

PHYSICS (PHY)

PHY 101. Conceptual Physics. (3 Credits)

I, II. Prerequisite: MAT 105 or higher or departmental approval. Conceptual approach to topics such as kinematics, Newtonian mechanics, electricity, magnetism, and optics. Not intended for science majors. Credit will not be awarded to students who have credit for PHY 102. 4 Lec/Lab. Gen. Ed. E-4.

View Course Learning Outcomes

1. {}

PHY 102. Inquiry Physics for MS Teachers. (3 Credits)

I, II. Prerequisite: MAT 105 or higher and pre-teaching or teaching middle school education, special education middle grades, or DHH middle grade education majors or departmental approval. An inquiry-based, conceptual approach physical science course for middle school teaching majors. Topics include kinematics, matter and heat, optics, electricity, and magnetism. Credit will not be awarded for both PHY 101 and 102. 4 Lec/Lab.

View Course Learning Outcomes

1. {}

PHY 104. Inquiry Physical Science for Elementary Teachers. (3 Credits)

I, II. Cross-Listed with CHE 104. Prerequisite: Elementary, special education elementary, and DHH elementary education majors only, sophomore standing, and MAT 112 or higher. An activity-oriented conceptual course in the physical sciences. Topics include the structure and properties of matter, heat and temperature, forces, motion, magnets, energy, and sound waves. Credit will not be awarded for students who have credit for CHE 104. 2 Lec/2 Lab.

View Course Learning Outcomes

1. {}

PHY 131. College Physics I. (5 Credits)

I, II. Prerequisite: MAT 112 or higher or departmental approval. MAT 120 or higher is recommended. Algebra and trigonometry based approach to Newtonian mechanics, including Kinematics, Newton's laws, momentum, energy, and rotation. Credit will not be awarded to students who have credit for PHY 201. 6 Lec/Lab. Gen. Ed. IVB or VII (NS).

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1. {}

PHY 132. College Physics II. (5 Credits)

I, II. Prerequisite: PHY 131 with a grade of "C" or better or departmental approval. Algebra and trigonometry based approach to electromagnetic phenomena, including electric forces and fields, simple DC circuits, magnetic forces and fields, magnetic induction, and optics. Credit will not be awarded to students who have credit for PHY 202. 6 Lec/Lab.

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1. {}

PHY 200. Volunteering in Physics and Astronomy. (0 Credits)

A. An exposure to physics and astronomy activities, including, but not limited to, exploring physical and astronomical research projects, organizing physics and astronomy community service, and assisting at other physics and astronomy departmental events. Students can choose the focus of the volunteering in each semester. Passing grade achieved for attending 80% of the designated activities in each semester.

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1. {}

PHY 201. University Physics I. (5 Credits)

I. Prerequisite: MAT 211, 234 or 234H or departmental approval. Composition and resolution of forces, laws of equilibrium, Newton's laws of motion, work and energy, momentum, simple harmonic motion, hydrodynamics, heat phenomena. Credit will not be awarded to students who have credit for PHY 131 and PHY 201. 6 Lec/Lab. Gen. Ed. IVB or VII (NS).

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1. {}

PHY 202. University Physics II. (5 Credits)

II. Prerequisite: PHY 201 with a grade of "C" or better. Prerequisite or Corequisite: MAT 244 or 244H or departmental approval. Electrostatics, electric potential, dielectrics, A.C. and D.C. circuits, magnetic fields, Faraday's Law, sound, wave motion, geometrical and physical optics. Credit will not be awarded to students who have credit for PHY 132. 6 Lec/Lab.

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1. {}

PHY 211. Intermediate Physics. (4 Credits)

A. Prerequisites: PHY 201 with a grade of "C" or better or PHY 131 with a minimum grade of "B" or better; MAT 234 or 234H; or departmental approval. Applications of calculus to physical principles. Topics include fluid mechanics, thermodynamics, and wave optics.

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1. {}

PHY 221. Statics. (3 Credits)

A. Prerequisite: PHY 201. Prerequisite/Corequisite: MAT 244 or 244H or departmental approval. Study of force systems on bodies at rest, descriptions of force systems, distributed and internal forces, frames and trusses, beams.

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1. {}

PHY 302. Modern Physics. (4 Credits)

(4) A. Prerequisites: PHY 132 or PHY 202; MAT 211 or MAT 234 or MAT 234H or departmental approval. Physics of the 20th century. Topics include special relativity, quantum effects, wave theory, Bohr theory, nuclear structure, nuclear reactions, and other topics related to 20th century modern physics. Credit will not be awarded to students who have credit for PHY 302W.

