PHYSICS (PHYS)

Courses

PHYS 5125. Mathematical Physics. 3 Credits.
Introduction to basic mathematical methods of theoretical physics; vector and tensor analysis, partial differential equations, orthogonal functions, complex variables and variational techniques. Prerequisites: PHYS 2200, PHYS 4300.

PHYS 5200. Advanced Dynamics. 3 Credits.
Classical mechanics presented as the basis of the concepts and methods of modern physics. Variational, Lagrangian, and Hamiltonian formulations, canonical transformations, continuous systems. Prerequisite: PHYS 2200.

PHYS 5300. Electromagnetic Theory. 3 Credits.
Development of Maxwell’s theory of electromagnetism emphasizing its physical basis and the modes of mathematical description. Prerequisite: PHYS 4300.

PHYS 5400. Statistical Mechanics. 3 Credits.
Following a review of thermodynamics, we study the fundamentals of classical and quantum statistical mechanics including ensembles, identical particles, Bose and Fermi statistics, phase-transitions and critical phenomena, renormalization group, irreversible processes and fluctuations. Prerequisite: PHYS 3400 or equivalent.

PHYS 5500. Quantum Mechanics II. 3 Credits.
Mathematical and physical foundations of nonrelativistic quantum mechanics from the unifying point of view of Dirac. Symmetry operations and the algebraic structure of quantum mechanics are emphasized. Prerequisite: PHYS 3500.

PHYS 5990. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles. Prerequisites: PHYS 2500; Department permission.

PHYS 6000. Teaching of College Physics. 1 Credit.
Instructional strategies and techniques with application to the teaching of laboratories and recitations. Prerequisites: Undergraduate degree in Physics; Instructor permission.

PHYS 6391. Master’s Thesis Research. 1-12 Credits.
Research for the Master’s Thesis.

PHYS 6600. Advanced Solid State Physics. 3 Credits.
Introduction to crystal symmetry and the reciprocal lattice. Crystal binding and lattice vibrations. Thermal, electrical, and magnetic properties of solids, free electron theory of metals, and band theory. Prerequisites: PHYS 4300, PHYS 3400, PHYS 3500 or their equivalents; Instructor permission.

PHYS 6700. Biological Physics II. 3 Credits.
Physical principles of biological systems including advanced techniques in macromolecular structure (experimental and computational), molecular solvation and hydration models, thermostatistics, two-state models and cooperativity, elasticity and mechanics of soft tissues, chemical equilibria and reaction kinetics including enzymes. Prerequisites: PHYS 1650, MATH 2248, or Instructor permission.

PHYS 6990. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

PHYS 6991. Internship. 1-18 Credits.
On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion.

PHYS 6993. Independent Study. 1-18 Credits.
A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

PHYS 6994. Teaching Assistantship. 1-3 Credits.
Student service as a teaching assistant, usually in an introductory level course in the discipline, for which credit is awarded. Offered at department discretion.

PHYS 6995. Graduate Independent Research. 1-18 Credits.
Graduate student work on individual or small team research projects under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

PHYS 7491. Doctoral Dissertation Research. 1-18 Credits.
Research for the Doctoral Dissertation.

PHYS 7990. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

PHYS 7991. Internship. 1-18 Credits.
On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion.

PHYS 7993. Independent Study. 1-18 Credits.
A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.