

PHY - PHYSICS

PHY 107 Technical Physics

Technical Physics is an algebra-based course designed primarily for students in the technologies. The course explores selected topics related to mechanics, sound, electricity, and magnetism, with an emphasis on technical applications of physics.

Upon successful completion of this course, students should be able to:

Identify the common units of mass, length, and time in both the English and metric systems and the derived units necessary for the calculations and measurements of the physical phenomena studied in this course.

Describe the motion of simple objects in terms of distance, time, velocity, and acceleration.

Analyze motion using Newton's Laws in one and two dimensions.

Apply the Laws of Conservation of Momentum and Energy.

Apply mechanics to rotating systems.

Describe the nature of wave motion and apply it to sound waves.

Analyze electrostatic forces and related electrical concepts.

Explain the fundamentals of magnetism.

Apply the topics listed above to understand the functioning of simple machines and electrical devices.

Apply laboratory skills and technologies to solve problems in a cooperative environment.

College Academic Learning Goal Designation: Scientific Reasoning (SI)

Prerequisite: MAT 128.

4 Credits3 Weekly Lecture Hours

2 Weekly Lab Hours

PHY 110 College Physics I

This is a course designed for science majors who are not in the calculus sequence. The course content consists of Mechanics and Thermodynamics.

Upon successful completion of this course, students should be able to:

Describe motion in one dimension.

Apply vector mathematics to explain two-dimensional motion.

Describe and analyze freely-falling objects.

Analyze motion using Newton's Laws.

Apply conservation laws.

Describe rotational motion.

Analyze oscillatory motion.

Describe and apply the basic concepts of thermodynamics.

Apply laboratory skills and computer-based technologies to solve problems in a cooperative environment.

College Academic Learning Goal Designation: Scientific Reasoning (SI)

Prerequisites: MAT 151 and MAT 152*. *May be taken concurrently.

4 Credits3 Weekly Lecture Hours

2 Weekly Lab Hours

PHY 111 College Physics II

This course is a continuation of College Physics I and is designed for Science majors who are not in the University Physics sequence. The course deals primarily with Electricity and Magnetism, Waves and Optics, and Modern Physics topics.

Upon successful completion of this course, students should be able to:

Describe electrostatic interactions in terms of force, fields, energy and potential.

Analyze circuits using Ohm's Law and Kirchhoff's Rules.

Describe the magnetic fields of simple geometries and their interactions with charged objects.

Define waves and their interactions.

Apply wave concepts to explain sound phenomena.

Apply the concepts of geometric and wave optics to the phenomena of refraction, reflection, interference and diffraction.

Discuss the development of the atomic model and quantum mechanics.

Use concepts of nuclear physics to describe decay processes.

Apply laboratory skills and computer technology to solve problems in a cooperative environment.

Prerequisites: MAT 152 and PHY 110.

4 Credits3 Weekly Lecture Hours

2 Weekly Lab Hours

PHY 131 University Physics I

This course is designed for Natural Science and Engineering majors who are required to take a calculus-based physics course. Dealing primarily with mechanics, the course covers the linear and rotational kinematics and dynamics of and the principles, laws and concepts pertaining to, the motion of solids, along with specific applications relating to liquids and gases.

Upon successful completion of this course, students should be able to:

Apply the kinematics equations to determine the linear motion of a particle.

Use the kinematics equations to determine the rotational motion of a solid.

Apply Newton's Laws of motion and gravity to the linear motion of a particle.

Apply Newton's Laws of motion to the rotational motion of a solid.

Know and apply the concepts of work and energy to solids, liquids and gases.

Utilize the concepts of momentum and conservation of momentum principle to analyze the interactions of particles and solids.

Use the concepts relating to the material properties of solids, liquids and gases.

Apply the concepts of periodic motion to solids experiencing simple harmonic motion.

Develop and use the kinematics and dynamics equations for wave motion as exhibited by liquids and gases.

Apply laboratory skills and computer technology to solve problems in a cooperative environment.

College Academic Learning Goal Designation: Scientific Reasoning (SI)

Prerequisite: MAT 160.

4 Credits3 Weekly Lecture Hours

2 Weekly Lab Hours

PHY 132 University Physics II

This course is a continuation of University Physics I and is designed for Natural Science and Engineering majors who are required to take a calculus-based physics course sequence. Dealing primarily with electricity and magnetism, the course covers the principles, laws and concepts of electrostatics and electrodynamics, including electromagnetic waves and physical and geometrical optics.

Upon successful completion of this course, students should be able to:
Determine the electric field by the application of Coulomb's Law and Gauss's Law.

Apply the concepts of potential difference, capacitance and resistance to direct and alternating current circuits.

Utilize Kirchhoff's Rules to analyze direct and alternating current circuits.

Calculate magnetic fields by the application of the Biot-Savart Law and Ampere's Law.

Apply Faraday's Law of Induction to explain the effects resulting from changing magnetic fields.

Use Maxwell's Equations to explain the creation and properties of an electromagnetic wave.

Apply the concepts of geometric and wave optics to the phenomena of refraction, reflection, interference and diffraction.

Apply laboratory skills and computer technology to solve problems in a cooperative environment.

Prerequisites: MAT 161* and PHY 131. *May be taken concurrently.

4 Credits3 Weekly Lecture Hours

2 Weekly Lab Hours

PHY 230 Modern Physics

This course is an introduction to topics in Modern Physics. Students will be introduced to Special Relativity, Wave-Particle Duality, Quantum Mechanics, Atomic physics, Nuclear physics, Particle Physics and Cosmology. This course is intended for students intending to major in physics and for students who need an extra course in Modern Physics.

Upon successful completion of this course, students should be able to:

Apply the concept of relativity to the physical world.

Discuss the concept of Wave-Particle Duality and Quantum Physics and its implications.

Describe the structure of matter as described by Atomic and Molecular physics.

Describe and explain physics at the nuclear level.

Describe the fundamental particles found in nature and their role in cosmology.

Prerequisite: PHY 132 and MAT 161.

3 Credits3 Weekly Lecture Hours