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1. {}

PHY 303. Introduction to Laser Physics. (3 Credits)

A. Prerequisite: PHY 132 or PHY 202 and instructor approval. An introduction to the theory and application of different types of lasers such as dye, nitrogen, He/Ne, diode, and mercury vapor; the characteristics of laser light, and optical measuring devices. 2 Lec/2 lab.

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1. {}

PHY 306. Classical Physics Laboratory. (2 Credits)

I. Prerequisite: PHY 132 or 202. Experiments in mechanics, optics, and electricity. Simulation of physical situations using a spreadsheet. Techniques of interfacing scientific equipment to microcomputers. 4 Lab.

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1. {}

PHY 307. Electronics. (4 Credits)

A. Prerequisite: PHY 132 or 202. Theory of solid state devices, power supplies, transducers, operational amplifiers, solid state switches, flip-flops, counters, digital devices, logic families. 3 Lec/3 Lab.

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1. {}

PHY 310. Theoretical Methods in Physics. (3 Credits)

(3) A. Prerequisites: MAT 254 with a grade of "C" or better; CSC 174, or departmental approval. Analytical methods for characterizing physics models and solving physics problems in advanced topics are discussed, including vector analysis, linear algebra, complex analysis, infinite series, waves and Fourier series, differential equations and other techniques.

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1. {}

PHY 315. Electrical Circuits. (4 Credits)

A. Prerequisite: PHY 202. Prerequisite or Corequisite: MAT 244 or 244H. Fundamental laws and principles for linear circuits whose elements consist of passive and active components used in present day practice. Determination of the sinusoidal steady state responses using the algebra of complex numbers.

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1. {}

PHY 349. Applied Learning in Physics. (0.5-8 Credits)

A. Work in placements related to academic studies. A minimum of 80 hours employment is required for each semester hour of academic credit. Total hours: eight, associate; sixteen, baccalaureate. Hours earned in PHY 349 will not apply toward a physics major or minor.

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1. {}

PHY 349A. Cooperative Study: Physics. (0.5-8 Credits)

A. Work in placements related to academic studies. A minimum of 80 hours employment is required for each semester hour of academic credit. Total hours: eight, associate; sixteen, baccalaureate. Hours earned in PHY 349 will not apply toward a physics major or minor.

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1. {}

PHY 349B. Cooperative Study: Physics. (0.5-8 Credits)

Work in placements related to academic studies. Hours earned in PHY 349 will not apply toward a physics major or minor.

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1. {}

PHY 349C. Cooperative Study: Physics. (0.5-8 Credits)

Work in placements related to academic studies. Hours earned in PHY 349 will not apply toward a physics major or minor.

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1. {}

PHY 349D. Cooperative Study: Physics. (0.5-8 Credits)

Work in placements related to academic studies. Hours earned in PHY 349 will not apply toward a physics major or minor.

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1. {}

PHY 360. Engineering Dynamics. (3 Credits)

A. Prerequisite: PHY 221 and MAT 244. Newtonian dynamics of particles and rigid bodies. Engineering applications of equations of motion, work and energy, conservative forces, acceleration, relative motion, and plane motion, including solving systems in multiple coordinate systems.

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1. {}

PHY 375. Engineering Thermodynamics. (3 Credits)

A. Prerequisite: PHY 202. Prerequisite or Corequisite: MAT 244 or 244H. Study of temperature, thermodynamic systems, ideal gases, first and second law of thermodynamics, Carnot cycle, Kelvin temperature scale, entropy, including thermodynamic analysis of engineering devices.

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1. {}

PHY 380. Fluid Mechanics. (3 Credits)

A. Prerequisite: PHY 360, PHY 375, and MAT 353. Properties of fluids, fluid statics, inviscid fluid dynamics, fluid kinematics, thermodynamic principles, mass momentum and energy principles, and viscous effects. Flow through pipes and around bodies.

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1. {}

PHY 402. Modern Optics. (3 Credits)

A. Prerequisite: PHY 211 or departmental approval. Prerequisite or Corequisite: MAT 244. Wave motion, interference, diffraction, electromagnetic radiation, dispersion, polarization, and lasers.

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1. {}

PHY 406. Advanced Physics Laboratory. (4 Credits)

Prerequisite: PHY 302, or departmental approval. Experiments in mechanics, optics, electricity, and nuclear physics. Computer simulations of physical situations. Measurement and data analysis techniques, including error analysis. May be repeated up to a maximum of eight hours provided content different each time. 1 Lec/6 Lab.

