

PHYSICS (PHY)

PHY 100L Physical Science Laboratory (1 Credits)

Survey of the unity of the physical sciences (astronomy, physics, chemistry, and geology) rather than arbitrary divisions. Emphasis on knowledge of selected facts, principles, and methods of science and the place of science in our modern world.

PHY 152 General Physics (3 Credits)

This lecture and recitation course deals with mechanics, heat, and sound. The course emphasizes analytical methods and problem solving. Accompanying laboratories: PHY 152L.

Prerequisites: Take MTH-153., Take PHY-152.

PHY 152L General Physics Laboratory I (1 Credits)

Opportunity to investigate the laws and principles of physics and to make conclusions based on observations and analysis.

PHY 153 General Physics (3 Credits)

This lecture and recitation course deals with electricity and magnetism, light, and modern physics. The course emphasizes analytical methods and problem solving. Accompanying laboratories: PHY 153L.

Prerequisites: Take MTH-153.

PHY 153L General Physics Laboratory II (1 Credits)

Opportunity to investigate the laws and principles of physics and to make conclusions based on observations and analysis.

PHY 154 Physics of Music (3 Credits)

Study of mechanical vibrations, sound, acoustics of halls and musical instruments, electroacoustics, electronic music, musical scales, waveform analysis, recording and reproduction of musical sounds. (1 hour lecture, 2 hours experiment, project recitation)

Prerequisites: Take MTH-153.

PHY 160 University Physics I (4 Credits)

This lecture and recitation course deals with mechanics, heat, and sound. The course emphasizes analytical methods with the application of calculus and problem solving. Accompanying laboratories: PHY 160L.

Prerequisites: Take MTH-184.

PHY 160L University Physics Laboratory I (1 Credits)

Opportunity to investigate the laws and principles of physics and to make conclusions based on observations and analysis.

Prerequisites: Take PHY-160.

PHY 161 University Physics II (4 Credits)

This lecture and recitation course deals with electricity and magnetism, light, and modern physics. The course emphasizes analytical methods with application of Calculus and problem solving. Accompanying laboratories: PHY 161L.

Prerequisites: Take PHY-160.

PHY 161L University Physics Laboratory II (1 Credits)

Opportunity to investigate the laws and principles of physics and to make conclusions based on observations and analysis.

Prerequisites: Take PHY-161.

PHY 241 Physics Seminar (1 Credits)

Presentation and discussion of current topics in all areas of physics. Required of sophomore physics majors.

Prerequisites: Take PHY-250. Take PHY-251.

PHY 260 University Physics III (4 Credits)

Study of basic concepts and principles of oscillatory motion, mechanical waves, electro-magnetic waves, geometrical optics, physical optics, and special relativity. Calculus and vector methods used throughout the course.

Prerequisites: Take MTH-184.

PHY 297 Introduction to Research (3 Credits)

Acquisition of fundamental skills in experiment design, data analysis, and other research skills. Undergraduate research supervised by a faculty member.

PHY 345 Math Methods in Physical Sciences I (3 Credits)

Introductory study of advanced mathematical topics including complex numbers, vectors, matrices, series, and differential equations with special emphasis on applications to physics topics.

Prerequisites: Take PHY-250. Take PHY-251. Take MTH-252.

PHY 350 Modern Physics (3 Credits)

Introduction to modern physics including relativity, atomic structure, nuclear structure, radioactivity, nuclear reactions, and elementary particles.

Prerequisites: Take PHY-250. Take PHY-251. Take MTH-251., Take MTH-252.

PHY 351 Modern Physics Laboratory (2 Credits)

Emphasis on experimental techniques, including G.M. counters, flow counters, absorption of radiation, half-life, range of alpha particles spectroscopy, selected experiments in neutron physics, and selected experiments in radiochemistry. Two hours laboratory per week.

Prerequisites: Take PHY-350. Take MTH-252.

PHY 356 Heat and Thermodynamics (3 Credits)

Examination of thermal equilibrium and the concepts of temperature, thermodynamic systems, work, heat, and the Laws of Thermodynamics, thermal properties of materials, heat engines, reversibility, Carnot's theorem, enthalpy, and the Helmholtz and Gibbs functions. Applications are made to surfaces, pure substances, magnetic materials in a magnetic field, flow processes, chemical reactions, mixture of gases and fuel cells, steam engines and turbines.

