

PHYSICS (PHYS)

PHYS 404G Laboratory Optics 1 Hour

The conclusions and concepts of optics and techniques of experimental optics.

Corequisite(s): PHYS 441G

Recent Term(s) Offered: None

PHYS 409G Laboratory Exper Physics/Research Tech 1 Hour

Laboratory techniques in experimental research, includes drawing and fabrication of apparatus, technical photography, and statistical treatment of data. Note: 2 years of college physics required.

Recent Term(s) Offered: None

PHYS 410G Physics for Teachers 3 Hours

A broad study, including laboratory experiences, of the areas of physics relevant to science teaching in grades K-12. For pre-service for in-service teachers who have a minimal physics background. Instruction will be differentiated according to student needs. Applicable toward a major or minor in physics only for those students obtaining teacher certification.

Recent Term(s) Offered: None

PHYS 431G Radiation Biophysics 4 Hours

The properties of the various forms of radiation and their interactions with, and effects on, living matter. Laboratory offers training in monitoring ionizing radiations and techniques of radioactive isotopes.

Prerequisite(s): PHYS 201 and PHYS 202 or (PHYS 231 and PHYS 232)

Recent Term(s) Offered: None

PHYS 440G Electromagnetism I 3 Hours

Introduction to the study of classical electromagnetic fields, including electrostatics.

Recent Term(s) Offered: None

PHYS 441G Optics 3 Hours

Geometrical and physical optics including wave propagation, refraction, dispersion, diffraction, and polarization. Note: One year of college physics and one year of calculus required.

Corequisite(s): PHYS 404G

Recent Term(s) Offered: spring 2020

PHYS 445G Electromagnetism II 3 Hours

Study of classical electrodynamics with emphasis on Maxwell's equations, electromagnetic waves, dispersion and radiation.

Recent Term(s) Offered: None

PHYS 450G Classical Mechanics II 3 Hours

A continuation of PHYS 350. Includes motion in central potentials, dynamics of systems of particles, rigid body motion.

Recent Term(s) Offered: None

PHYS 465G Geophysics 3 Hours

The fundamentals of general and exploration geophysics. Topics include the origin of the earth and solar system, the earth's interior, geochronology, gravity and isostasy, seismology, the earth's heat, geomagnetism, upper atmosphere, continents and ocean basins, ridges and island arcs, and plate tectonics. The theory and applications of exploration geophysics are also covered, especially gravity, magnetic, and seismic methods.

Prerequisite(s): GEOL 111

Equivalent(s): GEOS 565

Recent Term(s) Offered: None

PHYS 475G Topics/Physics 1-3 Hours (repeatable max of 6 hrs)

Directed study under the supervision of a faculty member.

Recent Term(s) Offered: None

PHYS 480G Quantum Mechanics 3 Hours

Fundamental principles of quantum mechanics including the hydrogen and helium atoms, the harmonic oscillator, and the Schrodinger wave equation.

Prerequisite(s): PHYS 320 and PHYS 350 and PHYS 450

Recent Term(s) Offered: None

PHYS 501 Classical Dev in Physics 3 Hours

Physics for junior high and high school teachers covers the discovery of physical laws, the origin of forces, motion, energy, momentum, conservation, principles, wave phenomena, and electromagnetics.

Recent Term(s) Offered: None

PHYS 502 Modern Develop/Physics 3 Hours

Physics for junior high and high school teachers. Covers atomic structure, the nucleus, elementary particles, probability and uncertainty, and special relativity. Emphasizes the impact of twentieth century discoveries on the foundations of physical law.

Recent Term(s) Offered: None

PHYS 503 Physics Demonstration 3 Hours

Designed to acquaint the junior high and high school teacher with laboratory equipment and demonstrations for use in secondary education.

Recent Term(s) Offered: None

PHYS 505 Investigations/Physics 3 Hours

Topics of individual interest relating to the teaching of physics.

Recent Term(s) Offered: None

PHYS 506 Overview of Homeland Security 1 Hour

Special requirements: Instructor permission required if not enrolled into graduate program in Homeland Security Sciences. A weekly seminar course available as an in-class group discussion, a real-time webcast, or a downloadable PEG file from the departmental website. Seminar speakers from Department of Homeland Security, businesses, and other recognized national and international experts, will provide an overview of the Homeland Security area. To be taken during the first semester of matriculation.

Recent Term(s) Offered: fall 2019; fall 2020; fall 2021

PHYS 510 Methods in Math Physics 3 Hours

No course description is available

Recent Term(s) Offered: None

PHYS 511 Quantitative Modeling for Physics Instruction I: Mechanics 3 Hours

An in-depth study of topics in physics typically taught at the high school level. Emphasizes both the content of physics as well as the process of effectively communicating the content to secondary students. Topics include kinematics, Newton's laws of motion, energy, momentum and other topics in mechanics. Note: One year of math-based physics at the college level required.

Recent Term(s) Offered: None

PHYS 512 Quantitative Modeling for Physics Instruction II: Electromagnetism 3 Hours

An in-depth study of topics in physics typically taught at the high school level. Emphasizes both the content of physics as well as the process of effectively communicating the content to secondary students. Topics include electric and magnetic fields, and circuits. Note: One year of math-based physics at the college level required.

