PH - PHYSICS (PH)

*Course Fees are Per Credit Hour

PH 1XX. Physics Elective. (1-3 Credits)

PH 101. Interactive Physics. (4 Credits)
A survey of basic physics principles presented in workshop format: students discover the fundamental principles of physics through hands-on activities, cooperative group learning, and guided explorations of phenomena in Motion, Conservation Laws, Gravity, Oscillations, and Heat and Temperature. Computers and electronic sensors are used in some of the activities, but no previous experience with computers is necessary. Not applicable for credit toward a physics major or minor. Three class periods; one 2-hour laboratory period per week. (Offered upon sufficient demand)
Course Fees: $60

PH 121. Introductory Physics. (4 Credits)
An introduction to the physical principles of motion, waves, sound, electricity, magnetism, and light. Computers and electronic sensors are used in some of the activities, but no previous experience with computers is necessary. Not applicable for credit toward a physics major or minor. Three class periods; one two-hour laboratory period per week. (Offered upon sufficient demand)
Course Fees: $60

PH 125. Descriptive Astronomy. (4 Credits)
The extraterrestrial environment including the solar system, stars, and galaxies. Cosmology and the development of astronomy is also considered along with topics of current interest. Instruction in the use of astronomical instrumentation is carried out in the observatory and planetarium. Not applicable for credit toward a physics major or minor. Three class periods; one 2-hour laboratory period per week. (Fall, Spring)
Course Fees: $60

PH 125H. Descriptive Astronomy-Honors. (4 Credits)
The extraterrestrial environment including the solar system, stars, and galaxies. Cosmology and the development of astronomy is also considered along with topics of current interest. Instruction in the use of astronomical instrumentation is carried out in the observatory and planetarium. Not applicable for credit toward a physics major or minor. Three class periods; one 2-hour laboratory period per week. (Fall, Spring)
Course Fees: $60

PH 142. Life in the Universe. (3 Credits)
The course includes a survey of selected planets in the Milky Way Galaxy which are similar to Earth; an overview of Earth's life forms, current and historic, Earth's diverse environments which are consistent with supporting life forms beyond Earth; and the influence of star formation on the development of planets. (Spring).
Course Fees: $60

PH 241. General Physics I. (4 Credits)
A basic physics course covering mechanics, heat, and sound. Designed for students in premedical, predental, prepharmacy, and other programs not requiring calculus-based physics. Not applicable for credit toward major or minor requirements in physics or in curricula specifically requiring PH 251 and 252. Three class periods; one 2-hour laboratory period per week. Prerequisites: MA 112; 113 or 115. (Fall, Summer)
Course Fees: $60

PH 242. General Physics II. (4 Credits)
A continuation of Physics 241, covering electricity, magnetism, optics, and topics in modern physics. Three class periods; one 2-hour laboratory period per week. Prerequisite: PH 241. (Spring, Summer)
Course Fees: $60

PH 251. Technical Physics I. (5 Credits)
A calculus-based physics course covering mechanics, heat, and sound. Required in preengineering, physics, general and professional chemistry, industrial hygiene programs and as an option in professional biology. Four class periods; one 2-hour laboratory period per week. Prerequisites OR Corequisites: MA 122 or MA 125. (Fall)
Course Fees: $60

PH 252. Technical Physics II. (5 Credits)
A continuation of Physics 251, covering electricity, magnetism, optics, and topics in modern physics. Four class periods; one 2-hour laboratory period per week. Prerequisites: MA 122 or 125; PH 251. (Spring)
Course Fees: $60

PH 343. Modern Physics. (4 Credits)
Special theory of relativity, origin of the quantum theory, the nuclear atom, emission spectra, nuclear forces, structures, and reactions. Prerequisite: PH 252. (Fall)
Course Fees: $60

PH 356W. Intermediate Laboratory. (4 Credits)
Measurements involving the fields of mechanics, electricity, magnetism, heat, sound, optics, and modern physics. Some data analysis by computer will be required. Formal laboratory reports will be graded for scientific content and grammatical correctness. Two class periods; two 2-hour laboratory periods per week. Prerequisite: PH 252. (Spring, Even-numbered years)
Course Fees: $60

PH 444. Quantum Mechanics. (3 Credits)
An introduction to quantum mechanics studying the postulates, the wave equation, operator techniques, atomic and molecular structure, and spectroscopy. Also listed as CH 444 but creditable only in the field for which registered. Prerequisites: PH 343; MA 122 or MA 126 or CH 381, 381 L. (Spring, Odd-numbered years)
Course Fees: $60

PH 447. Electricity and Magnetism. (3 Credits)
Elements of electric and magnetic fields. Prerequisites: PH 252, MA 122 or 126 or concurrently. (Fall, even-numbered years)
Course Fees: $60

PH 448. Electromagnetic Fields. (3 Credits)
Maxwell's equations, multi-pole fields, the wave equation with boundary conditions, and selected topics from relativistic electrodynamics. Prerequisite: PH 447. (Spring, odd-numbered years)
Course Fees: $60

