors.
- PHYS 370 Scientific Computing 4 CREDITS**
This course provides students with experience applying programming techniques in Python to a wide range of scientific problems. Topics include a brief review of basic programming principles, and applications in equation solving, data analysis, and model simulation.
- PHYS 401 Directed Studies 1 to 4 CREDITS**
A tutorial-based course used only for student-initiated proposals for intensive individual study of topics not otherwise offered in the Physics Program. Requires senior standing and consent of instructor and school dean. This course is repeatable for credit.
- PHYS 410 Quantum Chemistry 4 CREDITS**
A study of the basic principles of quantum mechanics and its application to atomic structure, molecular structure and spectroscopy. A laboratory section accompanies the lecture.
- PHYS 411 Thermodynamics and Statistical Mechanics 4 CREDITS**
A study of the theoretical macroscopic properties of matter. An introduction to statistical mechanics, chemical thermodynamics and kinetics with applications to gases, solutions, and phase and chemical equilibria. A laboratory section accompanies the lecture.
- PHYS 425 Quantum Physics 4 CREDITS**
Study of the mathematical fundamentals of quantum mechanics and its application to diverse non-chemical problems. Applications include quantization of problems, measurability, fundamental particles, scattering, operator algebra, representation theory, and more approximate methods.
- PHYS 430 Undergraduate Research 1 to 4 CREDITS**
Students undertake a portion of a research project and learn all aspects of scientific inquiry. One credit hour equates to three hours per week in the laboratory. This course may be taken one credit at a time.
- PHYS 431 Electrodynamics 4 CREDITS**
Fundamental theories of electricity and magnetism from the viewpoint of fields. Topics include electrostatic fields, Laplace's and Poisson's equations, magnetic fields, Maxwell's equations, propagation of electromagnetic waves, and electromagnetic radiation.
- PHYS 440 Internship 1 to 8 CREDITS**
Offers students the opportunity to integrate class room knowledge with practical experience. Prerequisites: junior or senior standing (for transfer students, at least 15 hours completed at Westminster or permission of instructor), minimum 2.5 GPA, completion of Career Resource Center Internship Workshop, and consent of program director and Career Center Internship Coordinator. This course is repeatable for credit. REGISTRATION NOTE: Registration for internships is initiated through the Career Center website and is finalized upon completion of required paperwork and approvals. More info: 801-832-2590 https://westminstercollege.edu/internships
- PHYS 487 Undergraduate Teaching 1 CREDIT**
Provides an opportunity for teaching experience in lower-division lower-division laboratories by junior- and senior- level Physics majors. PHYS 487 may not be used as elective hours in the Physics majors or minors. This course is graded Credit/No Credit. Prerequisite: consent of program director.