

438 Course Descriptions

PHOT 4940 PORTFOLIO I 3.0

Portfolio I. Prerequisite: Phot 4500 with grade of C or higher. Senior year studio experiences for B.F.A. degree candidates. Committee review.

PHOT 4950 PORTFOLIO II 3.0

Portfolio II. Prerequisite: Phot 4940 with grade of C or higher, or concurrently. Culminating studio experiences for B.F.A. degree candidates. Committee review.

PHOT 4980 SPECIAL PROBLEMS 3.0

Special Problems. Prerequisite: consent of instructor or of School director. Independent studies initiated by the student. May be repeated for a maximum of eight credit hours if topic varies.

PHYS = PHYSICS

PHYS 1111K INTRODUCTORY PHYSICS I 4.0

Introductory Physics I. Three lecture and two laboratory hours a week. Mechanics, heat, and wave motion. Phys 1111K and Phys 1112K meet the science requirement for the B.A., the B.B.A., and the B. S. in Education degrees, and the physics requirement for students in the biological and life sciences. Designed primarily as a terminal sequence. Most natural science majors should enroll in Phys 2211K and Phys 2212K.

PHYS 1112K INTRODUCTORY PHYSICS II 4.0

Introductory Physics II. Three lecture and two laboratory hours a week. Electricity, light, modern physics. Phys 1111K and Phys 1112K meet the science requirement for the B.A., the B.B.A., and the B.S. in Education degrees, and the physics requirement for students in the biological and life sciences. Most natural science majors should enroll in Phys 2211K and Phys 2212K.

PHYS 2030K PHSC: PHYSICS OF MUSIC & SPEECH 3.0

Physical Science: Physics of Music and Speech. Two lecture and two laboratory hours a week. No science background required. Not accepted as a part of the requirements for a major or an allied field in physics. Physical characteristics of musical sound; applications to musical tones, scales, harmony, and acoustics; problems of recording, amplifying, transmitting, and reproducing sound.

PHYS 2211K PRINCIPLES OF PHYSICS I 4.0

Principles of Physics I. Prerequisite: Math 2211 with grade of D or higher. Three lecture and three laboratory hours a week. Mechanics, Heat, and Waves. Phys 2211K Phys 2212K is the beginning sequence for students majoring in physics, chemistry, or geology. It is recommended for mathematics majors and other students with the necessary mathematical background. No credit if the Phys 1111K 1112K sequence is taken.

PHYS 2212K PRINCIPLES OF PHYSICS II 4.0

Principles of Physics II. Prerequisites: Math 2212 and Phys 2211K with grades of D or higher. Three lecture and three laboratory hours a week. Electricity and magnetism, light, modern physics. Phys 2211K 2212K is the beginning sequence for students majoring in physics, chemistry, or computer science. It is recommended for mathematics majors and other students with the necessary mathematical background. No credit if the Phys 1111K Phys 1112K sequence is taken.

PHYS 2940 DIRECTED LAB INVESTIGATIONS 1.0 to 2.0

Directed Laboratory Investigations. Prerequisite: consent of the department. Directed laboratory investigation in physics involving the development of experimental skills required for advanced study in physics or a related science. May be repeated for no more than two hours total credit.

PHYS 3150 ADVANCED GENERAL PHYSICS 3.0

Advanced General Physics. Prerequisites: a non calculus elementary physics sequence such as Phys 1111K and 1112K; Math 2212 with grades of D or higher, or equivalent. Three lecture hours a week. Not acceptable for credit for students who have had Phys 2211K/2212K. Designed to prepare the student who has completed a noncalculus level elementary physics sequence for more advanced physics courses. The utilization of calculus in solving problems in classical physics is stressed.

PHYS 3401 MODERN PHYSICS I 4.0

Modern Physics I. Prerequisites: Phys 2211K and 2212K with grade of D or higher. Four lecture hours a week. Special relativity, quantum optics, wave and particle duality, Bohr theory, Shroedinger's quantum mechanics, oneelectron atom, spin, and angular momentum.

PHYS 3402 MODERN PHYSICS II 3.0

Modern Physics II. Prerequisite: Phys 3401 with grade of D or higher. Three lecture hours a week. Atomic spectra, Xray spectra, nuclear structure, nuclear reactions, elementary particles, molecular spectra and structure, solidstate physics.

