

PHYSICS

Not all courses are offered every semester. Refer to the schedule of courses for each term's specific offerings.

More Info (<https://one.ufl.edu/soc/>)

Unless otherwise indicated in the course description, all courses at the University of Florida are taught in English, with the exception of specific foreign language courses.

Department Information

The Department of Physics is making strides toward becoming one of the premier physics departments in the United States. With active groups in astrophysics, biological physics, condensed matter/materials physics, and elementary particle physics, undergraduate and graduate students participate in cutting-edge research that prepares them for successful careers in a wide variety of fields.

Website (<https://www.phys.ufl.edu/wp/>)

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Curriculum

- Combination Degrees
- Physics
- Physics Minor

Courses

IDH 3931 Interdisciplinary Junior Honors 1-3 Credits

Grading Scheme: Letter Grade

Special topics restricted to those in the university-wide honors program. (WR)

Attributes: Satisfies 6000 Words of Writing Requirement

ISC 2400L Cross-Disciplinary Laboratory 1 3 Credits

Grading Scheme: Letter Grade

First course in a two-semester inquiry-based laboratory focusing on major themes and concepts in biology, chemistry and physics with an emphasis on their integrated applications in modern, quantitative research. Satisfies course requirements for BSC 2010L, CHM 2045L and PHY 2053L.

Prerequisite: high school algebra or equivalent. Degree-seeking students only.

ISC 2401L Cross-Disciplinary Laboratory 2 3 Credits

Grading Scheme: Letter Grade

Second course in a two-semester inquiry-based laboratory focusing on major themes and concepts in biology, chemistry and physics with an emphasis on their integrated applications in modern, quantitative research. Satisfies course requirements for BSC 2011L, CHM 2046L and PHY 2054L.

Prerequisite: ISC 2400L and MAC 1147 or equivalent;

Corequisite: BSC 2010 and CHM 2045 or CHM 2047 or CHM 2095.

ISC 3523C Research Methods 3 Credits

Grading Scheme: Letter Grade

The tools scientists use to solve scientific problems, including use of experiments to answer scientific questions, design of experiments to reduce systematic and random errors, use of statistics to interpret experimental results and deal with sampling errors, mathematical modeling of scientific phenomena and oral presentation of scientific work.

Prerequisite: UFTeach Step 1 and one year of college biology, chemistry or physics.

PHY 1033C Discovering Physics 3 Credits

Grading Scheme: Letter Grade

The fundamental concepts of physics that shape a scientist's view of the laws of nature. A laboratory experience is included to emphasize the importance of measurement for the testing of scientific hypotheses. (P)

Attributes: General Education - Physical Science

PHY 2004 Applied Physics 1 3 Credits**Grading Scheme:** Letter Grade

Emphasizes the practical applications of basic physics to a range of professions, including architecture, agricultural sciences, building construction and forest resources. Mechanics of motion, forces, energy, momentum, wave motion and heat. (P)

Prerequisite: algebra and trigonometry.**Attributes:** General Education - Physical Science**PHY 2004L Laboratory for Applied Physics 1 1 Credit****Grading Scheme:** Letter Grade

Laboratory experience illustrating the practical applications of basic physics, including the mechanics of motion, forces, energy, momentum, wave motion and heat. (P)

Corequisite: PHY 2004.**Attributes:** General Education - Physical Science**PHY 2005 Applied Physics 2 3 Credits****Grading Scheme:** Letter Grade

Continuation of the applied physics sequence. Electric and magnetic fields; geometrical, wave and applied optics; and modern and nuclear physics. (P)

Prerequisite: PHY 2004.**Attributes:** General Education - Physical Science**PHY 2005L Laboratory for Applied Physics 2 1 Credit****Grading Scheme:** Letter Grade

Laboratory experience illustrating the practical applications of electric and magnetic fields geometrical, wave and applied optics; and modern and nuclear physics. (P)

Corequisite: PHY 2005.**Attributes:** General Education - Physical Science**PHY 2020 Introduction to Principles of Physics 3 Credits****Grading Scheme:** Letter Grade

Fundamental principles of physics in mechanics, electricity and modern physics as applied to conservation laws. An in-depth analysis of selected topics with lecture demonstration, films and other teaching aids. (P)

Prerequisite: high school algebra and trigonometry or the equivalent.**Attributes:** General Education - Physical Science**PHY 2032 Energy and Society 3 Credits****Grading Scheme:** Letter Grade

Addresses the question of how the world's energy needs will be met based on available resources, technology, environmental concerns, economics, personal choices, and nation and international policy. Develops quantitative reasoning skills necessary to make informed decisions. Compares energy use, resources, and policy in different countries.

