

Physics 2010-2011 Course Outline

Ms. Ramkissoon

FIRST SIX WEEKS

MECHANICS

Introduction

- Safety in lab Review.
- What is Science, (scientific method).
- What is physics.
- Discuss scientists and scientific theory, Review of dimensional analysis, sig. figs.
- What is the difference between accuracy and precision.

Measurement and Graphical Analysis

- Fundamental and derived units. Derived units are a combination of fundamental units. Examples of derived units include volume, speed, momentum, area, etc.
- Construct, analyze, and interpret graphs to determine mathematical relationships between independent variables and dependent variables. Calculations may include percent error the prefixes in the metric system.
- Quantitative Observations
- Graphical Analysis
- Accuracy
- Precision

Displacement, Distance, Average Speed and Average Velocity

- Vector
- Scalar
- Speed
- Vector Analysis
- Vector Components
- Displacement
- Velocity
- Motion
- Relative Motion
- Frame of reference

SECOND SIX WEEKS

Motion

- Graphing
- Slope
- Uniform acceleration
- Non-uniform acceleration
- Constant velocity

Uniform and Accelerated Motion

- Uniform acceleration
- Non-uniform acceleration
- Linear Kinematic Equations
- Free Fall Motion
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MOTION (continued)

Forces and Laws of Motion

- Newton's Laws
- Motion
- Force
- Demonstrate the effects of forces on the motion of objects. Newton's laws of motion.
- Define and calculate the normal force present on a surface.

End of 9 weeks

Free Body Diagrams

- Friction. free-body diagram, force analysis, equilibrium.

Work-Energy Theorem and Energy Transformations

- Work, potential energy, power
- Kinetic energy, mechanical energy, transfer of energy

THIRD SIX WEEKS

Momentum and impulse

- Impulse-Momentum Theorem $P = mv$
- Angular momentum
- Conservation of Momentum
- What is a system
- Conservation of Energy

THERMODYNAMICS

- The laws of thermodynamics
- Internal energy
- Work
- Heat
- Temperature

- First law of thermodynamics
- Second law of thermodynamics
- Entropy
- Energy Transfer
- Conduction
- Specific Heat
- Convection
- Radiation

FOURTH SIX WEEKS

Two-Dimensional Projectile and Circular Motion

- Projectile Motion
- Vectors
- Circular Motion
- Centripetal Acceleration
- Centripetal Force

Principles of Newton's Law of Universal Gravitation

- Newton's Law of Universal Gravitation
- Orbital velocity
- Apparent weightlessness
- Gravitational force

Historical Development of Gravitational, Electrical, and Magnetic Force

- Gravitational, Electrical, and Magnetic Force
- Coulomb's Laws of Electrostatics and Magnetism
- Newton's Law of Universal Gravitation

END of SEMESTER 1

ELECTRICITY

Electric Charge

- Electric Forces
- Coulomb's Law
- Electric Fields
- Electric Potential Energy

FIFTH SIX WEEKS

Electric Circuits

- Electric circuits
- Electric circuit schematics

- Series circuits
- Parallel circuits
- Complex circuits
- Ohm's Law

WAVE PROPERTIES AND BEHAVIORS

- Energy transfer
- Mechanical waves
- Electromagnetic waves
- Longitudinal waves
- Transverse waves
- Wave characteristics
- Wave properties

Sound and Electromagnetic Waves

- Sound waves
- Intensity
- Snell's Law
- The Doppler Effect
- Resonance
- Law of Reflection
- Electromagnetic waves
- Total internal reflection

OPTICS

Mirrors and Reflection

- Mirrors
- Reflection
- The mirror and magnification equations
- Ray diagrams

SIXTH SIX WEEKS

Sonograms, Doppler devices, Lenses, and Fiber Optics

- Fiber Optics
- Lenses
- Doppler devices
- Sonograms

Electromagnetism

- Magnetic fields
- Electric currents

- Electromagnetic induction
- Electromotive Force (EMF)

Electromagnetic Applications

- Electric motors
- Electric generators
- Transformers
- Lenz's law

Atomic Physics and Photoelectric Effect

- Photoelectric effect
- Emission spectra
- Absorption spectra
- Gas-discharge tubes
- Planck's constant
- Quantum Theory

END