PHYS 3500 ELECTRONICS 3.0

Electronics. Prerequisite: Phys 2212K or Phys 1112K with grade of D or higher. Two lecture and four laboratory hours a week. Fundamentals of analog and digital circuit design; discrete and integrated circuit devices; electronic instrumentation.

PHYS 3800 OPTICS 3.0

Optics. Prerequisite: Phys 2212K with grade of D or higher. Three lecture hours a week. Fundamentals and applications of optics: diffraction, interference, lasers, fiber optics, and applications of optical instrumentation.

PHYS 3850 STATISTICAL & THERMAL PHYSICS 3.0

Statistical and Thermal Physics. Prerequisites: Phys 2212K and Math 2215 with grades of D or higher. Three lecture hours a week. Physical statistics, quantum states and degeneracy, statistical definition of entropy, development of thermodynamics; applications to gases, radiation, and solids.

PHYS 3901 MODERN PHYSICS LAB I 1.0

Modern Physics Laboratory I. Corequisite: Phys 3401. Three laboratory hours a week. Experiments in physical optics, spectroscopy, and atomic physics.

PHYS 3902 MODERN PHYSICS LAB II 1.0

Modern Physics Laboratory II. Corequisite: Phys 3402. Three laboratory hours a week. Experiments in atomic, nuclear, and solidstate physics.

PHYS 4010 APPLIED OPTICS LAB 1.0

Applied Optics Laboratory. Prerequisite: consent of instructor. Three laboratory hours a week.

PHYS 4020 ELECTRICAL MEASUREMENTS LAB 1.0

Electrical Measurements Laboratory. Prerequisite: consent of instructor. Three laboratory hours a week.

PHYS 4030 DIGITAL INSTRUMENTATION LAB 1.0

Digital Instrumentation Laboratory. Prerequisite: consent of instructor. Three laboratory hours a week.

PHYS 4040 MICROPROCESSOR LAB 1.0

Microprocessor Laboratory. Prerequisite: consent of instructor. Three laboratory hours a week.

PHYS 4050 PHYSICAL COMPUTATIONS LAB 1.0

Physical Computations Laboratory. Prerequisite: consent of instructor. Three laboratory hours a week.

PHYS 4060 ACOUSTICS LABORATORY 1.0

Acoustics Laboratory. Prerequisite: consent of instructor. Three laboratory hours a week.

PHYS 4110 EMBEDDED SYSTEMS 4.0

Introduction to Embedded Systems Laboratory. Prerequisite: Phys 3500 or CSc 3210 with grade of D or higher, or equivalent course work with consent of instructor. (Same as CSc 4110.) Four lecture hours per week. Topics taken from: review of basic logic functions; automatic systems; microprocessor based systems and applications; embedded system software survey; digital communications; and embedded systems programming.

PHYS 4180 NEUROBIOLOGY LABORATORY 4.0

Neurobiology Laboratory. Prerequisites: Biol 4102 with grade of C or higher or equivalent and consent of instructor. This course will introduce students to computational neuroscience, including computational models of single neurons and synapses, neuronal networks, and behavior. Students will learn to use Matlab, AnimatLab, and Content to test published models, to build and test their own models, to analyze data, and to present their results. During each section of the course, students will develop a project that will accumulate across sections. Presentations will occur at the end of each section.

PHYS 4391 INTRO TO DIFFERENTIAL GEOMETRY 3.0

Introduction to Differential Geometry and Its Applications. Prerequisite: Math 2215 with grade of C or higher. (Same as Math 4391.) Three lecture hours a week. The theory of curves and surfaces in parametric and implicit form. Curvature and torsion of a curve; the shape operator and the total and mean curvature of a surface. The Gauss-Weingarten equation; the Egregium Theorem; surfaces of constant curvature and non-Euclidean geometry; minimal surfaces; the Gauss-Bonnet Theorem; submanifolds in Euclidean spaces, vector fields, differential forms, and the theorems of Frobenius and Stokes. Application to Physics.

PHYS 4410 INTRO TO NUCLEAR/PARTICLE PHYS 3.0

Introduction to Nuclear and Particle Physics. Prerequisite: Introductory quantum mechanics at a level of Phys 3402 or higher with grade of D or higher. Three lecture hours a week. Properties of nuclei; nuclear models; nuclear reactions and radioactive decay processes; properties of elementary particles, their symmetries and interactions; standard model of elementary particles.

