

PHYSICS (PHYS)

PHYS 1010 - Conceptual Physics

3 Credits

Basic concepts of physics emphasizing the meaning of modern developments of the science. High school mathematics required. Fulfills three credit hours of the general science requirement. For non-science majors; does not apply toward the area of concentration with a major in physics.

Attributes: Natural Science Req (A&S)

PHYS 1050 - Intro to Physics of Human Body

3 Credits

Discusses the physics of certain aspects of the working of the human body. Fulfills three credit hours of the general science requirement. Primarily for Occupational Therapy majors and, if there is room, for any other student to satisfy the science requirement.

Attributes: Natural Science Req (A&S)

PHYS 1090 - Interactive Learning Seminar

1 Credit

The course offers interactive problem solving for PHYS-1610. Emphasizes organized approaches and use of mathematical techniques, including calculus, to solve a wide range of problems in mechanics. Topics include static equilibrium, applications of Newton's laws and conservation principles, rotational dynamics, and fluids.

Corequisite(s): PHYS 1610, PHYS 1620

PHYS 1110 - Introduction to Physics

1 Credit

Broad survey of physics. Introduction to computational and laboratory methods. Enrollment limited to students majoring in physics.

Attributes: Natural Science Req (A&S)

PHYS 1130 - Introduction to Astronomy

1 or 3 Credits

Modern concepts of the physical nature of the astronomical universe. Fulfills three credit hours of the general science requirement. For non-science majors; does not apply toward the area of concentration with a major in physics.

Prerequisite(s): (1 Course from MATH 1200-4999, Math Waiver per Advisor with a minimum score of 1200, or SLU Math Placement with a minimum score of 1400)

Attributes: Natural Science Req (A&S)

PHYS 1220 - General Physics I

3 Credits

Lectures, demonstrations, and laboratory in mechanics and heat. (Offered every Fall)

Corequisite(s): PHYS 1235

Restrictions:

Enrollment limited to students in the Doisy College Health Sciences college.

Attributes: Natural Science Req (A&S)

PHYS 1235 - General Physics I Lab

1 Credit

Should be taken concurrently with PHYS 1220. Laboratory topics on mechanics principles of motion, force, energy and waves.

Corequisite(s): PHYS 1220

PHYS 1240 - General Physics II

3 Credits

Lectures, demonstrations and laboratory in electricity, magnetism, wave motion, sound, optics and modern physics. (Offered every Spring)

Prerequisite(s): (PHYS 1220, PHYS 1310, PHYS 1330, or PHYS 1240)

Corequisite(s): PHYS 1255

Restrictions:

Enrollment limited to students in the Doisy College Health Sciences college.

Attributes: Natural Science Req (A&S)

PHYS 1255 - General Physics II Lab

1 Credit

Should be taken concurrently with PHYS 1240. Laboratory on electricity and magnetism principles of fields, circuits and light.

Corequisite(s): PHYS 1240

PHYS 1310 - College Physics I

3 Credits

Lectures and demonstrations in mechanics and heat.

Prerequisite(s): (MATH 1200, 1 Course from MATH 1410-4999,

MATH 1400, or SLU Math Placement with a minimum score of 1400)

Corequisite(s): PHYS 1320

Attributes: Natural Science Req (A&S)

PHYS 1320 - College Physics I Laboratory

1 Credit

Should be taken concurrently with PHYS 1310. Laboratory in mechanics and heat. (Offered every Fall)

Corequisite(s): PHYS 1310

Attributes: Natural Science Req (A&S)

PHYS 1330 - College Physics II

3 Credits

Lectures and demonstrations in electricity, magnetism, wave motion, sound, optics and modern physics. (Offered every Spring)

Prerequisite(s): PHYS 1310

Corequisite(s): PHYS 1340

Attributes: Natural Science Req (A&S)

PHYS 1340 - College Physics II Laboratory

1 Credit

Laboratory in electricity, magnetism, wave motion, sound, optics and modern physics. (Offered every Spring)

Corequisite(s): PHYS 1330

Attributes: Natural Science Req (A&S)

PHYS 1350 - Aviation Physics

3 Credits

Units and measurement; vectors; force and motion; energy; momentum; gravitation; forces of drag and lift; rotational motion; equilibrium of forces during flight; harmonic motion; selected topics in fluid mechanics and thermodynamics; electricity; electrical energy; magnetism; electromagnetic induction; linear and wave optics; atmospheric optics; laboratory experiments relating to the topics above.

Prerequisite(s): MATH 1320

Corequisite(s): PHYS 1365

Attributes: Natural Science Req (A&S), UUC:Natural & Applied Science

PHYS 1365 - Aviation Physics Lab

1 Credit

Should be taken concurrently with PHYS 1350. Laboratory topics on mechanics principles of motion, force, energy and waves.

