

# Physics

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## **PH106 Science of Sound**

**Cr-4**

This course introduces basic concepts of sound and human hearing. Topics include the history and development of basic acoustics and electricity, microphones, loudspeakers, signal processing, monitoring and recording systems, and an introduction to current digital audio. This course is not applicable as an electrical elective for Electrical majors. Prerequisites: Appropriate high school GPA or placement test score or MA089 Arithmetic.

## **PH112 Science of Light 1**

**Cr-4**

This course introduces the concepts of light and optics. Topics include the historical development of optical instruments, electromagnetic spectrum, lenses and image formation, light-sensitive materials and processes, color filters, Kirlean imaging, and holography. Examples are chosen from a variety of fields, including photography, human vision, and nature. Prerequisite: Appropriate high school GPA or placement test score or MA089 Arithmetic.

## **PH113 Science of Light 2**

**Cr-4**

This course is a continuation of PH112 Science of Light 1 and applies scientific principles to the analysis of the materials and processes of imaging. Topics include the historical development of color theory, color emulsions and their processing, physics of light sources, diffraction, interference, sensitometry, image evaluation, and digital image processing. Prerequisite: PH112 Science of Light 1.

## **PH114 Science of Digital Imaging**

**Cr-4**

This course provides an overview of the science underlying the field of digital imaging. Topics include the historical development of digital imaging technology, introduction to computers, color theory and color calibration, how image input and output devices work, the science of digital image manipulation, computer generation and display of 3-D images, and real-world applications and their impact upon the individual and society. Image manipulation software is used to demonstrate and explore concepts. Prerequisite: Appropriate high school GPA or placement test score or MA089 Arithmetic.

## **PH115 Science of Multimedia**

**Cr-4**

This course examines the scientific principles behind various branches of multimedia including text, audio, animation, and video. Students learn the physics involved in multimedia techniques such as color mixing and viewing, sound manipulation, and replicating real-life movements in digital animation and video. Students use the scientific method to explore and create multimedia projects that apply these basic scientific concepts.

## **PH116 Science of Multimedia 2**

**Cr-4**

This course extends the scientific and computer concepts developed in PH115 to 3-D multimedia. It provides hands-on experience using a professional 3-D graphics engine. Topics include vectors and vector operations, transformation theory, design of 3-D Graphical User Interfaces, 3-D lighting, 3-D cameras, multi-texturing, 3-D optimization techniques, mesh generation, third-party model generation, 3-D node hierarchy, using a 2-D mouse in a 3-D world, generation of physically accurate simulations, and 3-D game development. Hardware and software packages are used to explore and demonstrate concepts. Prerequisites: PH115 Science of Multimedia; and Appropriate high school GPA or placement test score or MA121 Fundamentals of College Mathematics 1, or MA125 College Algebra and Trigonometry.

## **PH131 Physics Fundamentals**

**Cr-4**

This conceptual survey of physics emphasizes verbal reasoning and understanding in a classroom and laboratory format. It covers

mechanical energy, sound, electricity, optics, thermal energy, and atomic nuclear energy. This course does not satisfy the graduation requirements for science and technology majors. Prerequisite: Appropriate high school GPA or placement test score or MA089 Arithmetic.

## **PH141 Astronomy: The Solar System**

**Cr-4**

This course covers the history of astronomy, the tools of the astronomer, the earth as an astronomical body, and the solar system. Laboratory sessions may be scheduled in the evening. Prerequisite: Appropriate high school GPA or placement test score or MA089 Arithmetic.

## **PH142 Astronomy: Stars, Galaxies, & the Universe**

**Cr-4**

This course covers these topics: the sun and other stars, multiple star systems, the Milky Way and other galaxies, nebulae, intergalactic material, cosmology and the evolution of stars, pulsars, and black holes. Laboratory sessions may be scheduled in the evening. Prerequisite: Appropriate high school GPA or placement test score or MA089 Arithmetic.

## **PH151 General Physics 1**

**Cr-4**

This non-calculus Physics course for technology, business administration, computer science, and liberal arts and sciences students covers topics in mechanics, wave motion, and heat. Prerequisite: Appropriate high school GPA or placement test score or MA121 Fundamentals of College Mathematics 1, or MA125 College Algebra and Trigonometry.

## **PH152 General Physics 2**

**Cr-4**

This course is a continuation of PH151 General Physics 1 and includes topics in electricity and magnetism, geometrical and physical optics, and modern physics. Prerequisite: PH151 General Physics 1.

## **PH261 Engineering Physics 1**

**Cr-4**

This is a calculus-based physics course for mathematics, physics, and engineering students. Topics include translational motion, particle dynamics, work and energy, momentum and impulse, rotational kinematics, rigid body motion, gravitation, vibrational motion, wave motion, and acoustics. Prerequisites: MA151 Calculus 1.

## **PH262 Engineering Physics 2**

**Cr-4**

This calculus-based physics course in electricity, magnetism, geometrical optics, and physics optics is for mathematics, physics, and engineering students. Topics include Coulomb's Law, the electric field, potential, capacitance, Ohm's Law, DC circuits, the magnetic field, charged particle ballistics, induced EMF, inductance, Maxwell's Equations, alternating current circuits, geometrical optics, and physical optics. Prerequisites: MA152 Calculus 2; PH261 Engineering Physics 1.

## **PH265 Modern Physics and Thermodynamics**

**Cr-4**

This calculus based course provides an introduction to thermodynamics as well as an overview of major developments in physics from the early 20th century through today. Topics include heat, kinetic theory, thermodynamics, Einstein's special theory of relativity, quantum nature of light, wave nature of particles, atomic structure, molecular physics, nuclear physics, particle physics, and cosmology. Prerequisite: MA253 Calculus 3 and PH262 Engineering Physics 2.

**PH270 Waves and Oscillations****Cr-3**

This course introduces the physical description of waves and oscillatory motion and the mathematical techniques used in analyzing such phenomena. Topics include harmonic oscillators, wave packets, normal modes, electromagnetic waves, interference, diffraction, Fourier analysis, and eigenvectors. Co-requisites: MA260 Differential equations and MA280 Linear Algebra.