Recent Term(s) Offered: None

PHYS 516 Classroom Physics Teaching: Theory and Practice 3 Hours

Designed to assist new physics instructors in teaching physics. Includes constructing and using laboratory equipment, implementing research-based curriculum, and assessments in physics. Note: Must be instructor in a physical science course as verified by a letter from the school principal or equivalent.

Prerequisite(s): PHYS 511 or PHYS 512

Recent Term(s) Offered: None

PHYS 518 Classroom Applications of Physics and Science Education Research 3 Hours (repeatable max of 6 hrs)

Help instructors to make practical connections between discipline-based science education research in physics and other areas with their own classroom teach. Students will read original research, document examples in classroom, and evaluate and modify curricular materials. Note: Must be instructor in a physical science course as verified by a letter from the school principal or equivalent.

Prerequisite(s): PHYS 511 or PHYS 512

Recent Term(s) Offered: None

PHYS 519 Physical Science Education Research Methods 3 Hours

Equips physics and physical science instructors to design and carry out practical educational research projects with the goal of improving instruction. Covers research methodologies in physics and other discipline-based science education research (DBSER), designing and carrying out research projects with the goal of informing classroom instruction.

Prerequisite(s): PHYS 518

Recent Term(s) Offered: None

PHYS 520 Atomic and Molecular 3 Hours

No course description is available

Recent Term(s) Offered: None

PHYS 530 Statistical Physics 3 Hours

No course description is available

Recent Term(s) Offered: None

PHYS 540 Electromagnetic Theory 3 Hours

No course description is available

Recent Term(s) Offered: None

PHYS 550 Classical Mechanics 3 Hours

No course description is available

Recent Term(s) Offered: None

PHYS 560 Introduction to Physics Applications in Homeland Security 3 Hours

A preparatory course in Homeland Security Science for students with limited physics background. An overview of physics applicable to Homeland Security Sciences. Topics include atomic and nuclear physics, optics and analytical techniques.

Recent Term(s) Offered: fall 2019; fall 2020; fall 2021

PHYS 565 Optical Detection Methods of Biological and Chemical Agents 3 Hours

Explore the application of optical detection technologies to detect and characterize chemical and biological agents. Optical methods such as laser induced breakdown spectroscopy (LIBS), light detection and ranging (LIDAR), coherent anti-stokes Raman spectroscopy, photoacoustic, and photothermal imaging. Apply theoretical principles to real-world examples.

Prerequisite(s): PHYS 560 or permission of instructor

Recent Term(s) Offered: fall 2019; fall 2021

PHYS 570 Nuclear / Radiological Detection and Remediation 3 Hours

An advanced study of the fundamental principles of nuclear physics and their applications for detection and remediation of nuclear and radiological threats.

Prerequisite(s): PHYS 560

Corequisite(s): PHYS 571

Recent Term(s) Offered: spring 2019

PHYS 571 Nuclear / Radiological Detection and Remediation Laboratory 1 Hour

Students perform laboratory experiments in applications of nuclear physics for detection and remediation of nuclear and radiological threats. Students will gain experience in computerized data acquisition and data analysis using modern techniques and equipment.

Prerequisite(s): PHYS 560

Corequisite(s): PHYS 570

Recent Term(s) Offered: spring 2019

PHYS 580 Quantum Theory 3 Hours

No course description is available

Recent Term(s) Offered: None

PHYS 590 Physical Principles of CBE Detection and Remediation 3 Hours

The course explores physical principles behind chemical agent, biological agent and explosives detection and remediation, and examines current detection techniques and systems deployed.

Prerequisite(s): PHYS 570 or equivalent

Corequisite(s): PHYS 591

Recent Term(s) Offered: None

PHYS 591 Physics CBE Detection and Remediation Laboratory 1 Hour

Explores physical principles behind chemical agent, biological agent and explosives detection and remediation. Examines current detection techniques and systems deployed.

Prerequisite(s): PHYS 570 or equivalent

Corequisite(s): PHYS 590

Recent Term(s) Offered: None

PHYS 598 Graduate Seminar 0.5 Hours

No course description is available

Recent Term(s) Offered: spring 2019; fall 2019; spring 2020; fall 2020; spring 2021; fall 2021

PHYS 599 Thesis Research / Writing 1-6 Hours (repeatable max of 6 hrs)

Thesis research/writing.

Prerequisite(s): PHYS 570 or CHEM 572 or BIOL 552

Recent Term(s) Offered: spring 2019; summer 2019; fall 2019; spring 2020; fall 2020; spring 2021; summer 2021

PHYS 600 Maintain Matriculation 1-6 Hours (repeatable max of 6 hrs)
Continued enrollment for thesis completion.
Recent Term(s) Offered: summer 2021

PHYS 660 Theory of Solids 3 Hours
No course description is available
Recent Term(s) Offered: None

PHYS 670 Theoretical Nuclear Physics 3 Hours
No course description is available
Recent Term(s) Offered: None

PHYS 675 Advanced Topics in Physics 1-3 Hours
No course description is available
Recent Term(s) Offered: fall 2020

PHYS 799 Doctoral Research/Physics 1-10 Hours
Research undertaken to complete requirements for the doctoral program.
Note: Admission to candidacy in collaborative doctoral program required.
Recent Term(s) Offered: None