

COURSE DESCRIPTIONS

PHYS 440S	Internship	1 to 8 CREDITS	PHYS 325	Astrophysics	4 CREDITS
PHYS 151	Principles of Physics I and Lab	4 CREDITS	A study of the principles underlying astrophysical phenomena such as solar system objects; stellar structure and evolution; galactic dynamics and cosmology.		
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 370	Scientific Computing	4 CREDITS
PHYS 152	Principles of Physics II & Lab	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.		
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 401	Directed Studies	1 to 4 CREDITS
PHYS 211	Physics Scientists and Engineers I & Lab	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.		
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 410	Quantum Chemistry	4 CREDITS
PHYS 212	Physics Scientists Engineers II & Lab	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.		
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 411	Thermodynamics and Statistical Mechanics	4 CREDITS
PHYS 301	Introduction to Modern Physics	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.		
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 425	Quantum Physics	4 CREDITS
PHYS 305	Optics	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.		
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 430	Undergraduate Research	1 to 4 CREDITS
PHYS 309	Mathematical Methods for Physics	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.		
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 431	Electrodynamics	4 CREDITS
PHYS 311	Analytical Mechanics	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.		
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 440	Internship	1 to 8 CREDITS
			Offers students the opportunity to integrate classroom knowledge with practical experience. Students will be graded on assigned coursework and evaluation by their site supervisor. Prerequisites: 60 college credits completed (for transfer students at least 15 hours completed at Westminster or permission of instructor), minimum 2.5 GPA, and consent of faculty advisor and Career Center internship coordinator. Interns will work for 42 hours per each registered credit. This course is repeatable for credit. Some majors limit how many internship credits may count towards the major, consult your faculty advisor. 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/student-life/career-center/internships.html		
			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.		