PHYSICS (PHYS)

PHYS 1010Q. Elements Of Physics. (4 Credits)
Basic concepts and applications of physics for the non-science major. Scientific principles and quantitative relationships involving mechanics, energy, heat and temperature, waves, electricity and magnetism, and the theory of the atom are covered. A laboratory provides hands-on experience with the principles of physics. CA 3-LAB.
Enrollment Requirements: Not open for credit to students who have passed PHYS 1201 or 1401 or 1501 or 1601.
Skill Codes: COMP. Quantitative Competency
Content Areas: CA3LAB: Science & Tech Lab
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%201010Q)

PHYS 1020Q. Introductory Astronomy. (3 Credits)
A basic introductory astronomy course without laboratories, including principles of celestial coordinate systems and telescope design; applications of fundamental physical laws to the sun, planets, stars and galaxies; evolution of stars, galaxies and the universe; recent space probe results, modern cosmology, astrobiology. Night observing sessions are an integral part of the course. CA 3.
Enrollment Requirements: Not open to students who have passed PHYS 1025.
Skill Codes: COMP. Quantitative Competency
Content Areas: CA3: Science & Technology
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%201020Q)

PHYS 1025Q. Introductory Astronomy with Laboratory. (4 Credits)
A basic introductory astronomy course including principles of celestial coordinate systems and telescope design; applications of fundamental physical laws to the sun, planets, stars and galaxies; evolution of stars, galaxies and the universe; recent space probe results, modern cosmology, astrobiology. Basic quantitative laboratory techniques relevant to astronomy. Night observing sessions are an integral part of the course. CA 3-LAB.
Enrollment Requirements: Not open to students who have passed PHYS 1020.
Skill Codes: COMP. Quantitative Competency
Content Areas: CA3LAB: Science & Tech Lab
Topics of Inquiry: TOI6L: Science Emp Inq (Lab)
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%201025Q)

PHYS 1030Q. Physics of the Environment. (3 Credits)
Concepts of physics applied to current problems of the physical environment: energy, transportation, pollution. No previous knowledge of physics is assumed. Not applicable to any requirement that specifies a course in "general physics." CA 3.
Skill Codes: COMP. Quantitative Competency
Content Areas: CA3: Science & Technology
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%201030Q)

PHYS 1040QE. Cosmic Origins of Life. (3 Credits)
Principles of physics and quantitative reasoning applied to astrobiology, the search for extraterrestrial life, and cosmic, stellar, and atmospheric conditions for habitability. A systems perspective on the impacts of human civilization on habitability. CA 3.
Skill Codes: COMP. Environmental Literacy, COMP. Quantitative Competency
Content Areas: CA3: Science & Technology
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%201040QE)

PHYS 1075Q. Physics of Music. (4 Credits)
Basic principles of physics and scientific reasoning will be taught in the context of the production and perception of music, emphasizing the historic and scientific interplay between physics and music. Basic quantitative laboratories pertaining to sound, music, and waves. No previous knowledge of physics or music is assumed. CA 3-LAB.
Skill Codes: COMP. Quantitative Competency
Content Areas: CA3LAB: Science & Tech Lab
Topics of Inquiry: TOI1: Creativity: Des,Expr,Inn, TOI6L: Science Emp Inq (Lab)
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%201075Q)

PHYS 1201Q. General Physics I. (4 Credits)
A non-calculus based course introducing the laws of force and motion applied to mechanical phenomena. Concepts such as work, mechanical energy, linear and angular momentum, and energy conservation are explained. The laboratory offers fundamental training in precise measurements. CA 3-LAB.
Enrollment Requirements: MATH 1060Q or a qualifying score equivalent to pre-Calculus on the math placement assessment (placement.uconn.edu/mathematics-placement). Not open for credit to students who have passed PHYS 1401Q, 1501Q, or 1601Q. May not be taken out of sequence after passing PHYS 1202Q.
Skill Codes: COMP. Quantitative Competency
Content Areas: CA3LAB: Science & Tech Lab
Topics of Inquiry: TOI6L: Science Emp Inq (Lab)
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%201201Q)

PHYS 1202Q. General Physics II. (4 Credits)
A non-calculus based course introducing the principles governing electromagnetic phenomena, including electromagnetic radiation and waves and electric circuits. The laboratory offers fundamental training in precise measurements. CA 3-LAB.
Enrollment Requirements: PHYS 1201Q. Not open for credit to students who have passed PHYS 1402Q, 1502Q, or 1602Q.
Skill Codes: COMP. Quantitative Competency
Content Areas: CA3LAB: Science & Tech Lab
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%201202Q)

