

# PHYSICS (PHYS)

**PHYS 1101 Physical Science.** (Formerly 101) An introduction to the basic concepts of physics and scientific reasoning relating to the experiences encountered in the everyday physical environment. For non-science majors. Prerequisite for PHYS 1101: "C" or better in MATH 0095. IAI P9900 3 semester credit hour/s.

**Designation:** Physical-Scientific (QPS)

**Campus:** LISLE (Typically Offered: Fall and Spring Terms)  
MESA

**PHYS 1105 Big Ideas in Physics.** The big ideas in 20th and 21st century physics will be presented in a largely non-quantitative, conceptual format intended for non-science majors. The ideas that have revolutionized the modern world will be discussed, including quantum mechanics, special and general relativity, and electronics. Prerequisite: "C" or better in MATH 95. 3 semester credit hour/s.

**Designation:** Physical-Scientific (QPS)

**Campus:** LISLE (Typically Offered: Periodically)

**PHYS 1106 Astronomy.** (Formerly 106) Examines astronomical phenomena and concepts including the solar system, stars, galaxies, planetary motion and the evolution of the universe. IAI P1906 3 semester credit hour/s.

**Designation:** Physical-Scientific (QPS)

**Campus:** LISLE (Typically Offered: Fall, Spring, and Summer Terms)  
MESA

**PHYS 1107 Earth and Space Science.** (Formerly 107) A physical science laboratory course that includes the study of key principles of Earth and Space Science through the investigation of real world problems. The earth science component includes the study of large-scale dynamic forces, events, and processes that affect the Earth's land, water, and atmospheric systems, identification and evaluation of the uses of the Earth's resources, and the processes involved in the life cycle. The space science component focuses on concepts that explain the composition, structure of and changes in the universe and Earth's place in it. By working and studying within the context of a real world problem, students learn how scientific principles are used and applied in everyday life. 4 semester credit hour/s.

**Designation:** Physical-Scientific (QPS)

**Campus:** LISLE (Typically Offered: Spring Term)  
MESA

**PHYS 1113 College Physics I.** (Formerly 113) A non-calculus based introduction to general physics topics that include vectors, classical mechanics, fluids, thermodynamics, and wave phenomena. Prerequisite: "C" or better in MATH 1111 or placement into MATH 1170 or a higher-level math course. IAI P1900 3 semester credit hour/s.

**Designation:** Physical-Scientific (QPS)

**Campus:** LISLE (Typically Offered: Fall, Spring, and Summer Terms)  
MESA

**PHYS 1114 College Physics I Laboratory.** (Formerly 114) Selected experiments to illustrate the concepts studied in PHYS 1113. Prerequisite: credit or co-registration in PHYS 1113. IAI P1900L 1 semester credit hour/s.

**Designation:** Physical-Scientific (QPS)

**Campus:** LISLE (Typically Offered: Fall, Spring, and Summer Terms)  
MESA

**PHYS 1118 College Physics II.** (Formerly 118) A non-calculus based introduction to general physics topics that include electromagnetism, electric circuits, geometrical and physical optics, atomic physics, and nuclear physics. Prerequisite: "C" or better in PHYS 1113. 3 semester credit hour/s.

**Designation:** Physical-Scientific (QPS)

**Campus:** LISLE (Typically Offered: Fall, Spring, and Summer Terms)  
MESA (Typically Offered: Fall, Spring, and Summer Terms)

**PHYS 1119 College Physics II Laboratory.** (Formerly 119) Selected experiments to illustrate the concepts studied in PHYS 1118. Prerequisite: "C" or better in PHYS 1114 and credit or co-registration in PHYS 1118. 1 semester credit hour/s.

**Designation:** Physical-Scientific (QPS)

**Campus:** LISLE (Typically Offered: Fall, Spring, and Summer Terms)  
MESA (Typically Offered: Fall, Spring, and Summer Terms)

**PHYS 1141 PHY141 - Physics I.** (Formerly 141) Consortium course offered at North Central College. 3 semester credit hour/s. Department Consent Required.

**Campus:** LISLE

**PHYS 1142 PHY141 - Physics I Lab.** (Formerly 142) Consortium course offered at North Central College. 1 semester credit hour/s. Department Consent Required.

**Campus:** LISLE

**PHYS 2205 University Physics I Laboratory.** (Formerly 205) Laboratory course which introduces topics and concepts presented in PHYS 2211 through the use of experimental methods and techniques. Topics to be covered include vectors, statics, dynamics, work, energy, collisions, and rotational motion. Prerequisite: Credit or co-registration in PHYS 2211. 1 semester credit hour/s.

