

Physics 247 CP Course Syllabus 2025-2026

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Classroom: D209

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Course Description

Physics is a lab-based course that requires students to apply mathematical principles to solve practical problems. Students will gain an understanding of classical mechanics dealing with one- and two-dimensional motion, Newton's laws, conservation of work and energy, impulse and momentum, circular motion, thermodynamics, wave phenomenon, and the fundamental principles of electricity and magnetism.

Course Overview

Lectures and various learning activities will serve to highlight the major aspects of a particular topic by focusing upon the pertinent theory and problem-solving techniques. Students are expected to take notes daily. Students will be required to perform small-group laboratory experiments as part of each unit of study. Students are responsible for reading assigned material as well as completing assigned homework problems.

Course Materials

- Textbook (provided): Conceptual Physics (2009) by Hewitt (ISBN: 9780133647495) Pearson.
- Binder with loose-leaf paper or notebook/folder for note-taking
- Writing utensils (pens/pencils)
- District-provided MacBook (fully charged!)

Grading Policy

All marking period grades are calculated using a weighted average:

- Tests (50%)
 - A *minimum* of three tests containing theoretical questions and problems are scheduled each quarter (one per unit).
 - In-class tests include multiple choice and open-ended problems.
 - Make-up tests are administered at the sole discretion of the instructor provided the absence is authorized as legitimate.
 - Students with an IEP with a provision for extended time must make such arrangements prior to the administration of any assessment. If the assessment must be divided into one or more sections to allow for additional time, the students must complete the remaining section(s) the same or the next school day during tutorial, grade room, or after school.
- Lab Reports and Projects (25%)
 - Each lab group member receives the same score unless circumstances warrant otherwise.
 - The lab report score is based upon the group's performance of the experiment, the description of the procedures, and the analysis/interpretation of the data.

- Homework/Classwork Assignments/Quizzes (25%)
 - Students must complete problem sets corresponding to the material discussed in each unit.
 - Assignments are to be completed independently and honestly.
 - Not all assignments will be graded. However, it is the student's responsibility to complete all assignments.
 - Homework will typically be reviewed at the start of class. Students are encouraged to ask questions concerning homework assignments at this time.

There is no individual extra credit available in this course.

When a student does not submit an assignment or complete an assessment (quiz/test) for reasons other than an unexcused absence, a (M)issing code will be posted to the GENESIS grade book which will assign a grade of zero, until the student completes the assignment/assessment in keeping with department practice. Although no credit can be awarded, the student is expected to complete the missed work to benefit from teacher feedback.

MacBook Use

Students are responsible for bringing their district-provided MacBook device fully charged and operational to class each day. The device may be required for the administration of an assessment or for the completion of a learning activity where no paper option is available. Failure to have an operational MacBook may adversely impact the scoring of graded assignments.

Contact Hours

Additional assistance is available to students during tutorial and I/E periods in room D209.

Assessment Security

The department must ensure the security of common summative assessments administered each semester and across multiple sections taught by several teachers. Assessments in some cases may include publisher copyrighted content prohibiting retention by students. For these reasons, some graded assessments will only be available for students to review during class time, but returned and retained by the teacher.

Although students lose ownership rights to assessments submitted through Google Classroom, the ownership reverts to students upon return of these graded assignments. These graded assignments may also be retained by the teacher after review by students to minimize the possibility of plagiarism by other students. Students copying and/or distributing any part of a secure test or submitted assignment will be subject to disciplinary action in keeping with the academic dishonesty policy

Use of Graphing Calculators & Personal Electronic Devices

Students are allowed to use graphing calculators during tests/examinations provided the student shows evidence that all stored programs have been cleared beforehand.

Permission to use personal electronic devices (smart phones) is granted to students when engaged in laboratory investigations for the purposes of acquiring, recording, and/or analyzing experimental data. Such devices may also be used for individual online research during problem-solving activities or classroom discussions.

Laboratory Investigations

Each group is required to submit a detailed analysis of the experiment following the prescribed format. The typed report must contain a step-by-step description of the procedures, collected data and sample calculations in addition to a discussion of the theory. At least one lab report may be scored in part with the ELA rubric using proper citation and formatting according to the APA Style Guide.

An experiment-specific rubric is used to assess each lab that indicates the credit awarded for performing the experiment, formatting the report, listing procedures, completing the data charts with sample calculations and any graphs, and presenting a thorough discussion and analysis.

Students are obligated to follow lab safety rules and reimburse the school for any damage made to the equipment. No food or drink is allowed to be consumed in the lab.

Assignments

The Rancocas Valley Regional High School District strongly supports independent practice and the extension of learning as an integral part of a student's academic program. Student achievement increases when homework is regularly assigned and when students complete it as part of their total program. Homework encourages student self-discipline, independence, and responsibility. Homework assignments can serve to help students practice previously-learned material, learn new material, incorporate higher-order thinking skills, and improve study skills.

Parents are encouraged to access Genesis on a regular basis to monitor student progress on assignments. Students are expected to submit all work by the required due date. No new daily assignments due the next school day will be posted after school hours unless advanced notice has been communicated directly to students. Additionally, nothing that supports a daily assignment will be posted after school hours. Parents are encouraged to provide an environment in which students can complete homework. It is important that parents be aware of the types of assignments given and assignment deadlines so that they can monitor effectively.

It is the practice of the Science & Technology Department to reduce credit by 10% for each school day that any assignment is submitted after the due date to a maximum of three days at which time no credit will be given for the assignment.