PHYS 1230. General Physics Problems. (3 Credits)
Physics problems, emphasizing applications of calculus, dealing with topics in general physics. Intended for those students who have taken or are taking PHYS 1202Q and who desire to have a calculus-based physics sequence equivalent to PHYS 1401Q-1402Q or 1501Q-1502Q.
Enrollment Requirements: PHYS 1202Q, and MATH 1122 or 1132Q, any of which may be taken concurrently. Not open for credit to students who have passed PHYS 1401Q, 1501Q or 1601Q.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%201230)

PHYS 1401Q. General Physics with Calculus I. (4 Credits)
Quantitative study of the basic facts and principles of physics with an emphasis on mechanical phenomena. Concepts such as work, mechanical energy, linear and angular momentum, and energy conservation are explained. The laboratory offers fundamental training in physical measurements. Recommended for non-engineering students who desire to have a calculus-based physics sequence. It is also recommended for science majors for whom a one year introductory physics course is adequate. CA 3-LAB.
Enrollment Requirements: Recommended preparation: MATH 1121Q or 1131Q. Not open for credit to students who have passed PHYS 1501Q or 1601Q. May not be taken out of sequence after passing PHYS 1402Q. May be taken for not more than two credits, with the permission of the instructor, after passing PHYS 1201Q.
Skill Codes: COMP. Quantitative Competency
Content Areas: CA3LAB: Science & Tech Lab
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%201401Q)

PHYS 1402Q. General Physics with Calculus II. (4 Credits)
Quantitative study of the basic facts and principles of physics with an emphasis on electromagnetic phenomena, including electromagnetic radiation and waves and electric circuits. The laboratory offers fundamental training in physical measurements. Recommended for non-engineering students who desire to have a calculus-based physics sequence. It is also recommended for science majors for whom a one year introductory physics course is adequate. CA 3-LAB.
Enrollment Requirements: PHYS 1401Q. Recommended preparation: MATH 1122Q or 1132Q. Not open for credit to students who have passed PHYS 1502Q or 1602Q. May be taken for not more than two credits, with the permission of the instructor, by students who have passed PHYS 1202Q.
Skill Codes: COMP. Quantitative Competency
Content Areas: CA3LAB: Science & Tech Lab
Topics of Inquiry: TOI6L: Science Emp Inq (Lab)
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%201402Q)

PHYS 1501Q. Physics for Engineers I. (4 Credits)
Introduction to Newton's laws, their extensions and applications. Concepts such as work, mechanical energy, linear and angular momentum, and energy conservation are explained. Basic concepts of calculus are used. Recommended for prospective Engineering majors. CA 3-LAB.
Enrollment Requirements: Recommended preparation: PHYS 1010Q or high school physics; CE 2110; MATH 2110Q or 2130Q, which may be taken concurrently. Not open for credit after passing PHYS 1401Q or 1601Q. May not be taken out of sequence after passing 1502Q. May be taken for not more than two credits, with the permission of the instructor, by students who have passed PHYS 1201Q.
Skill Codes: COMP. Quantitative Competency
Content Areas: CA3LAB: Science & Tech Lab
Topics of Inquiry: TOI6L: Science Emp Inq (Lab)
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%201501Q)

PHYS 1502Q. Physics for Engineers II. (4 Credits)
Introduction to principles of electromagnetism and Maxwell's equations, including electric circuits, electromagnetic wave propagation, optics, and other relevant applications to engineering. Basic concepts of calculus are used. Recommended for prospective Engineering majors. CA 3-LAB.
Enrollment Requirements: PHYS 1501Q. Not open to students who have passed PHYS 1402Q or 1602Q. May be taken for not more than two credits, with instructor's permission, by students who have passed PHYS 1202Q.
Skill Codes: COMP. Quantitative Competency
Content Areas: CA3LAB: Science & Tech Lab
Topics of Inquiry: TOI6L: Science Emp Inq (Lab)
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%201502Q)

PHYS 1600Q. Introduction to Modern Physics. (4 Credits)
Quantitative exploration of the structure of matter, including gas laws, electric and magnetic forces, the electron, x-rays, waves and lights, relativity, radioactivity, and spectra. This course is recommended for prospective Physics majors. CA 3-LAB.
Enrollment Requirements: Recommended preparation: MATH 1060, which may be taken concurrently, or a qualifying score on the mathematics placement assessment.
Skill Codes: COMP. Quantitative Competency
Content Areas: CA3LAB: Science & Tech Lab
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%201600Q)