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1. {}

PHY 410. Independent Study in Physics:____. (1-6 Credits)

(1-6) A. Prerequisite: PHY202 or departmental approval. May be retaken to a maximum of six hours provided subject matter is different each time. Student must have the independent study form approved by faculty supervisor and department chair prior to enrollment.

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1. {}

PHY 411. Special Topics in Physics:.. (1-6 Credits)

(1-6) A. Prerequisite: PHY 202 or departmental approval. Special topics in physics of current interest to faculty and students will be presented through lecture, discussion, and reports. May be retaken to a maximum of six hours provided subject matter is different each time.

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1. {}

PHY 412. Directed Research in Physics:.. (1-6 Credits)

A. Prerequisite: PHY 302 and departmental approval. A directed research experience for physics majors that may include laboratory experiments, development of new equipment, physics education research, or computational solutions of special problems related to physics. May be retaken to a maximum of six hours. Student must have the independent study form approved by faculty supervisor and department chair prior to enrollment.

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1. {}

PHY 421. Electricity and Magnetism I. (3 Credits)

(3) I. Prerequisites: PHY 310 with a grade of "C" or better or departmental approval. Electrostatics in vacuum and dielectrics, solutions of Laplace's and Poisson's equations, magnetic fields, induced EMF's, magnetic materials, and Maxwell's equations.

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1. {}

PHY 422. Electricity and Magnetism II. (3 Credits)

(3) II. Prerequisites: PHY 421 or departmental approval. Maxwell's equations, electromagnetic waves in insulators and conductors, energy and momentum, electromagnetic radiation, dipole radiation, special relativity, special applications.

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1. {}

PHY 456. Statistical and Thermal Physics. (3 Credits)

A. Prerequisites: PHY 302; PHY 310 with a grade of "C" or better; or departmental approval. Microscopic approach to thermal processes. Topics include probability, entropy, the canonical ensemble, blackbody radiation, and quantum statistics including Bose-Einstein and Fermi-Dirac statistics.

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1. {}

PHY 460. Classical Mechanics. (4 Credits)

(4) A. Prerequisite: PHY 310 with a grade of "C" or better or departmental approval. Prerequisite/Corequisite: MAT 353. Applications of calculus to the principles of classical mechanics. Topics include rectilinear motion in 1-D, motion in 3-D, non-inertial frames, central forces, many-bodied systems, rigid bodies, Lagrangian mechanics, and other topics related to classical mechanics.

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1. {}

PHY 470. Quantum Mechanics. (3 Credits)

A. Prerequisites: PHY 310 and PHY 460, or departmental approval. Basic principles of wave mechanics, solutions of Schrodinger wave equation for simple systems, interpretation of solutions and application to atomic and molecular problems.

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1. {}

PHY 506. Physics for High School Teachers. (3 Credits)

A. Credit given toward major or minor only in teaching programs. Topics from general and modern physics to prepare teachers to teach high school physics and give classroom demonstrations. 2 Lec/3 Lab.

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1. {}

PHY 706. Physics for High Sch Teachers. (3 Credits)

A. Prerequisites: one year of college physics and instructor approval. Credit given toward major or minor only in teaching programs. Topics from general and modern physics to prepare teachers to teach high school physics and give classroom demonstrations. 3 Lec/3 Lab.

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1. {}

PHY 806. Sel Top in PHY for Sec Tchrs. (3 Credits)

A. Prerequisite: secondary certification in physics. Study of topics in physics selected from the following fields: mechanics, thermodynamics, sound, electricity, magnetism, optics, and modern physics. Selection will depend upon the need of the student. 2 Lec/3 Lab.

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1. {}

PHY 808. Top in Phys Sci for Sec Tchrs. (1-6 Credits)

A. Restricted to physical science teachers not certified in physics. Study of problems in science relevant to secondary physical science. May be retaken to a maximum of six hours.

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1. {}

PHY 809. Wrkshp in Physics for Teachers. (1-3 Credits)

A. This course is designed for summer workshops for science teachers needing further work on content or techniques in teaching physics. Different workshops may be repeated for up to six hours credit.

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1. {}

PHY 880. Special Topics in Physics. (1-3 Credits)

A. Specially assigned theoretical or experimental work on topics not covered in other courses.

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PHY 881. Selected Topics. (1-3 Credits)

A. Prerequisite: instructor approval. Selected topics not normally presented that may be of interest to groups of certain students will be presented. May be retaken to a maximum of three hours.

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