Prerequisite: Any Quest 1 course with a minimum grade of C.**Attributes:** Quest 2, General Education - International, General Education - Physical Science**PHY 2048 Physics with Calculus 1 3 Credits****Grading Scheme:** Letter Grade

The first of a two-semester sequence of physics for scientists and engineers. The course covers Newtonian mechanics and includes motion, vectors, Newton's laws, work and conservation of energy, systems of particles, collisions, equilibrium, oscillations and waves. (P)

Prerequisite: high-school physics, PHY 2020 or the equivalent, and MAC 2311.**Corequisite:** MAC 2312.**Attributes:** General Education - Physical Science**PHY 2048L Laboratory for Physics with Calculus 1 1 Credit****Grading Scheme:** Letter Grade

Laboratory experience for PHY 2048 illustrating the practical applications of Newtonian mechanics. (P)

Prerequisite: Degree-seeking students only.**Corequisite:** PHY 2048 or the equivalent.**Attributes:** General Education - Physical Science**PHY 2049 Physics with Calculus 2 3 Credits****Grading Scheme:** Letter Grade

The second of a two-semester sequence of physics for scientists and engineers. Content includes Coulomb's law, electric fields and potentials, capacitance, currents and circuits, Ampere's law, Faraday's law, inductance, Maxwell's equations, electromagnetic waves, ray optics, interference and diffraction. (P)

Prerequisite: PHY 2048 and MAC 2312;**Corequisite:** MAC 2313.**Attributes:** General Education - Physical Science

PHY 2049L Laboratory for Physics with Calculus 2 1 Credit**Grading Scheme:** Letter Grade

Laboratory experience for PHY 2049 illustrating the practical applications of Coulomb's law, electric fields and potentials, capacitance, currents and circuits, Ampere's law, Faraday's law, inductance, Maxwell's equations, electromagnetic waves, ray optics, interference and diffraction. (P)

Prerequisite: Degree-seeking students only.**Corequisite:** PHY 2049 or the equivalent.**Attributes:** General Education - Physical Science**PHY 2053 Physics 1 4 Credits****Grading Scheme:** Letter Grade

First semester of introductory physics de-emphasizing calculus. Structure and properties of matter; kinematics, dynamics and statics; momentum and energy; rotation, elasticity; vibration; fluids; temperature and expansion, heat transfer, thermal behavior of gases; wave motion and sound. (P)

Prerequisite: high school algebra and trigonometry, or the equivalent. Degree-seeking students only.**Attributes:** General Education - Physical Science**PHY 2053L Laboratory for Physics 1 1 Credit****Grading Scheme:** Letter Grade

Laboratory experience for PHY 2053 illustrating the practical applications of the structure and properties of matter; kinematics, dynamics and statics; momentum and energy; rotation, elasticity; vibration; fluids; temperature and expansion, heat transfer, thermal behavior of gases; wave motion and sound. (P)

Corequisite: PHY 2053 or the equivalent. Degree-seeking students only.**Attributes:** General Education - Physical Science**PHY 2054 Physics 2 4 Credits****Grading Scheme:** Letter Grade

Second semester of introductory physics de-emphasizing calculus. Electric charge, fields and circuits; electromagnetism, applied electricity; geometrical optics, wave optics, applied optics; electrons and photons; atoms and nuclei. (P)

Prerequisite: PHY 2053 or the equivalent. Degree-seeking students only.**Attributes:** General Education - Physical Science**PHY 2054L Laboratory for Physics 2 1 Credit****Grading Scheme:** Letter Grade

