

# Classical High School

## AP Physics C: Mechanics

Syllabus 2023-2024

Instructor: Mr. Butler

Text: “*University Physics*” 13<sup>th</sup> Edition      Author: *Young & Freedman*

Prerequisite: Calculus AB - Completion or Concurrent Enrollment

Required Materials: Scientific Calculator, Slot Folder, Notebook, Pencils

Website: [Physica.cloud](https://www.physica.cloud)

### Course Description

AP Physics C: Mechanics is a full year, introductory, calculus-based physics course designed to present students with the opportunity to study physics at the college level. The application of calculus, depth of concept development, pace of topics covered, and inquiry-based lab experiments combine to give students the experience of learning the concepts of mechanics as presented in a first year college or university physics course. This course is designed to introduce students to fundamental physical concepts in a sound and rigorous manner while successfully preparing them for the AP Physics C: Mechanics exam in May. This AP Physics course will follow the Physics C: Mechanics sequence of topics outlined in the *Advanced Placement Program Course Description Handbook*.

### Course Approach

The major goal of this course is to prepare the student to achieve a high score on the *AP Physics C: Mechanics Exam*. Additional goals of the AP Physics course include developing students' critical thinking skills and systematic problem solving strategies. Through the analysis of a wide variety of physical phenomena, students are encouraged to make careful observations, question information, analyze and interpret data to discover patterns; to think beyond the obvious, validate their statements and conclusions using physical laws and principles and to observe natural phenomena with new insight.

### Calculus Review

To start the year on a solid mathematical footing, all students should read and complete the assignments in ***Quick Calculus: A Self-Teaching Guide by Danile Kleppner and Norman Ramsey***. This book helps students learn or review basic differentiation and integration calculus techniques that are used extensively in the course. These techniques are essential in being able to successfully develop and derive meaningful solutions to problems encountered in the course.

### Summer Reading

During the summer break students will read one book that relates to the science and nature of physics. Below is listed the book students should read this summer. An assessment covering the material from the book will be given during the first quarter.

30-Sec Physics, B. Clegg

### Evaluation

<u>Quarter:</u>		<u>Midterm:</u>		<u>Final:</u>	
Tests	70 %	1 <sup>st</sup> Quarter	40 %	Final Exam	10 %
AP Exam Prep	30 %	2 <sup>nd</sup> Quarter	40 %	Midterm Exam	10 %
& Labs		Midterm Exam	20 %	Quarter Grades	80 %

## Retests

Students are afforded retest opportunities for scores less than 75. Only one retest is given for each test. Test and retest scores are added for the Skyward entered score for that test.

Highest score after retest is 75.

Retests are given only after:

- (1) a review of test questions and answers with instructor to identify concepts of weakness.
- (2) the student revisits and restudies course material that was not understood.
- (3) completion of a Concept Correlation identifying specific places within the resources where “missed” concepts and principles are found.

Points awarded on the retest are based on the number of points lost on the test. If a student receives no points on a retest the original test grade is entered into Skyward. A grade of 50 will be entered into Skyward for any student whose cumulative grade is less than 50 after taking the retest.

## Concept Correlations

As per College Board protocol, test questions are not released and students may not copy test questions in any way. After a test is corrected and handed back, students have the opportunity to review the test questions and answers with the instructor. The instructor will provide feedback to explain the questions and answers, if needed. A “concept correlation” sheet is provided to each student that identifies the concept, principle or application skill of each test question. Students correlate questions they missed on the test with the items on the concept correlation sheet. The concept correlation serves as an individual study guide identifying concepts to revisit for deeper understanding and prep for the retest.

## Absences

Due to the amount of material and pace with which it is covered, students who are absent can easily fall behind. The student is responsible for any assignments missed/owed during an absence. On the day the student returns from an absence, he/she is expected to see the instructor to get the assignments missed and to turn in any assignments that are owed.

## Make-Up Policy

Tests/Retests: Students who are absent on the day of a test/retest may make up that test/retest in an alternate version on the day they return to school, provided the absence is excused. No test/retest make-up is allowed for an unexcused absence.

Labs: Due to the time involved in lab preparation, setup, and break-down, a make-up for a lab may not always be possible. In this case, an alternate assignment related to the lab will be assigned.

### Due Dates

**The importance of assignment due dates cannot be overemphasized. It has been shown that adhering to assignment due dates promotes a greater level of success by affording the following:**

- (1) receive timely feedback regarding strengths and weaknesses gauged to concept understanding and application**
- (2) keep pace with the course so as not to fall behind on course material**
- (3) ensure timely preparation for tests and retests**

**Be aware that late assignments will be accepted with reduced credit!**

## Homework/Assignments

**This is an advanced course taught at the college level.** The student should expect to devote the requisite amount of time each day working on physics assignments. Additional study time will most likely be necessary when preparing for tests, lab reports and the midterm/final exams.

## Reading/Questions/Exercises/Problems

Textbook readings, questions, exercises and problems are designed to provide the student with valuable opportunities to apply the principles studied in class. These are an important and essential component of the learning experience in physics. Successful understanding and application of the physical principles studied depends to a large extent on devoting adequate time solving and answering the assigned exercises, problems and questions whether from textbook, free-response or online platform modes.

## AP Exam Prep

- MyAP
- Concept Apps
- Physica Activities
- Textbook Problems
- AP Practice Questions

## Focus Questions

Upon entering the class each day, students are expected to immediately begin their work in physics by answering a focus question. The focus question is designed to engage students, activate their prior knowledge and relate to the topics being studied in the upcoming or previous lessons. A short session involving direct questioning, analysis and reflective discussion will follow.

## Laboratory

Conducting laboratory experiments and writing scientific laboratory reports are an integral part of the AP Physics course. This includes pre-lab discussions, designing and setting up lab apparatus and equipment, running the labs and collecting experimental data and class discussion of lab results. In this AP Physics course, laboratory experiments have been designed primarily to test and verify those laws and principles which are being covered in class. Through these laboratory investigations, students will acknowledge the validity of the laws and principles describing natural phenomena.

Depending on class size, lab teams of three to four students will be assigned to conduct experiments, collect the data and to produce the lab report. Lab partners need to work cooperatively to discuss their observations and results and to interpret those results. Each team must work collaboratively and is responsible for writing one lab report. Each team member receives the same lab report grade. It is assumed that each team's lab report will be a product involving individual creativity! A laboratory report format will be given to you by your instructor. This format will outline the method for writing lab reports.

### Cell Phone Policy

**Cell phone use is NOT allowed at any time during instruction.**

**The use of cell phones interferes with teaching and learning.**

**Cell phone use distracts both students and teacher and interrupts instruction.**

- **Students are required to dock their phones immediately upon entering the classroom!**
- **Students may collect their phones once the period has ended!**