

# PH - PHYSICS (PH)

## \*Course Fees are Per Credit Hour

### PH 502. Biophysics. (3 Credits)

Physical processes in biological systems and sub-systems. Independent project and/or term paper required. Prerequisites: BI 111 and two semesters of physics.

Course Fees: \$60

### PH 520. Optics. (3 Credits)

Physical and geometric optics. Independent project and/or term paper required. Prerequisite: PH 252.

Course Fees: \$60

### PH 547. Electricity and Magnetism. (3 Credits)

Electric and magnetic fields in vacuum and in matter. Computer project, independent project and/or term paper required. Prerequisites: MA 126, PH 252.

Course Fees: \$60

### PH 548. Electromagnetic Fields. (3 Credits)

Maxwell's equations, multipole fields, the wave equation with boundary conditions. Computer project, independent project and/or term paper required. Prerequisite: PH 447 or PH 547.

Course Fees: \$60

### PH 556. Statistical Mechanics. (3 Credits)

Classical statistical mechanics and thermodynamics, with an introduction to quantum statistical mechanics. Prerequisites: MA 126, PH 252.

Course Fees: \$60

### PH 571. Mechanics I. (3 Credits)

Statics and kinematics of particles and rigid bodies including periodic motion. Computer project, independent project, and/or term paper required. Prerequisites: MA 126, PH 252.

Course Fees: \$60

### PH 572. Mechanics II. (3 Credits)

Moving coordinate systems, LaGrange's and Hamilton's equations, rotation of rigid bodies, fluid mechanics. Computer project, independent project and/or term paper required. Prerequisite: PH 471 or PH 571.

Course Fees: \$60

### PH 580. Topics in Physics. (1-6 Credits)

Topics selected from various branches of physics. Departmental approval required. Special fee may be required depending on the topic.

Course Fees: \$60

### PH 581. Topics in Physics. (1-6 Credits)

Topics selected from various branches of physics. Departmental approval required. Special fee may be required depending on the topic.

Course Fees: \$60

### PH 582. Topics in Physics. (1-6 Credits)

Topics may be selected from electronic instrumentation, optics, spectroscopy, nuclear physics, solid state physics, statistical mechanics, advanced quantum mechanics, and mathematical physics. Departmental approval required.

Course Fees: \$60

### PH 583. Topics in Physics. (1-6 Credits)

Topics may be selected from electronic instrumentation, optics, spectroscopy, nuclear physics, solid state physics, statistical mechanics, advanced quantum mechanics, and mathematical physics. Departmental approval required.

Course Fees: \$60

### PH 584. Topics in Physics. (1-6 Credits)

Topics may be selected from electronic instrumentation, optics, spectroscopy, nuclear physics, solid state physics, statistical mechanics, advanced quantum mechanics, and mathematical physics. Departmental approval required.

Course Fees: \$60

### PH 585. Topics in Physics. (1-6 Credits)

Topics may be selected from electronic instrumentation, optics, spectroscopy, nuclear physics, solid state physics, statistical mechanics, advanced quantum mechanics, and mathematical physics. Departmental approval required.

Course Fees: \$60

### PH 586. Topics in Physics. (1-6 Credits)

Topics may be selected from electronic instrumentation, optics, spectroscopy, nuclear physics, solid state physics, statistical mechanics, advanced quantum mechanics, and mathematical physics. Departmental approval required.

Course Fees: \$60

### PH 587. Topics in Physics. (1-6 Credits)

Topics may be selected from electronic instrumentation, optics, spectroscopy, nuclear physics, solid state physics, statistical mechanics, advanced quantum mechanics, and mathematical physics. Departmental approval required.

Course Fees: \$60

### PH 588. Topics in Physics. (1-6 Credits)

Topics may be selected from electronic instrumentation, optics, spectroscopy, nuclear physics, solid state physics, statistical mechanics, advanced quantum mechanics, and mathematical physics. Departmental approval required.

Course Fees: \$60

### PH 589. Topics in Physics. (1-6 Credits)

Topics may be selected from electronic instrumentation, optics, spectroscopy, nuclear physics, solid state physics, statistical mechanics, advanced quantum mechanics, and mathematical physics. Departmental approval required.

Course Fees: \$60

### PH 595. Directed Research. (1-3 Credits)

Experimental, theoretical, or computational investigation of problems in physics under the direction of departmental faculty. Departmental approval required. Prerequisite: undergraduate physics major or minor, or equivalent experience.

Course Fees: \$60

### PH 601. Teaching Physics in the Secondary School. (3 Credits)

Considers the problems of what to teach in physics at the secondary level and how to teach it. Discussions cover the relevance of physics in today's world and how to use this to motivate students to learn. Independent project and/or term paper required. Prerequisite: PH 252.

Course Fees: \$60

**PH 603. Modern Physics for Teachers. (3 Credits)**

Considers physics developed in this century, including relativity, particle-wave nature of matter, uncertainty, and topics from nuclear physics. Independent project and/or term paper required. Prerequisite: PH 343. Course Fees: \$60

**PH 605. Modern Physics for Teachers. (3 Credits)**

Considers the basic components in electronics and the function of each. Complete but simple circuits are analyzed and functions discussed. Modern developments are surveyed. Prerequisite: PH 252. Course Fees: \$60

**PH 607. Astronomy for Teachers. (3 Credits)**

This course considers popular topics in astronomy. Content includes observational aspects of astronomy including constellations, planets, the Sun, celestial moons, and Earth's seasons with an emphasis on understanding those topics which are known to have common misconceptions. A paper or major project will be completed in partial fulfillment of course requirements. Prerequisite: PH 125 or permission of department chair. Course Fees: \$60

**PH 644. Quantum Mechanics. (3 Credits)**

The wave equation with interpretations, operation, eigenvalues, expectation values, one-dimensional motion, angular momentum, spin and approximate solutions to the wave equation with applications. Prerequisites: MA 126, PH 343. Course Fees: \$60

**PH 680. Special Topics in Physics. (3-6 Credits)**

Courses on a variety of topics are available to eligible graduate students under this course number and title. Course number may be repeated as different topics in physics are offered. Prerequisite: Departmental approval required. (Fall on sufficient demand, Spring on sufficient demand) Course Fees: \$60

**PH 683. Topics in Physics: Observational Astronomy. (3 Credits)**

The course involves an introduction to observational astronomy, including spherical astronomy, coordinate systems, observing techniques, types of telescopes and detectors. Methods of calibrating and verification of astronomical measurements and their error estimates will be discussed. Students will also become familiar with the operating systems and software used by professional astronomers and how to setup a small telescope for observing. They will also conduct real scientific observations in order to gain experience conducting a research project. Prerequisite: PH 242 or PH 252. (Fall on sufficient demand, Spring on sufficient demand) Course Fees: \$60