PHYS 1601Q. Fundamentals of Physics I. (4 Credits)
Foundational principles of mechanics: kinematics, forces, energy, momentum, angular momentum, torque, gravitation, waves, harmonic motion and nonlinear dynamics. Basic concepts of calculus are used. Recommended for prospective Physics majors, this course is taught integrating theory, experimental activities, and collaborative problem solving in an active learning setting. CA 3-LAB.
Enrollment Requirements: Recommended preparation: MATH 1121Q or 1131Q or 1151Q (1151Q is preferred for physics majors). Not open to students who have passed PHYS 1401Q or 1501Q. May not be taken out of sequence after passing PHYS 1602Q. May be taken for not more than three credits, with instructor's permission, by students who passed PHYS 1201Q.
Skill Codes: COMP. Quantitative Competency
Content Areas: CA3LAB: Science & Tech Lab
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%201601Q)

PHYS 1602Q. Fundamentals of Physics II. (4 Credits)
Foundational principles of electromagnetism: electrostatics, magnetostatics, electrodynamics, Maxwell's equations, electromagnetic wave propagation, and optics, including some of their relevant applications to physics. Basic concepts of calculus are used. Recommended for prospective Physics majors, this course is taught integrating theory, experimental activities, and collaborative problem solving in an active learning setting. CA 3-LAB.
Enrollment Requirements: Recommended preparation: PHYS 1601Q; MATH 1122Q or 1132Q or 1152Q (1152Q preferred for Physics majors). Not open for credit to students who have passed PHYS 1402Q or 1502Q. May be taken for not more than three credits, with instructor's permission, after passing PHYS 1202Q.
Skill Codes: COMP. Quantitative Competency
Content Areas: CA3LAB: Science & Tech Lab
Topics of Inquiry: TOI6L: Science Emp Inq (Lab)
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%201602Q)

PHYS 2200. Computational Physics. (3 Credits)
A basic introduction to numerical and mathematical methods required for the solution of physics problems using currently available scientific software for computation and graphics.
Enrollment Requirements: PHYS 1230 or 1402Q or 1502Q or 1530 or 1602Q, any of which may be taken concurrently; MATH 2410Q, which may be taken concurrently.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%202200)

PHYS 2300. The Development of Quantum Physics. (3 Credits)
The inadequacies of classical physical concepts in the submicroscopic domain. The revision of physical principles that led to special relativity and modern quantum theory. Application to topics chosen from atomic and molecular physics, solid state physics, nuclear physics and elementary particle physics.
Enrollment Requirements: PHYS 1230 or 1402Q or 1502Q or 1530 or 1602Q , which may be taken concurrently; or PHYS 1202 with consent of instructor. May not be taken out of sequence after passing PHYS 3300, 3401, 4300, or 4900.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%202300)

PHYS 2400. Mathematical Methods for the Physical Sciences. (3 Credits)
Theoretical mathematical methods required for physical science courses.
Enrollment Requirements: PHYS 1230 or PHYS 1402Q or PHYS 1502Q or PHYS 1530 or PHYS 1602Q; and MATH 2110Q; either or both may be taken concurrently; or instructor consent.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%202400)

PHYS 2501W. Advanced Undergraduate Laboratory. (4 Credits)
Experiments in classical and/or quantum phenomena with an emphasis on acquiring, analyzing, and interpreting experimental data. Extensive writing in the style of experimental reports and/or journal articles.
Enrollment Requirements: PHYS 1201Q or 1401Q or 1501Q or 1601Q; ENGL 1007 or 1010 or 1011 or 2011.
Skill Codes: COMP. Writing Competency
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%202501W)

PHYS 2701. Foundations of Modern Astrophysics. (3 Credits)
The conceptual framework describing astronomical objects. Topics include orbits, light, and stars. Concepts of statistical mechanics, quantum mechanics, and relativity as needed for astrophysical topics.
Enrollment Requirements: PHYS 1401Q or 1501Q or 1601Q; MATH 1131Q (or 1151Q) and 1132Q (or 1152Q). Prerequisite or corequisite: PHYS 1402Q or 1502Q or 1602Q; MATH 2110Q. May not be taken out of sequence after passing PHYS 2702 or PHYS 4740.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%202701)