PHYS 4510 MATHEMATICS OF PHYSICS I 3.0

Mathematics of Physics I. Prerequisite: Math 2215 with grade of C or higher. (Same as Math 4258.) Three lecture hours a week. Algebra of vectors, vector calculus, divergence, gradient, curl, line integrals, surface integrals, divergence theorem of Gauss, Stokes's theorem, conservative fields, orthogonal curvilinear coordinates, matrices, and Eigen value problems.

PHYS 4520 MATHEMATICS OF PHYSICS II 3.0

Mathematics of Physics II. Prerequisite: Math 3260 with grade of C or higher. (Same as Math 4265.) Three lecture hours a week. Derivation and solution of partial differential equations of physics, wave equation, Laplace's equation, Schrodinger's equation, special functions of mathematical physics, Fourier series, Sturm-Liouville system, complex analysis, and integration.

PHYS 4600 CLASSICAL MECHANICS 4.0

Classical Mechanics. Prerequisites: Phys 2212K and Math 3260 with grades of D or higher, or equivalent, or consent of instructor. Four lecture hours a week. Vector algebra, Newton's laws, conservation laws, many body systems, motion in central fields, small oscillations, motion in electromagnetic fields, rotation of rigid bodies, Lagrangian equations, Hamilton's principle, and virtual work.

PHYS 4700 ELECTRICITY AND MAGNETISM 4.0

Electricity and Magnetism. Prerequisites: Phys 2211K, Phys 2212K, and Math 2215 with grades of D or higher. Four lecture hours a week.

Electrostatics, steady currents, magnetic fields, magnetic induction, AC circuits, dielectrics, magnetic properties of matter, Maxwell's equations, and wave propagation.

PHYS 4810 INTRO TO QUANTUM MECHANICS 3.0

Introduction to Quantum Mechanics. Prerequisites: Phys 3401 and Math 3260 with grades of D or higher, or consent of instructor. Three lecture hours a week. Schrodinger's theory of quantum mechanics; solutions of Schrodinger's equation; perturbation theory; one-electron atoms; magnetic moments, spin, and relativistic effects; identical particles; multi-electron atoms.

PHYS 4910 SOLID STATE PHYSICS 3.0

Solid State Physics. Prerequisites: Phys 3401 and 3402 with grades of D or higher, or equivalent or consent of instructor. Three lecture hours a week. Atoms in crystals (crystal structure); waves in crystals; crystal binding, lattice constants; lattice vibrations and other thermal properties of solids, free electrons in crystals, energy bands, and semiconductors.

PHYS 4920 ELEMENTARY SCIENCE ED PARTNERS 1.0

Elementary Science Education Partners. Prerequisites: junior or senior majoring in natural science and consent of the ESEP coordinator. Demonstrating hands-on science in the public elementary school classroom. May be repeated for a maximum of four hours.

PHYS 4950 SENIOR RESEARCH 1.0 to 3.0

Senior Research. Prerequisites: Phys 3401 and Phys 3402 with grades of D or higher, and senior standing. Training in the techniques of basic research in physics and application of these techniques to research projects of current importance. May be repeated for a maximum of three credit hours.

POLS = POLITICAL SCIENCE**POLS 1101 AMERICAN GOVERNMENT 3.0**

Introduction to American Government. American system of government covering the institutions and ideals basic to the American experience and the process by which the public participates in and is governed by these institutions and ideals.

POLS 2101 INTRO TO POLITICAL SCIENCE 3.0

Introduction to Political Science. A survey of the fundamental questions in the study of political science.

POLS 2401 GLOBAL ISSUES 3.0

Global Issues. An introduction to international relations focusing on contemporary issues in world politics such as conflict and cooperation, business and trade, population, environment, and human rights.

POLS 3110 STATE GOVERNMENT 3.0

State Government. Organization, powers, functions, and political processes at the state level in the United States.

POLS 3140 JUDICIAL PROCESS & COURTS 3.0

Judicial Process and Courts. Social and political context of judicial decisions with emphasis on Supreme Court decisionmaking. Relates law to public policy.

POLS 3145 INTRO TO AMERICAN LAW 3.0

Introduction to American Law. Substance of law as a component of public policy and the political system; emphasis on the elements and rationale of private law.

POLS 3150 AMER POL PARTIES/INTEREST GRPS 3.0

American Political Parties and Interest Groups. The nature and role of political parties and interest groups in the American political system.

POLS 3170 AMERICAN LEGISLATIVE PROCESS 3.0