AP Physics C

UC/CSU "d" approved/NCAA approved
Grade Level: 10-12
Estimated Work Outside of Class: 5 hrs per week

Course Description:
The Physics C: Mechanics course is equivalent to a one-semester, calculus-based, college-level physics course. It is especially appropriate for students planning to specialize or major in physical science or engineering. The course explores topics such as kinematics; Newton's laws of motion; work, energy and power; systems of particles and linear momentum; circular motion and rotation; and oscillations and gravitation. Introductory differential and integral calculus is used throughout the course.

Laboratory experience must be part of the education of AP Physics C students and should be included in all AP Physics courses. Colleges may require students to present their laboratory materials from AP science courses before granting college credit for the laboratory, so students are encouraged to retain their laboratory notebooks, reports, and other materials.

Students are strongly encouraged to take the AP Exam in May.

Prerequisite:
Completion of AP Calculus AB, AP Calculus BC, or College Math with a C or higher OR concurrent enrollment in AP Calculus AB, AP Calculus BC, or College Math

Recommended Prerequisite Skills:
Graphing skills and ability to analyze graphs.
Good ability to solve word problem
Mastery in Differentials and Integration

Course Grade Categories:
- Individual work/Project: 10%
- Labs: 30%
- Assessments:: 60%

Major Assessments/Units/Topics:
This course applies both differential and integral calculus and provides instruction in each of the following six content areas:

1. Kinematics : Vectors, Vector Algebra, Vector Components, Coordinate Systems, Displacements, velocities, and Accelerations
- Motion in one dimension
- Motion in two dimensions; including projectile motion
  *Quiz, Test, and One dimensional motion Experiment using Motion sensor
  and Projectile Motion Experiment

2. Newton's laws of motion and Circular Motion:

- Static Equilibrium; First Law
- Dynamics of a single particle; second law
- System of two or more objects; third law
- Uniform Circular Motion

*Quiz, Test, Second law lab and Friction lab, UCM lab

3. Work, energy and power:

- Work and Work-Energy theorem
- Forces and Potential Energy
- Conservation of Energy
- Power

*Quiz, Test, Work by Variable force Lab

4. Systems of particles and linear momentum:

- Center of mass
- Impulse and Momentum
- Conservation of Momentum, Collisions

*Quiz, Test, Momentum-Impulse lab, Elastic and Inelastic Collision

5. Rotation:

- Torque and Rotational Statics
- Rotational Kinematics and Dynamics
- Angular Momentum and its Conservation

*Quiz, Test, Rotational Dynamics Lab

6. Oscillations:

- Simple harmonic Motion: Dynamics and Energy relationships
- Mass on a Spring
- Pendulum and other Oscillations
- Energy in SHM and
- Pendulum lab

*Quiz, Test, Energy in SHM and Pendulum lab

7. Gravitation:

- Newton's Law of Gravity
- Orbits of Planets and Satellites

*Quiz, Test, Simulation Lab on Planetary motion