PHYS 2702. Techniques of Modern Astrophysics. (3 Credits)
Observational astronomy and applications to astrophysical phenomena. Topics include telescopes and astronomical instrumentation, production of chemical elements and molecules, distance scales, black holes and compact objects, gravitational lensing, galaxy kinematics and structure, dark matter, dark energy, cosmic rays, gravitational waves, and Big Bang cosmology.
Enrollment Requirements: PHYS 2701. May not be taken out of sequence after passing PHYS 4710, 4720, or 4740.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%202702)

PHYS 3101. Mechanics I. (3 Credits)
Newton's Laws of motion applied to mass points, systems of particles, and rigid bodies.
Enrollment Requirements: PHYS 1230 or 1402Q or 1502Q or 1530 or 1602Q; MATH 2110Q or 2130Q which may be taken concurrently.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%203101)

PHYS 3102. Mechanics II. (3 Credits)
Further applications of Newton's Laws; continuous media; Lagrange's and Hamilton's formulation of dynamics.
Enrollment Requirements: MATH 2410Q or 2420Q; PHYS 3101 or CE 2120.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%203102)

PHYS 3150. Electronics. (3 Credits)
The principles of devices and their applications to instrumentation in science and engineering. Rectification, filtering, regulation, input and output impedance, basic transistor circuits, operational amplifiers, preamplifiers for photodiodes and other transducers, logic gates, and digital circuits.
Enrollment Requirements: PHYS 1230 or 1402Q or 1502Q or 1530 or 1602Q or instructor consent.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%203150)

PHYS 3201. Electricity and Magnetism I. (3 Credits)
Advanced theory and applications of electrostatics, magnetostatics, potentials, and electromagnetic fields in matter.
Enrollment Requirements: PHYS 1230 or 1402Q or 1502Q or 1530 or 1602Q or instructor's consent; MATH 2110Q and 2410Q, or MATH 2130Q and 2420Q.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%203201)

PHYS 3202. Electricity and Magnetism II. (3 Credits)
Advanced theory and applications of electromagnetic fields. Gauge transformations, electromagnetic waves and radiation, and relativistic corrections to electrodynamics.
Enrollment Requirements: PHYS 3201.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%203202)

PHYS 3300. Statistical and Thermal Physics. (3 Credits)
The laws of thermodynamics and their microscopic statistical basis; entropy, temperature, Boltzmann factor, chemical potential, Gibbs factor, and the distribution functions.
Enrollment Requirements: PHYS 1230 or 1402Q or 1502Q or 1530 or 1602Q; PHYS 2300; MATH 2110Q and 2410Q, or MATH 2130Q and 2420Q. Recommended preparation: PHYS 3201 and 3401.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%203300)

PHYS 3401. Quantum Mechanics I. (3 Credits)
Elementary Principles of quantum mechanics; solutions to the Schrödinger equation for bound states and scattering in one dimension; general solution for central forces in two and three dimensions, orbital angular momentum and spin, and other fundamental quantum mechanical principles.
Enrollment Requirements: PHYS 2300; MATH 2110 and 2410 or MATH 2130 and 2420.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%203401)

PHYS 3402. Quantum Mechanics II. (3 Credits)
Applications of quantum mechanics, useful approximation methods, the variational method, the WKB method, scattering and other advanced topics.
Enrollment Requirements: PHYS 3401.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%203402)

PHYS 3501. Modern Experimental Methods. (3 Credits)
In-depth exploration of classical and quantum phenomena through advanced experimentation using contemporary methods.
Enrollment Requirements: PHYS 1202Q or 1402Q or 1502Q or 1602Q; and 2501W.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%203501)

PHYS 3989. Undergraduate Research. (1-3 Credits)
Introduction to original investigation performed by the student under the guidance of a faculty member. The student is required to submit a brief report at the end of each semester.
May be repeated for credit
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%203989)

PHYS 4093. Foreign Study. (1-3 Credits)
Special topics taken in a foreign study program. Consent of Department Head required, normally to be granted prior to the student's departure. May count toward the major with consent of the advisor.
May be repeated for credit
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%204093)

PHYS 4095. Special Topics. (1-3 Credits)
Enrollment Requirements: Prerequisites and recommended preparation vary.
May be repeated for credit
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%204095)

