# AP Physics C

Physics introduces the basic underlying principles that govern the physical universe and an opportunity to meet these principles through group work, discussion, laboratory experiences and projects. It is presented in a logical manner and is designed for students who plan to continue their education after high school. Mathematics is the language of physics; therefore, a strong mathematical background is needed for the course. A scientific calculator is a necessary tool for the course.

Class Website - https://sites.google.com/site/daysphysicsclass/
Email - mday@efsd.net
Phone - 412-896-2349 ext. 7902
Twitter - @MDayEF

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|---|---|
| BE SAFE | Listen to staff and maintain personal space |
| RESPECT OTHERS | Be on time, be polite, and use appropriate language and tone |
| ACCOUNTABLE | Be prepared, be honest, do your own work, and use electronic devices only when permitted |
| VICTORIOUS | Do your best work and celebrate academic success |
| ENTHUSIASTIC | Have a positive attitude and Take ownership of learning |

# ACADEMIC INTEGRITY - SCIENCE

- Try! Listen! Think!
- Use your iPad and phone for educational purposes
- Be prepared for your class
- Follow directions
- Be safe in the lab
- Do not cheat
- Do not get off task or give up
- Do not damage school property

## Grading Procedures

1. Grades are based on tests, quizzes, labs, projects, and homework.
    - Assignments will be given and collected daily.
    - Laboratory write-ups will be completed mainly in groups.
    - Quizzes will be given at various times during a chapter.
        - Make-up quiz will be different than the quiz given on the scheduled quiz date.
    - Tests will be given at the end of each chapter.
    - Bonus points will be offered at various times during the year.
2. **As per school policy:** No assignments will be taken late. Any assignment that is not turned in on the due date will be given an automatic zero.
3. **As per school policy:** Students will be given one day to make up assignments for every day they are absent. Any assignments not turned in by this make-up date will be given a zero.
4. **As per school policy:** No credit will be given for assignments that are partially or completely copied from someone else's work.

## Classroom Rules and Procedures

1. Be in your seat and ready to work when the bell rings.
2. Students will only be allowed to leave class with permission.
3. Answer bell ringer questions as soon as you enter class and prepare for class to begin. Bell ringers are timed (4 minutes after bell rings) and reviewed every day.
4. Your iPad is all you will be required to bring to class daily.
    a. Your iPad is a school issued resource; I expect it to only be used as such during my class.
    b. If you choose to use your phone it may only be used for educational proposes as well.
    c. All electronics must be always placed flat on the table.
5. All students will be paired with another student.
    - Your partner is the person sharing your table.
    - You will be expected to help each other understand class material.
    - Groups will be split, and students will work individually if both students are not actively working.
    - Students will only be permitted to talk to their partner.
6. Students are responsible for all their own make-up work.
    - The daily list of topics covered, and assignments given will be listed on the calendar on the classroom website, on Canvas, and in the weekly email.
7. Closers will be given with 3 minutes remaining in each class.

## Actions for breaking classroom rules

1. Warning
2. Student conference / Parent email
3. Teacher detention / Parent phone call
4. Office referral – An office referral will be issued for all following offences

❖ **I have reviewed and understand all the information presented on this page.**

**Student: Name** _____

**Signature** _____

**Email Address:** _____

**Parent / Guardian: Name** _____

**Signature** _____

**Email Address:** _____

# Syllabus for AP Physics C

Introduction to classroom rules and class website
Chapter 2 – Motion One Dimension
- Reference Frames and Displacement
- Average Velocity
- Instantaneous Velocity
- Acceleration
- Motion at Constant Acceleration
- Solving Problems
- Falling Objects
- Graphical Analysis of Linear Motion

Chapter 3 – Vectors
- Vectors and Scalars
- Addition of Vectors-Graphical Methods
- Subtraction of Vectors, and Multiplication of a Vector by a Scalar
- Adding Vectors by Components
- Projectile Motion
- Solving Problems Involving Projectile Motion
- Projectile Motion Is Parabolic
- Relative Motion

Chapter 4 – Motion in Two Dimensions
- Dynamics: Newton's Laws of Motion
- Force
- Newton's First Law of Motion
- Mass
- Newton's Second Law of Motion
- Newton's Third Law of Motion
- Weight – the Force of Gravity; and the Normal Force
- Solving Problems with Newton's Laws; Free Body Diagrams
- Problems Involving Friction, Inclines
- Problem Solving – A general approach

Chapter 5 – The Laws of Motion
- Work Done by a Constant Force
- Work Done by a Varying Force
- Kinetic Energy, and the Work-Kinetic Energy Principle
- Potential Energy
- Conservative and Nonconservative Forces
- Mechanical Energy and its Conservation
- Problems Solving Using Conservation of Mechanical Energy
- Other forms of Energy
- Energy Conservation with Dissipative Force
- Power

Chapter 6 – Circular Motion and Other Applications of Newton's Laws
- Momentum and its Relation to Force
- Conservation of momentum
- Collisions and Impulse
- Conservation of Energy and Momentum in Collisions
- Elastic Collisions in One-Dimension
- Inelastic Collisions
- Collisions in Two or Three Dimensions
- Center of Mass
- CM for the Human Body
- CM and Translational Motion

Chapter 7 – Energy of a System
- Systems and Environments
- Work Done by a Constant Force
- The Scalar Product of Two Vectors
- Work Done by a Varying Force
- KE and the Work-KE Theorem
- Potential Energy of a System
- Conservative and Nonconservative Forces
- Relationship Between Conservative and Nonconservative Forces
- Energy Diagrams and Equilibrium of a System

Chapter 8 – Conservation of Energy
- The Non-isolated System: Conservation of Energy
- The Isolated System
- Situations Involving Kinetic Friction
- Changers in Mechanical Energy for Nonconservative Forces
- Power

Chapter 9 – Linear Momentum and Collisions
- Linear momentum and Its Conservation
- Impulse and momentum
- Collisions in One Dimension
- Collisions in Two Dimensions
- The Center of Mass
- Motion of a System of Particles
- Deformable Systems
- Rocket Propulsion

Chapter 10 – Rotation of a Ridged Object
- Angular Position, Velocity, and Acceleration
- Rotational Kinematic
- Angular and Translational Quantities
- Rotational Kinetic Energy
- Calculation of moments of Inertia
- Torque
- The Ridged Object Under a Net Torque
- Energy Considerations of Rotational Motion
- Rolling Motion of a Ridged Object

Chapter 11 – Angular Momentum
- The Vector Product and Torque
- Angular Momentum: The Non-isolated System
- Angular Momentum of a Rotating Ridged Object
- The Isolated System: Conservation of Angular Momentum
- The Motion of Gyroscopes and Tops

Chapter 15 – Oscillatory Motion
- Motion of an Object Attached to a Spring
- The Particle in Simple Harmonic Motion
- Energy of the Simple Harmonic Oscillator
- Comparing SHM with Uniform Circular Motion
- The Pendulum
- Damped Oscillation
- Force Oscillations

Chapter 13 – Universal Gravitation
- Newton's Laws of Universal Gravitation
- Free-Fall Acceleration and the Gravitational Force
- Kepler's Laws and the Motion of Planets
- The Gravitational Field
- Gravitational Potential Energy
- Energy Consideration in Planetary and Satellite Motion