Students absent for any reason are expected to make up missed work. The student shall be responsible for requesting missed assignments and any assistance required. **In general, students will be allowed one (1) day to make up missed work for each one (1) day of an excused absence. Reasonable accommodations will be made to extend time for students as**

warranted. Any class cut may result in a grade of zero for the work that was missed that day (including assessments). For any unexcused absences over six per semester course (three per quarter course) will result in a grade of zero for all assignments AND assessments administered on those dates, as per the district attendance policy.

Academic Honesty

Students are expected to be honest in all of their academic work. Cheating on examinations, includes but is not limited to, the non-authorized use of books or notes, the use of crib sheets, copying from other students' papers, exchanging information with other students orally, in writing, or by signals, obtaining copies of the examination illegally and other similar activities. Plagiarism is not permitted in term papers, themes, essays, reports, images, take-home examinations, and other academic work.

Plagiarism is defined as stealing or use without acknowledgment of the ideas, words, formulas, textual materials, online services, computer programs, etc. of another person, or in any way presenting the work of another person as one's own. This would also include students submitting work products that they have submitted previously to other teachers or institutions. Falsifications, includes forging signatures, altering answers after they have been graded, the insertion of answers after the fact, the erasure of grader's markings, and other acts that allow for falsely taking credit.

A student found guilty of academic dishonesty may be subjected to a full range of penalties including, but not limited to, reprimand and loss of credit for all of plagiarized work. Any student who lends his/her work to another and thus facilitates an act of plagiarism is subject to the same consequences. Any graded assignment (e.g. homework, classwork, tests, quizzes, research projects, etc.) that the teacher deems to be plagiarized or copied will result in a zero for the assignment.

A student will be permitted to resubmit an assignment (not applicable to tests and quizzes) for half credit if the assignment is valued at more than 10% of the total number of points for the quarter. The assignment must be resubmitted within two days of being notified by the teacher that the assignment is plagiarized in some fashion. Teachers must report incidents of academic dishonesty to the discipline office.

Any student who lends his/her work is subject to the same consequences. If the student lending the work or facilitating the academic dishonesty has already completed the course that is involved, disciplinary action will be taken in lieu of academic penalty.

Technology Access

Classroom documents, assessments, and other media may require the student to have access to web-enabled technologies outside of class time. If for any reason, a student does not have access to such technologies, he/she is responsible for contacting the teacher before any deadlines for assessments to make alternate arrangements.

Artificial Intelligence (AI) Guidelines

Artificial Intelligence (AI) technology offers a wide range of tools and resources that can enhance your learning experience, personalize your education, and better prepare you for the future. You will have access to AI-powered tools that can help you gather information more efficiently and develop critical thinking and problem-solving skills. To ensure your safety and security, all AI tools and platforms will comply with federal and state regulations regarding data protection, including FERPA (Family Educational Rights and Privacy Act). You will be provided with specific [guidelines](#) as to the appropriate and acceptable use of AI. Failure to document your use of AI when completing an assignment will be considered a violation of the Academic Honesty Policy.

Course Outline

(Subject to change)

Unit 1 - Rectilinear & Projectile Motion

This unit will cover the basic motion variables of distance, velocity and acceleration and derive the mathematical relationships between these variables. The vector nature of these variables will be explored in 2-dimensional projectile motion, including calculations and practical real-world applications. The concept of free fall will be explored as a specific application of constant acceleration motion.

Experimentation: Free-Falling Bodies (Determination of Acceleration Due to Gravity)

Unit 2 - Newton's Laws of Motion

This unit will cover the variable of motion and its expansion into Newton's 3 Laws of Motion. Aristotelian and Newtonian world-view will be compared and contrasted in exploring the Laws of Motion. Specific forces of friction and gravitation will be examined, and these forces will be applied in real-world applications through use of Newton's Laws free body diagram analysis.

Experiment: Newton's Second Law of Motion and/or Composition of Force (Force Table)

Unit 3 - Laws of Conservation of Energy & Momentum

This unit will cover the analysis of Newton's Laws through the concepts of energy and momentum. The Law of Conservation of Energy will be derived as an extension of Newton's 1st and 2nd Laws through the Work-Kinetic Energy Theorem. Momentum and its conservation will be derived as an application of Newton's 3rd Law of Motion and will be related to energy through analysis of collisions.

Experiment: Conservation of Linear Momentum (One-Dimensional Collision of Carts on Air Track)

Unit 4 - Thermodynamics & Gas Laws

This unit will cover the concepts of energy beyond mechanics to applications of thermal energy. Calorimetry, states of matter and state change, thermal expansion and the gas laws will be analyzed as additional applications of the Law of Conservation of Energy.

Experiment: Calorimetry

Unit 5 - Wave Phenomenon: Light & Sound

This unit will cover wave dynamics in the specific applications of light and sound. Basic wave interactions and definitions will be applied to sound and light. Sound interactions will include interference and resonance, loudness and Doppler Effect, with an emphasis on practical applications. The wave/particle duality of light will be investigated, as well as reflection and refraction with mirrors and lenses.

Experiment: Lenses & Mirrors (Optical Bench)

Unit 6 - Electrostatics, DC Circuits, and Magnetism

This unit will cover the analysis from electrostatics to electric circuits to magnetism and electromagnetic induction. A derivation of Coulomb's law will lead to the concepts of electric field and electric potential. Potential progresses to Ohm's law and the analysis of voltage, resistance and current in electric circuits. The unit concludes with magnetism and electromagnetic induction and an analysis of real-world technology and applications.

Experiment: DC Circuits (Snap Kits)