**Designation:** Physical-Scientific (QPS)

**Campus:** LISLE (Typically Offered: Spring Term)  
MESA (Typically Offered: Spring Term)

**PHYS 2206 University Physics II Laboratory.** (Formerly 206) Laboratory course which introduces topics and concepts of introductory physics through the use of experimental methods and techniques. Topics to be covered include electromagnetism, introductory circuits, and geometrical and physical optics. Prerequisite: Co-registration or credit in PHYS 2212. 1 semester credit hour/s.

**Designation:** Physical-Scientific (QPS)

**Campus:** LISLE (Typically Offered: Fall Term)  
MESA (Typically Offered: Fall Term)

**PHYS 2207 University Physics III Laboratory.** (Formerly 207) Laboratory course which introduces topics and concepts presented in physics 2213 through the use of experimental methods and techniques.

Topics to be covered include: propagation of light, geometric optics, interference, diffraction, periodic motion, mechanical waves, sound, and thermodynamics. Prerequisite: "C" or better in PHYS 2205 or 2206 and credit or co-registration in PHYS 2213. 1 semester credit hour/s.

**Designation:** -

**Campus:** LISLE (Typically Offered: Spring Term)

**PHYS 2211 University Physics I.** (Formerly 211) A calculus based introduction to mechanics. Topics include: vectors, Newton's laws, kinematics, dynamics, work, energy conservation, vibrations, momentum, rotations, equilibrium and elasticity, and fluid mechanics. Prerequisite: "C" or better in MATH 2210 (Calculus I); or "C" or better in MATH 1170 and Co-registration in MATH 2200. 3 semester credit hour/s.

**Designation:** Physical-Scientific (QPS)

**Campus:** LISLE (Typically Offered: Spring Term)  
MESA (Typically Offered: Spring Term)

**PHYS 2212 University Physics II.** (Formerly 212) A calculus based introduction to electricity, magnetism, and electric circuits. Topics include: electrostatics, Gauss's law, electric potential, capacitance, AC and DC electric circuits, magnetism, electromagnetic induction, electromagnetic waves. Prerequisite: "C" or better in PHYS 2211 and credit or Co-Registration in MATH 2211 3 semester credit hour/s.

**Designation:** Physical-Scientific (QPS)

**Campus:** LISLE (Typically Offered: Fall Term)  
MESA (Typically Offered: Fall Term)

**PHYS 2213 University Physics III.** (Formerly 213) A calculus based introduction to waves, optics and thermodynamics. Topics include: The nature and propagation of light, geometric optics, interference, diffraction, periodic motion, mechanical waves, sound and hearing, laws of thermodynamics, special relativity, and quantization. Prerequisite: "C" or better in PHYS 2211 and credit in Math 2211. 3 semester credit hour/s.

**Designation:** -

**Campus:** LISLE (Typically Offered: Spring Term)

**PHYS 2296 Physics Teaching.** (Formerly 296) Teaching assistant. 1-2 semester credit hour/s. Course Repeatable. Maximum number of units allowed: 2. Department Consent Required.

**Campus:** LISLE (Typically Offered: Fall, Spring, and Summer Terms)

**PHYS 3208 Modern Physics Laboratory.** (Formerly 208) Experimental physics course designed to cover laboratory methods and techniques that apply to topics from Modern Physics. Topics to be covered include electron charge to mass ratio, crystal scattering, spectroscopy, blackbody radiation, scanning probe microscopy, photon, tunneling, lasers, semiconductor devices, holography, radioactive decay, and the photoelectric effect. Prerequisite: Credit or co-registration in PHYS 3214. 1 semester credit hour/s.

**Designation:** Writing Intensive

**Campus:** LISLE (Typically Offered: Fall Term, Even Years)

**PHYS 3214 Modern Physics.** (Formerly 214) A calculus based introduction to concepts of 21st century and modern physics. Topics include: special relativity, quantum mechanics, solid state physics, atomic physics, nuclear physics, particle physics, and cosmology. Prerequisite: "C" or better in PHYS 2212. Writing-intensive (WI). 3 semester credit hour/s.

**Designation:** Writing Intensive

**Campus:** LISLE (Typically Offered: Fall Term)

**PHYS 3234 Materials Science.** An interdisciplinary course concentrated on studying the mechanical, electrical, chemical, and thermal properties of material systems such as composites, polymers, semiconductors, biomaterials and nanomaterials. The emphasis will be on understanding the science behind contemporary technological applications and the role materials play in technology, biomedical engineering, renewable energy engineering, and environmental sustainability. Prerequisite: "C" or better in PHYS 1118 or PHYS 2213; and a "C" or better in CHEM 1123. 3 semester credit hour/s.

**Campus:** LISLE

**PHYS 3291 Selected Topics.** (Formerly 291) Current topics in physics or biophysics. Prerequisite: Dependent upon topic. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Periodically)

**PHYS 3323 Biophysics.** (Formerly 323) An introduction to the use of physics methods, mathematics, and modeling in biological systems. Prerequisites: "C" or better in BIOL 1198, CHEM 1123 or CHEM 1127, PHYS 1118 or 2213, and MATH 2211. 3 semester credit hour/s.