Prerequisites: Take PHY-250. Take PHY-251. Take MTH-252., Take MTH-372.

PHY 365 Physical Mechanics I (3 Credits)

Study of elements of vector analysis, laws of dynamics and statics of particles, cables and rigid bodies, central forces and celestial mechanics, theory of vibrations, and special relativity. Survey of mechanics comparable to the classical Newtonian approximation.

Prerequisites: Take PHY-320. Take PHY-350. Take MTH-372.

PHY 366 Physical Mechanics II (3 Credits)

Study of elements of vector analysis, laws of dynamics and statics of particles, cables and rigid bodies, central forces and celestial mechanics, theory of vibrations, and special relativity. Survey of mechanics comparable to the classical Newtonian approximation.

Prerequisites: Take PHY-320. Take PHY-350. Take MTH-372.

PHY 366H Honors Physical Mechanics (3 Credits)

Study of elements of vector analysis, laws of dynamics and statics of particles, cables and rigid bodies, central forces and celestial mechanics, theory of vibrations, and special relativity. Survey of mechanics comparable to the classical Newtonian approximation.

Prerequisites: Take PHY-320. Take PHY-350. Take MTH-372.

PHY 375 Electricity and Magnetism I (3 Credits)

Introduction to classical electromagnetic theory. Topics include elements of vector analysis, static and time-dependent electric and magnetic fields, electric and magnetic properties of matter, electromagnetic induction, and Maxwell's equations.

Prerequisites: Take PHY-350. Take MTH-252. Take MTH-372.

PHY 380 Quantum Mechanics I (3 Credits)

Introduction to Schrodinger's equation and topics, including free particle wave functions, square well and simple harmonic oscillator potentials, the hydrogen atom, and identical particles.

Prerequisites: Take PHY-320. Take PHY-350. Take MTH-372.

PHY 397 Introduction to Research (3 Credits)

Development in the skills of research, including preparations, fabrication, design and execution of experiments, and data analysis. Undergraduate research supervised by a faculty member.

PHY 399 Advanced Laboratory (2 Credits)

Introduction to techniques of advanced experimentation and to development of research and technical writing skills. Experiments in mechanics, heat, electronics, optical spectroscopy, and atomic and nuclear physics.

Prerequisites: Take PHY-350. Take PHY-351. Take PHY-365.

PHY 445 Math Methods in Physical Sciences II (3 Credits)

Study of advanced mathematical topics including Fourier series, calculus of variations, series solutions of differential equations, and partial differential equations, with special emphasis on applications to physics topics.

Prerequisites: Take PHY-345.

PHY 468 Optics (3 Credits)

Focus on topics from geometrical and physical optics, including circular and elliptical polarization, thick-lens equations, Fresnel and Fraunhofer diffraction, interference and dispersion of electromagnetic waves, fiber optics, and optical pumping.

Prerequisites: Take PHY-350. Take MTH-252.

PHY 475 Electricity and Magnetism II (3 Credits)

Advanced treatment of classical electromagnetic theory, including electrostatic and magnetostatic fields, electric and magnetic properties of matter, Maxwell's equations and time-dependent electric and magnetic fields, electromagnetic waves, and radiation.

Prerequisites: Take PHY-375.

PHY 480 Quantum Mechanics II (3 Credits)

Advanced treatment of Schrodinger equation and topics, including free particle wave functions, square well and simple harmonic oscillator potentials, the hydrogen atom, identical particles, perturbation theory, and collision theory. Emphasis on applications.

Prerequisites: Take PHY-380.

PHY 498 Sr Project I (2 Credits)

Preparation and presentation of Senior Project proposal planned with a faculty mentor. Oral report describing the plan is required. A faculty review panel offers suggestions for revisions where needed.

PHY 499 Sr Project II (2 Credits)

Supervised investigation of a research problem including planning, execution, and analysis. Preparation of report, oral presentation, and completion of senior assessment examination required.

Prerequisites: Take PHY-399.

PHY 499H Honors Sr Project II (2 Credits)

Supervised investigation of a research problem including planning, execution, and analysis. Preparation of report, oral presentation, and completion of senior assessment examination required.

Prerequisites: Take PHY-399.