Laboratory experience for PHY 2054 illustrating the practical applications of electric charge, fields and circuits; electromagnetism, applied electricity; geometrical optics, wave optics, applied optics; electrons and photons; atoms and nuclei. (P)

Corequisite: PHY 2054 or the equivalent. Degree-seeking students only.**Attributes:** General Education - Physical Science**PHY 2060 Enriched Physics with Calculus 1 3 Credits****Grading Scheme:** Letter Grade

First of the enriched sequence for physics majors and others wishing a deeper understanding of mechanics, kinematics, conservation laws, harmonic motion, central forces and special relativity. (P)

Prerequisite: Degree-seeking students only;**Corequisite:** MAC 2312 or the equivalent.**Attributes:** General Education - Physical Science**PHY 2061 Enriched Physics with Calculus 2 3 Credits****Grading Scheme:** Letter Grade

Second course of the enriched sequence studying electricity and magnetism, including electrostatics, Gauss's Law, potentials, vector analysis, Laplace's equation, conductors and insulators, circuits, magnetism, Maxwell's equations and E and M fields in matter. (P)

Prerequisite: PHY 2060 or instructor permission;**Corequisite:** MAC 2313 or the equivalent.**Attributes:** General Education - Physical Science**PHY 3063 Enriched Modern Physics 3 Credits****Grading Scheme:** Letter Grade

Theory of relativity and introduction to quantum theory. Course includes wave mechanics, quantum theory of solids, nuclear and particle physics and cosmology.

Prerequisite: PHY 2061 or instructor permission, and MAP 2302 or the equivalent.**PHY 3101 Introduction to Modern Physics 3 Credits****Grading Scheme:** Letter Grade

Modern and atomic physics, relativity, wave phenomena and the basis of quantum physics. (P)

Prerequisite: PHY 2049 or the equivalent.**Attributes:** General Education - Physical Science

PHY 3221 Mechanics 1 3 Credits**Grading Scheme:** Letter Grade

First part of PHY 3221/4222 sequence in classical mechanics emphasizing matrices, vector calculus, Newtonian mechanics, frames of reference, conservation laws and harmonic oscillation. (P)

Prerequisite: PHY 2049 or the equivalent;**Corequisite:** MAP 2302 or the equivalent.**Attributes:** General Education - Physical Science**PHY 3323 Electromagnetism 1 3 Credits****Grading Scheme:** Letter Grade

First part of the PHY 3323/4324 sequence in electromagnetism. Course covers static electric and magnetic fields, electric circuits, Maxwell's equations, radiation and propagation of electromagnetic waves. (P)

Prerequisite: (PHY 2049 or PHY 2061, or the equivalent) or (MAP 2302 or the equivalent).**Attributes:** General Education - Physical Science**PHY 3513 Thermal Physics 1 3 Credits****Grading Scheme:** Letter Grade

First part of the PHY 3513/4523 sequence that includes treatment of classical thermodynamics, including fundamental postulates, entropy and equations of states; thermodynamic equilibrium and potentials; Maxwell relations and phase transitions. (P)

Prerequisite: PHY 2049 or PHY 2061.**Attributes:** General Education - Physical Science**PHY 3840L Building Scientific Equipment 2 Credits****Grading Scheme:** Letter Grade

Hands-on experience in the mechanical fabrication of research apparatus. Topics include shop drawings, properties of materials, metal cutting (lathe and milling-machine operation) and metal joining.

Prerequisite: PHY 2061 or PHY 3101, or the equivalent.**PHY 4222 Mechanics 2 3 Credits****Grading Scheme:** Letter Grade

Second part of the sequence in classical mechanics studying rigid body mechanics; motion in a non-inertial frame, Lagrangian and Hamiltonian dynamics; elements of fluid mechanics; and relativity theory.

Prerequisite: PHY 3221 and differential equations.**PHY 4324 Electromagnetism 2 3 Credits****Grading Scheme:** Letter Grade

The second in the PHY 3323/4324 electromagnetism sequence studying static electric and magnetic fields, electric circuits, Maxwell's equations, radiation and propagation of electromagnetic waves.