PH 456. Thermodynamics and Statistical Mechanics. (3 Credits)
Elements of classical statistical mechanics and thermodynamics, with an introduction to quantum statistical mechanics. Also listed as CH 456 but creditable only in field for which registered. Prerequisites: MA 122 or 126 or concurrently, PH 252. (Fall, odd-numbered years)
Course Fees: $60

PH 471. Classical Dynamics. (3 Credits)
Statics and kinematics of particles and rigid bodies including periodic motion. Prerequisites: PH 252, MA 122 or 126 or concurrently. (Spring, Even-numbered years)
Course Fees: $60

PH 480. Topics in Physics. (1-6 Credits)
Topics will be selected from electronic instrumentation, optics, spectroscopy, nuclear physics, solid state physics, statistical mechanics, advanced quantum mechanics, and mathematical physics. Departmental approval required. (Offered upon sufficient demand)
Course Fees: $60

PH 481. Topics in Physics. (1-6 Credits)
Topics will be selected from electronic instrumentation, optics, spectroscopy, nuclear physics, solid state physics, statistical mechanics, advanced quantum mechanics, and mathematical physics. Departmental approval required. (Offered upon sufficient demand)
Course Fees: $60

PH 482. Topics in Physics. (1-6 Credits)
Topics will be selected from electronic instrumentation, optics, spectroscopy, nuclear physics, solid state physics, statistical mechanics, advanced quantum mechanics, and mathematical physics. Departmental approval required. (Offered upon sufficient demand)
Course Fees: $60

PH 483. Topics in Physics. (1-6 Credits)
Topics will be selected from electronic instrumentation, optics, spectroscopy, nuclear physics, solid state physics, statistical mechanics, advanced quantum mechanics, and mathematical physics. Departmental approval required. (Offered upon sufficient demand)
Course Fees: $60

PH 484. Topics in Physics. (1-6 Credits)
Topics will be selected from electronic instrumentation, optics, spectroscopy, nuclear physics, solid state physics, statistical mechanics, advanced quantum mechanics, and mathematical physics. Departmental approval required. (Offered upon sufficient demand)
Course Fees: $60

PH 485. Topics in Physics. (1-6 Credits)
Topics will be selected from electronic instrumentation, optics, spectroscopy, nuclear physics, solid state physics, statistical mechanics, advanced quantum mechanics, and mathematical physics. Departmental approval required. (Offered upon sufficient demand)
Course Fees: $60

PH 486. Topics in Physics. (1-6 Credits)
Topics will be selected from electronic instrumentation, optics, spectroscopy, nuclear physics, solid state physics, statistical mechanics, advanced quantum mechanics, and mathematical physics. Departmental approval required. (Offered upon sufficient demand)
Course Fees: $60

PH 487. Topics in Physics. (1-6 Credits)
Topics will be selected from electronic instrumentation, optics, spectroscopy, nuclear physics, solid state physics, statistical mechanics, advanced quantum mechanics, and mathematical physics. Departmental approval required. (Offered upon sufficient demand)
Course Fees: $60

PH 488. Topics in Physics. (1-6 Credits)
Topics will be selected from electronic instrumentation, optics, spectroscopy, nuclear physics, solid state physics, statistical mechanics, advanced quantum mechanics, and mathematical physics. Departmental approval required. (Offered upon sufficient demand)
Course Fees: $60

PH 489. Topics in Physics. (1-6 Credits)
Topics will be selected from electronic instrumentation, optics, spectroscopy, nuclear physics, solid state physics, statistical mechanics, advanced quantum mechanics, and mathematical physics. Departmental approval required. (Offered upon sufficient demand)
Course Fees: $60

PH 495. Directed Research. (1-3 Credits)
Experimental, theoretical, or computational investigation of problems in physics under the direction of departmental faculty, with enrollment and projects subject to prior approval of the department. Formal reports of research progress will be required for credit. Scheduled work and conferences require a minimum average of three hours per week per credit hour. May be repeated to a maximum of six credit hours. A maximum of two credit hours will be offered during the summer term. Also listed as ES 495 but creditable only in field registered. Prerequisite: departmental approval required. (Fall, Spring, Summer)
Course Fees: $60

PH 498. Senior Assessment Seminar. (1 Credit)
In this course, students prepare for national standardized instruments, such as the MFT-Physics and GRE-Physics exams, that use multiple choice questions. In other physics major courses, students do not encounter these type questions. Students will practice solving such questions by depending upon far fewer full calculations than are required in other courses. This course requires students to complete the MFT-Physics exam as a pre-test at the beginning of the semester, and as a post-test at the end of the semester. This course is graded Pass/Fail with the pass grade dependent upon completion of the pre- and post-tests and attendance during the weekly seminar. Open to Professional Physics and General Physics majors in their last year of studies. Departmental approval required. (Fall, Spring).
Course Fees: $60