

Department: Science

Course Name: Physics

Course Description:

An introductory course exploring the relationships between matter, energy, and forces in nature with applications in daily life. The emphasis is on conceptual physics with mathematics used as a tool for problem solving and a guide to consistent and correct thinking. Pre-requisite: Algebra II or higher. Topics include mechanics, gravitation, light, sound, fluids, thermodynamics, oscillations, waves, and optics. Students will perform experiments and submit lab report evaluation forms for assessing their comprehension of theory, procedure, numerical results, and experimental uncertainties. Students will complete homework assignments using the internet-based system “WebAssign”, and therefore students enrolled in this course must have home access to a computer and the internet. A small fee will be charged for WebAssign access.

Content:

Kinematics (including vectors, coordinate systems, displacement, velocity, acceleration)

Motion in 1-Dimension (graphical representations; slope/area connections)

Motion in 2-Dimensions (projectile motion, uniform circular motion)

Newton’s Laws of Motion

Static Equilibrium

One Body Systems

Two Body Systems

Work, Energy, Power

Work-Energy Theorem

Conservative Forces

Conservation of Energy

Systems of Particles/Linear Momentum

Impulse and Momentum

Conservation of Linear Momentum (Collisions)

Rotation/Angular Momentum

Torque

Moment of Inertia

Angular Momentum (Conservation of Angular Momentum)

Oscillations (Periodic Systems)

Simple Harmonic Motion

Mass on a Spring

Pendulums

Universal Law of Gravitation (Orbits, Kepler’s Laws)

Kinetic Theory, and Thermodynamics

Temperature and Heat

Specific and Latent Heat (Calorimetry)

Heat Transfer

Thermal Expansion

Ideal gases

Laws of Thermodynamics

Waves and Physical Optics

Wave Motion

Traveling and Standing Waves

Doppler Effect

Superposition Principle
Resonance
Snell's Law
Total Internal Reflection
Interference and Diffraction
Dispersion of Light
Electromagnetic Spectrum

Skills:

Collaborate to gather data
Generate and interpret data in tabular and graphical form
Construct laboratory reports
Analyze data
Represent data graphically using spreadsheets
Utilize advanced features of a scientific graphing calculator
Apply math and logical reasoning to problem solving

Text and Materials:

Serway and Faughn. Physics (Holt, Rinehart, and Winston, 2006)
(WebAssign homework account required www.webassign.net)
Online education resources
Laptop Cart with IBM Think-pad Laptops

Methods of Instruction:

Utilize a Learning management system for accessing content, assignments, and assignment submission
Lecture
iPad notes, apps, and visualizations
Real time (live) demonstrations
Java Applets, Internet, DVD computer demonstrations
Laboratory experiments
Excel Data analysis tutorials
“Quizizz” class game competitions
Online videos, practice problems
Online interactive virtual labs
Quiz and Test review
Online assessments

Methods of Evaluation:

Quizzes (in-class and online)
Tests
Lab reports
Activity worksheets
Homework
Class productivity
Class participation
Lab participation
Quarter Research Presentations