**Designation:** -

**Campus:** LISLE (Typically Offered: Periodically)

**PHYS 3350 Introduction to Astrophysics.** An introduction to astrophysics. Includes basic celestial mechanics, optics and instrumentation, stellar atmospheres, stellar interiors, degenerate stellar remnants, basic relativity, the properties and distribution of the solar system, the nature and formation of galaxies and introductory cosmology. Prerequisites "C" or better in PHYS 2211 or PHYS 1113 and "C" or better in MATH 2211. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Periodically)

**PHYS 4313 Classical Thermodynamics.** (Formerly 313) Properties of gases, relating heat and work, concepts of enthalpy and entropy, laws of thermodynamics, heat engines, thermodynamics of mixing processes, and phase changes. Prerequisite: "C" or better in CHEM 1123 or CHEM 1127, PHYS 2213, and MATH 2212. Cross listed as CHEM 4313/PHYS 4313. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Fall Term)

**PHYS 4314 Physical Chemistry I Laboratory.** (Formerly 314) Applies principles discussed in CHEM 4313/PHYS 4313. Prerequisite: Co-registration or credit in CHEM 4313/PHYS 4313. Cross listed as CHEM 4314/PHYS 4314. 1 semester credit hour/s.

**Designation:** Writing Intensive

**Campus:** LISLE (Typically Offered: Fall Term)

**PHYS 4315 Quantum and Statistical Mechanics.** (Formerly 315) Failures of classical physics, development of quantum theory, atomic structure and spectra, statistical mechanics, and statistical thermodynamics. Prerequisites: "C" or better in CHEM 4313/PHYS 4313 Cross listed as CHEM 4315/PHYS 4315. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Spring Term)

**PHYS 4316 Physical Chemistry II Laboratory.** (Formerly 316) Applies principles discussed in CHEM 4315/PHYS 4315. Prerequisite: Credit or co-registration in CHEM 4315/PHYS 4315. Cross-listed as CHEM 4316/PHYS 4316. 1 semester credit hour/s.

**Designation:** Writing Intensive

**Campus:** LISLE (Typically Offered: Spring Term)

**PHYS 4340 Electricity and Magnetism I.** (Formerly 340) Theoretical study of classical electrostatics and electrodynamics. Topics include vector calculus of the electromagnetic field, electric field and potential, conductors, Laplace equations, boundary value problems, multipoles, polarization, dielectrics, magnetostatics, divergence and curl of the magnetic field, magnetization, Ampere's law, electrodynamics, electromagnetic induction, and Maxwell's equations, and an introduction to superconductivity formalism. Prerequisites: "C" or better in PHYS 2212 and MATH 2260. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Periodically)

**PHYS 4357 Molecular Dynamics and Kinetics.** (Formerly 357) Electronic properties of molecules, molecular interactions, molecular motion, chemical kinetics, molecular reaction dynamics. Prerequisite: Credit or Co-registration in CHEM 4357/PHYS 4315. Cross listed as CHEM 4357/PHYS 4357. 3 semester credit hour/s.

**Campus:** LISLE (Typically Offered: Periodically)

**PHYS 4390 Selected Topics in Physics.** (Formerly 390) Lecture course covering topics with which the student has not become acquainted in formal course work. May be an extension of or supplement to material previously encountered or material from a completely new area. Prerequisite: PHYS 2213 and MATH 2260. 3 semester credit hour/s. Course Repeatable. Maximum number of units allowed: 12.

**Campus:** LISLE (Typically Offered: Periodically)

**PHYS 4393 Internship.** (Formerly 393) Practical experience in physics or related career areas under the supervision of the physics program. Prerequisite: consent of faculty coordinator. 12 semester credit hour/s. Course Repeatable. Maximum number of units allowed: 12.

**Designation:** Engaged Learning

**Campus:** LISLE (Typically Offered: Periodically)

**PHYS 4395 Independent Study.** (Formerly 395) Designed to encourage desire in superior students to continue the study of physics beyond the scope of undergraduate course offerings through guided independent study. 2 semester credit hour/s. Course Repeatable. Maximum number of units allowed: 12.

**Campus:** LISLE (Typically Offered: Periodically)

**PHYS 4398 Research.** (Formerly 398) Original research in physics conducted under the supervision of a faculty or adjunct faculty member. Publication and public presentation of the research are course objectives. Prerequisite: departmental consent. 3 semester credit hour/s. Course Repeatable. Maximum number of units allowed: 18. Department Consent Required.

**Designation:** Engaged Learning

**Campus:** LISLE (Typically Offered: Fall, Spring, and Summer Terms)