Prerequisite: PHY 3323 and differential equations.**PHY 4424 Optics 1 3 Credits****Grading Scheme:** Letter Grade

The phenomena of reflection, refraction, dispersion, interference, diffraction and polarization of light.

Prerequisite: PHY 3323 or instructor permission.**PHY 4523 Statistical Physics 3 Credits****Grading Scheme:** Letter Grade

Second of the PHY 3513/4523 sequence. Introduction to statistical physics and continued study of classical thermodynamics, including fundamental postulates, entropy and equations of states; thermodynamic equilibrium and potentials; Maxwell relations and phase transitions.

Prerequisite: PHY 3513 and PHY 4604; differential equations.**PHY 4550 Cryogenics 3 Credits****Grading Scheme:** Letter Grade

History of cryogenics, air separation, liquefaction of permanent gases and natural gases, and superconducting devices and electronics.

Prerequisite: PHY 3101 or the equivalent;**Corequisite:** PHY 3513 or the equivalent.**PHY 4604 Introductory Quantum Mechanics 1 3 Credits****Grading Scheme:** Letter Grade

First of the PHY 4604/4605 sequence. Basic concepts of quantum mechanics with applications in atomic and nuclear physics and condensed matter. (P)

Prerequisite: (PHY 3101 or PHY 3063) and MAP 2302 or equivalent.**Attributes:** General Education - Physical Science**PHY 4605 Introductory Quantum Mechanics 2 3 Credits****Grading Scheme:** Letter Grade

Second of the PHY 4604/4605 quantum mechanics sequence with applications in atomic and nuclear physics and condensed matter.

Prerequisite: PHY 4604.

PHY 4802L Laboratory Physics 1 3 Credits

Grading Scheme: Letter Grade

Electronics in the laboratory.

Corequisite: PHY 3323 or the equivalent.

PHY 4803L Laboratory Physics 2 3 Credits

Grading Scheme: Letter Grade

Current laboratory techniques.

Prerequisite: PHY 4604 and PHY 4802L.

PHY 4905 Individual Work 1-4 Credits

Grading Scheme: Letter Grade

Qualified undergraduate students study selected topics in physics.

Prerequisite: 12 credits of physics and instructor permission.

PHY 4911 Undergraduate Research in Physics 0-3 Credits

Grading Scheme: Letter Grade

Course provides firsthand, supervised research in Physics. Projects may involve inquiry, design, investigation, scholarship, discovery or application in Physics.

PHZ 3113 Introduction to Theoretical Physics 3 Credits

Grading Scheme: Letter Grade

This course expands and systematizes the treatment of standard problems previously encountered in elementary physics. Mathematical techniques are developed to study problems in thermodynamics, statistical physics, the motion of coupled oscillators and electrodynamics.

Prerequisite: MAC 2313 and PHY 2061, or instructor permission.

PHZ 4390 Introduction to Elementary Particle Physics 3 Credits

Grading Scheme: Letter Grade

History and phenomenology of particle physics, physics of the Standard Model and beyond, and particle accelerators and detectors.

Prerequisite: PHY 3101 or PHY 3063;

Corequisite: PHY 4604.

PHZ 4404 Introduction to Solid State Physics 3 Credits

Grading Scheme: Letter Grade

Atomic binding, crystalline structure, diffraction and reciprocal lattice, lattice vibration, phonons, electrons in solids, energy bands, semiconductors.

Prerequisite: PHY 4604;

Corequisite: PHY 4523.

PHZ 4710 Introduction to Biological Physics 3 Credits

Grading Scheme: Letter Grade

The physics of biological systems, including physics of proteins and nucleic acids, biomolecular motors and diffusional signaling and sensing.

Important experimental tools such as magnetic resonance and synchrotron x-ray crystallography are also discussed. (WR)

Prerequisite: one year of introductory physics (PHY 2053/PHY 2054, PHY 2048/PHY 2049, or the equivalent) and one year of calculus (MAC 2311/ MAC 2312, or the equivalent).

Attributes: Satisfies 2000 Words of Writing Requirement