Corequisite(s): PHYS 1350

PHYS 1610 - University Physics I

3 Credits

Calculus and vector approaches to study of kinematics, statics and dynamics; work and energy; impulse and momentum; circular motion and gravity; rotational motion and equilibrium; vibrations, waves and sound; heat; fluid mechanics; elasticity.

Prerequisite(s): (MATH 1510 with a grade of C- or higher, MATH 1520 with a grade of C- or higher, MATH 1400 with a grade of B or higher, or SLU Math Placement with a minimum score of 1510)

Corequisite(s): PHYS 1620

PHYS 1620 - University Physics I Laboratory

1 Credit

Laboratory experiments to illustrate and supplement material in PHYS 1610. (Offered every Fall and Spring)

Corequisite(s): PHYS 1610

Attributes: Natural Science Req (A&S)

PHYS 1630 - University Physics II

3 Credits

Calculus and vector approaches to study of electric charges, forces, fields and potentials; electric current; magnetic forces and fields; electromagnetic waves; light and geometrical optics; mirrors and lenses. (Offered every Fall and Spring)

Prerequisite(s): PHYS 1610; PHYS 1620; PHYS 1640*

* Concurrent enrollment allowed.

Corequisite(s): PHYS 1640

Attributes: Natural Science Req (A&S)

PHYS 1640 - University Physics II Laboratory

1 Credit

Laboratory experiments to illustrate and supplement material in PHYS 1630. (Offered every Fall and Spring)

Prerequisite(s): (PHYS 1610 and PHYS 1620)

Corequisite(s): PHYS 1630

Attributes: Natural Science Req (A&S)

PHYS 1930 - Special Topics

1 or 3 Credits (Repeatable for credit)

Attributes: Natural Science Req (A&S)

PHYS 1980 - Independent Study

1-3 Credits (Repeatable for credit)

Attributes: Natural Science Req (A&S)

PHYS 2610 - Modern Physics

3 Credits

Lectures three hours per week. At the level of Beiser's Concepts of Modern Physics. (Offered every Spring)

Prerequisite(s): PHYS 1630

Attributes: Natural Science Req (A&S)

PHYS 2620 - Modern Physics Lab

1 Credit

(Offered every Fall)

Prerequisite(s): PHYS 2610*; (Math Waiver per Advisor with a minimum score of 1520 or 1 Course from MATH 1520-4999)

* Concurrent enrollment allowed.

Attributes: Natural Science Req (A&S)

PHYS 2910 - Co-Op with Industry

1-6 Credits (Repeatable for credit)

A full-time supervised work experience with an agency, firm or organization that employs persons in this degree field. This course is used for the first experiential learning session. Grading system is determined by department offering course. Offered every semester.

Prerequisite(s): (CORE 1000 or UUC Ignite Seminar Waiver with a minimum score of S); CORE 1500*

* Concurrent enrollment allowed.

Attributes: Natural Science Req (A&S), UUC:Reflection-in-Action

PHYS 2930 - Special Topics

1-4 Credits (Repeatable for credit)

PHYS 2980 - Independent Study

1-3 Credits (Repeatable for credit)

Attributes: Natural Science Req (A&S)

PHYS 3110 - Classical Mechanics

3 Credits

The elementary theory of the statics, kinematics and dynamics of particles and rigid bodies. At the level of Symon's Mechanics.

Prerequisite(s): MATH 2530

Attributes: Natural Science Req (A&S)

PHYS 3310 - Optics

3 Credits

Lectures and demonstrations three hours per week. Physical and geometrical optics.

Attributes: Natural Science Req (A&S)

PHYS 3320 - Optics Laboratory

1 Credit

The fundamental experiments of modern optics are repeated in this course. Three hours per week.

Corequisite(s): PHYS 3310

Attributes: Natural Science Req (A&S)

PHYS 3410 - Thermodynamics and Statistical Mechanics

3 Credits

At the level of Schroeder's Thermal Physics.

Prerequisite(s): MATH 3550* and PHYS 1630

* Concurrent enrollment allowed.

Attributes: Natural Science Req (A&S)

PHYS 3510 - Analog & Digital Electronics

0 or 3 Credits

Lecture-laboratory six hours per week. Fundamentals of digital circuits with applications to computers. Operational amplifiers. Interfacing of computers with experimental equipment for data collection and control.

Prerequisite(s): PHYS 3511*

* Concurrent enrollment allowed.

Corequisite(s): PHYS 3511

Attributes: Natural Science Req (A&S)

PHYS 3511 - Analog & Digital Electronics Lab

1 Credit

This is laboratory component of the Analog & Digital Electronics course. It is designed to give practical experience with building, debugging, and testing analog and digital circuits, including micro-controller-operated circuits, power regulation, operational amplifiers, etc.

