

Classical High School

AP Physics C

Syllabus

Instructor: Mr. Butler

Text: “*University Physics*” 13th Edition Author: *Young & Freedman*

Prerequisite: Completion of Calculus AB w/minimum grade of B-

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

Website: www.physica.cloud

Course Description

AP Physics C 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 physics concepts in a sound and rigorous manner while preparing them to successfully complete the AP Physics C Mechanics exam in May. This AP Physics course will follow the Physics C 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 *A.P. 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 will read and complete the assignments in ***Quick Calculus: A Self-Teaching Guide*** by ***Danile Kleppner and Norman Ramsey***. This book helps students initially learn or review the basic differentiation and integration techniques needed to understand the physical principles and to apply those principles in deriving and developing meaningful solutions to problems. A quiz covering the material will be given during the first two weeks of school.

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 A test covering the material from the book will be given during the first quarter of school.

30-Sec Physics B. Clegg (Summer 2020)

Evaluation

<u>Quarter:</u>		<u>Midterm:</u>		<u>Final:</u>	
Tests/Quizzes	50 %	1 st Quarter	40 %	Final Exam	10 %
AP Exam Prep	30 %	2 nd Quarter	40 %	Midterm Exam	10 %
Laboratory	20 %	Midterm Exam	20 %	Quarter Grades	80 %

***Retake tests and quizzes will be provided as an opportunity for concept mastery.**

~ Due Dates Are Important ~

Late Work Will Be Accepted With Reduced Credit Score!

Quizzes/Tests (Retake)

Students have the opportunity to retake a test if they fail only after careful review of test with instructor to identify concepts of weakness. Students will also have the opportunity to retake any quiz to develop mastery and to improve their grade only after careful review of the quiz to identify concepts of weakness.

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

Quizzes/Tests: Students who are absent on the day of a quiz/test may make-up that quiz/test and will be prepared to take an alternate version on the day they return to school, provided the absence is excused. No quiz/test make-up is allowed for an unexcused absence.

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

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 time will be necessary when preparing for quizzes, tests, or the midterm/final exam.

Homework assignments are in the form of:

- ✓ Focus Questions
- ✓ Newtonian Tasks
- ✓ Textbook Readings
- ✓ Laboratory Reports
- ✓ Textbook Concept Questions
- ✓ Cooperative Group Problem Sets
- ✓ AP Online Problems

Questions/Exercises/Problems

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 physics principles depends to a large extent on devoting adequate time solving and answering the assigned exercises, problems and questions.

Two problem sets will be assigned for each chapter:

Individual: This problem set includes a variety of textbook questions, exercises and problems for students to work individually through the online MyAP College Board program.

Cooperative Groups: These problem sets and Newtonian Tasks include selected exercises and problems provided by the instructor for student teams to work solutions and turn in on test day.

Focus Questions

Upon entering the class each day, students are expected to immediately begin their work in physics class by answering a focus question which will be shown on the *SmartBoard*. This focus question is designed to engage students and activate their prior knowledge related to the topics being studied in the upcoming or previous lessons. A short session of interactive instruction involving direct questioning, analysis and reflective discussion related to the focus question will follow.

Laboratory

Conducting laboratory experiments and writing scientific laboratory reports are an integral part of the AP Physics course. Approximately 25% of instructional time is devoted to doing laboratory work. 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. In addition, it is hoped that through these laboratory investigations, students will acknowledge for themselves the significance of those laws and principles as being the fundamental means by which we account for and explain natural phenomena.

Groups of three or four students will be assigned to conduct laboratory experiments and to collect the experimental data. Lab partners are encouraged to discuss their observations and results and to work cooperatively to interpret those results. However, each student is responsible for writing his/her own lab report. This includes generating graphs, doing computations/calculations and developing/writing conclusions...It is assumed that the 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.

Laboratory Portfolio/Notebook

Each student will be required to complete a laboratory portfolio and notebook. The portfolio will be in the form of a binder and will include all the students written lab reports. Several options for lab notebooks will be discussed. Lab portfolios and notebooks will be submitted each semester and grades will be weighted as part of the final average. The format for the lab portfolio and notebook will be reviewed by your instructor and will outline methods of organization and construction.

Guided Inquiry/Student Centered Learning

To foster the development of critical thinking skills, the following guided inquiry and student-centered learning components have been incorporated into the course and are practiced during each topic covered.

1. Student-lead Discussions
2. Cooperative Group Work
3. Film Synopsis
4. AP Exam Practice Sessions
5. Interactive Computer Applets and Activities
6. Pre/Post Laboratory Analysis