PHYS 4096W. Research Thesis in Physics. (3 Credits)
Research investigation for the advanced undergraduate. Research and writing of a Thesis are required. Final public presentation is recommended.
Enrollment Requirements: ENGL 1007 or 1010 or 1011.
Skill Codes: COMP. Writing Competency
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%204096W)

PHYS 4098. Variable Topics. (3 Credits)
Enrollment Requirements: Prerequisites and recommended preparation vary.
May be repeated for credit
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%204098)

PHYS 4099. Independent Study. (1-3 Credits)
May be repeated for credit
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%204099)

PHYS 4100. Physics of the Earth's Interior. (3 Credits)
(Also offered as ERTH 4550.) The composition, structure, and dynamics of the Earth's core, mantle, and crust inferred from observations of seismology, geomagnetism, and heat flow. Formerly offered as GSCI 4550.
Enrollment Requirements: PHYS 1230 or 1402Q or 1502Q or 1530 or 1602Q, any of which may be taken concurrently; MATH 1122Q or 1126Q or 1131Q any of which may be taken concurrently. Recommended preparation: MATH 1132Q.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%204100)

PHYS 4130. Fundamentals of Planetary Science. (3 Credits)
(Also offered as ERTH 4560.) Evolution of the solar system, celestial mechanics, tidal friction, internal composition of planets, black-body radiation, planetary atmospheres. Formerly offered as GSCI 4560.
Enrollment Requirements: PHYS 1230 or 1402Q or 1502Q or 1530 or 1602Q, any of which may be taken concurrently; MATH 1122 or 1126Q or 1131Q, any of which may be taken concurrently.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%204130)

PHYS 4140. Principles of Lasers. (3 Credits)
The physics of lasers, including optical pumping and stimulated emission, laser rate equations, optical resonators, Gaussian beam propagation, Q-switching, mode-locking and nonlinear optics. Applications to gas, solid-state and tunable laser systems.
Enrollment Requirements: PHYS 3202 and 3401. Recommended Preparation: PHYS 4150.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%204140)

PHYS 4150. Optics. (4 Credits)
An introduction to geometrical and physical optics. Thick lenses, stops, aberrations, interference, diffraction, polarization.
Enrollment Requirements: PHYS 1230 or 1402Q or 1502Q or 1530 or 1602Q or instructor consent. Recommended preparation: PHYS 3103 or 3201.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%204150)

PHYS 4210. Introduction to Solid State Physics. (3 Credits)
Crystal lattices, lattice waves, thermal and electronic properties, imperfections in solids.
Enrollment Requirements: PHYS 1230 or 1530 or 1402Q or 1502Q or 1602Q.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%204210)

PHYS 4350. Nuclei and Particles. (3 Credits)
Properties of nuclei and particles, conserved quantities, isospin, quark model, Fermi gas model, electroweak interaction, high energy scattering.
Enrollment Requirements: PHYS 3401.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%204350)

PHYS 4710. Stars and Compact Objects. (3 Credits)
The structure and evolution of stars. Gravitational collapse, hydrostatic equilibrium, novae and shocks, and compact objects with degenerate matter.
Enrollment Requirements: PHYS 2701 and 2702; MATH 2410Q.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%204710)

PHYS 4720. Galaxies and the Interstellar Medium. (3 Credits)
Galaxy formation and evolution in the hierarchical expanding Universe. Properties of the interstellar medium, including star formation and radiative transfer; stellar populations, structure, kinematics and dynamics of galaxies.
Enrollment Requirements: PHYS 2701 and 2702; MATH 2410Q. Recommended preparation: proficiency in calculus.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%204720)

PHYS 4730. General Relativity and Cosmology. (3 Credits)
Gravity and the problem of motion from the ancient Greeks to Newton to Einstein. Special relativity. General relativity. Curvature. Classic tests of general relativity. Gravitational waves. Black holes. Newtonian cosmology. Big Bang theory. Inflation. Dark matter. Dark energy. Accelerating universe.
Enrollment Requirements: PHYS 2300, 3101, and 3201; or instructor consent.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%204730)

PHYS 4740. Advanced Methods in Astrophysics. (3 Credits)
Basic principles and techniques of observational and computational astrophysics. Statistical techniques for data analysis and interpretation of astronomical data. Data mining, visualization, and numerical techniques in simulations of astrophysical systems. Includes short research projects using data from observations and/or simulations.
Enrollment Requirements: PHYS 2701 and PHYS 2702.
View Classes (https://catalog.uconn.edu/course-search/?details&code=PHYS%204740)