Prerequisite(s): PHYS 3510*

* Concurrent enrollment allowed.

Attributes: Natural Science Req (A&S)**PHYS 3610 - Atomic, Molecular and Solid-State Physics**

3 Credits

This course will provide an upper level introduction to topics in Modern Physics including Atomic Physics, Statistical Physics, Molecular Physics, Solid State Physics, Nuclear Physics, Elementary particle Physics, Astrophysics, and Cosmology.

Attributes: Natural Science Req (A&S)**PHYS 3860 - Physics Research I**

0 Credits (Repeatable for credit)

First of three course sequence required for B.S. degree in Physics.

Attributes: Natural Science Req (A&S)**PHYS 3910 - Co-Op with Industry**

1-6 Credits (Repeatable for credit)

A full-time supervised work experience with an agency, firm or organization that employs persons in this degree field. This course is used for the second experiential learning session. (Offered every Fall, Spring and Summer)

Prerequisite(s): PHYS 2910; (CORE 1000 or UUC Ignite Seminar Waiver with a minimum score of S); CORE 1500*

* Concurrent enrollment allowed.

Attributes: Natural Science Req (A&S), UUC:Reflection-in-Action**PHYS 3915 - Internship with Industry**

1-6 Credits (Repeatable for credit)

A work experience with an agency, firm or organization that employs persons in this degree field. This experience may be full time or part-time as required by the industry sponsor. This course is used for the first experiential learning session. (Offered every semester)

Prerequisite(s): (CORE 1000 or UUC Ignite Seminar Waiver with a minimum score of S); CORE 1500*

* Concurrent enrollment allowed.

Restrictions:

Enrollment limited to students with a classification of Junior or Senior.

Attributes: Natural Science Req (A&S), UUC:Reflection-in-Action**PHYS 3930 - Special Topics**

3 Credits (Repeatable for credit)

PHYS 3939 - Collaborative Inquiry

1-3 Credits (Repeatable for credit)

Collaborative Inquiry Special Topics.

Prerequisite(s): (CORE 1000 or UUC Ignite Seminar Waiver with a minimum score of S); CORE 1500*; Minimum Earned Credits of 60

* Concurrent enrollment allowed.

Attributes: UUC:Collaborative Inquiry**PHYS 3980 - Independent Study**

1-3 Credits (Repeatable for credit)

Attributes: Natural Science Req (A&S)**PHYS 4010 - Nanoscience Frontiers**

0 or 3 Credits

The Nanoscale Science and Nanotechnology applications have become increasingly important for industry and manufacturing. This interdisciplinary physics course is designed to introduce concepts and take a detailed look at how to study, understand and present interdisciplinary science that has significant experimental design components. This course will be devoted to several topics such as Nanoscale Physics, Nanomaterials Engineering, Nanofabrication and Nanolithography.

Prerequisite(s): CHEM 1110 with a grade of C or higher; Minimum Earned Credits of 60; MATH 2530 with a grade of C or higher; PHYS 1630 with a grade of C or higher; (CORE 1000 or UUC Ignite Seminar Waiver with a minimum score of S); CORE 1500*

* Concurrent enrollment allowed.

Attributes: Natural Science Req (A&S), UUC:Collaborative Inquiry**PHYS 4020 - Experimental Physics**

3 Credits

Experimental Physics teaches students basic techniques such as principles of ultra high vacuum, IV curve and resistance measurements, computer automation, microwave circuit design and measurements. We will also measure microwave resonators and quantum bits at 50 mK. All class work will consist of lab work in a studio classroom.

Attributes: Natural Science Req (A&S)**PHYS 4110 - Intro to Biophysics**

3 Credits

This course covers the basic concepts in biophysics at the fluid, cellular, macromolecular, and molecular levels, including diffusion processes, self-assembly, cooperative transitions, ion pumping, basic ideas of molecular machines, and passage of action potentials in neurons.

Prerequisite(s): PHYS 3410**Attributes:** Natural Science Req (A&S)**PHYS 4210 - Electricity & Magnetism I**

3 Credits

Lecture three hours per week. At the level of Griffiths, Introduction to Electrodynamics. (Offered every Spring)

Prerequisite(s): MATH 3550**Attributes:** Natural Science Req (A&S)**PHYS 4610 - Quantum Mechanics**

3 Credits

At the level of Griffiths, Introduction to the Quantum Mechanics.

Prerequisite(s): PHYS 2610; PHYS 3110**Attributes:** Natural Science Req (A&S)**PHYS 4840 - Senior Inquiry: Thesis**

0 Credits

Attributes: Natural Science Req (A&S)**PHYS 4870 - Physics Research II**

0 Credits (Repeatable for credit)

Second of three course sequence required for B.S. degree in Physics.

Attributes: Natural Science Req (A&S)

PHYS 4880 - Senior Inquiry: Research Project

3 Credits (Repeatable for credit)

Third of three course sequence required for B.S. degree in Physics (3 Cr), or satisfies senior inquiry requirement for B.A. degree in Physics (0-3 Cr).

Attributes: Natural Science Req (A&S)**PHYS 4890 - Senior Inquiry: Comprehensive Examination**

0 Credits

Attributes: Natural Science Req (A&S)**PHYS 4910 - Co-Op with Industry**

1-6 Credits (Repeatable for credit)

A full-time supervised work experience with an agency, firm or organization that employs persons in this degree field. This course is used for the third experiential learning session. (Offered every Fall, Spring and Summer)

Prerequisite(s): PHYS 3910; (CORE 1000 or UUC Ignite Seminar Waiver with a minimum score of S); CORE 1500*

* Concurrent enrollment allowed.

Attributes: Natural Science Req (A&S), UUC:Reflection-in-Action**PHYS 4915 - Internship with Industry**

1-6 Credits (Repeatable for credit)

A work experience with an agency, firm or organization that employs persons in this degree field. This experience may be full time or part-time as required by the industry sponsor. (Offered every Fall, Spring and Summer)

Prerequisite(s): PHYS 3915; CORE 1500*; (CORE 1000 or UUC Ignite Seminar Waiver with a minimum score of S)

* Concurrent enrollment allowed.

Attributes: Natural Science Req (A&S), UUC:Reflection-in-Action**PHYS 4930 - Special Topics**

3 Credits (Repeatable for credit)

Attributes: Natural Science Req (A&S)**PHYS 4980 - Advanced Independent Study**

1-6 Credits (Repeatable for credit)

Prior permission of sponsoring professor and chairperson required.

Attributes: Natural Science Req (A&S)**PHYS 5010 - Nanoscience and Nanofabrication Frontiers**

0 or 3 Credits

Nanoscale Science and Nanotechnology applications have become increasingly important for industry and manufacturing. This course is designed to introduce concepts and take a detailed look at how to study, understand and present interdisciplinary science. The course will be devoted to several topics in Nanoscale physics, Nanochemistry, Nanomaterials, Nanofabrication and Nanolithography.

PHYS 5020 - Experimental Physics

3 Credits

Experimental Physics teaches students basic techniques such as principles of ultra high vacuum, IV curve and resistance measurements, computer automation using LabVIEW, computer drafting of micro scale circuitry using L-Edit, and microwave simulations using Sonnet. All class work will consist of lab work in a studio classroom. Offered periodically in even years.

PHYS 5030 - Mathematical Methods in Physics

3 Credits

This course introduces a variety of powerful mathematical techniques of great utility to physics. Topics covered include differential and integral equations, complex analysis, Green's functions, and variational methods, including Lagrangian and Hamiltonian formalism of classical mechanics. Mathematical methods are illustrated with examples from electrodynamics, statistical, quantum, and classical mechanics.

PHYS 5310 - Introduction in Optics

3 Credits

This course will provide an upper level introduction to the concepts and techniques of modern optics, including: Review of ray optics and optical properties of lenses; Wave properties of light; Wave interference (including beats); Interference from two discrete sources of light; Interference from N discrete sources of light; Diffraction of light passing through apertures and past obstacles (plugs); Quantum nature of light (including photon counting); Laser physics. (Offered every Spring)

PHYS 5610 - Modern Physics for Educators

3 Credits

This course will provide an upper level introduction to topics in Modern Physics including Atomic Physics, Statistical Physics, Molecular Physics, Solid State Physics, Nuclear Physics, Elementary particle Physics, Astrophysics, and Cosmology.

PHYS 5930 - Special Topics

3 Credits (Repeatable for credit)

PHYS 5955 - Capstone Project 1

3 Credits

A capstone project for the BS degree combined with the beginning of research toward the MS degree; process of design; proposal development; project planning and scheduling; prototyping; quality; testing; research ethics; design review; teamwork; oral and written reports. Restricted to students in the Accelerated BS-MS Program in Engineering/Engineering Physics.

PHYS 5960 - Masters Project

1-3 Credits (Repeatable for credit)

Masters Project is for students in the MS Non-Thesis degree program who will conduct a small project under the supervision of their Faculty Advisor. No more than 3 hours will be devoted to the Project.

PHYS 5965 - Capstone Project 2

3 Credits

Continuation of PHYS 5955. Restricted to students in the Accelerated BS-MS Program in Physics.

PHYS 5980 - Graduate Independent Study in Physics

1 or 3 Credits (Repeatable for credit)

PHYS 5990 - Thesis Research

0-6 Credits (Repeatable for credit)