

MONTE VISTA CHRISTIAN SCHOOL
SCIE 4520, Physics
Course Syllabus

Course Description:

Physics is the study of matter, energy, and how they are related in a manner more fundamental than in previous science courses. Through the various mathematical and physical topics instructed, students will generate a deeper understanding of the laws that govern the various aspects of our universe. Furthermore, students receive exposure to different philosophical viewpoints regarding the beginning and creation of the universe, in order to show the complexity and interweaving that point directly to God, the Divine Creator.

Curricular Mapping:

This course will continue to develop student abilities and thought processes in the area of science and experimentation. The subjects of study in Physics include: the mechanics and dynamics of motion (emphasis on vector calculations); circular and rotational motion; linear and angular momentum; simple harmonic motion; electricity; magnetism; the analysis of mechanical, light, and sound waves; the thermodynamics of materials; the properties of fluids; recent discoveries in particle physics, and an introduction to astrophysics. This course will build on the topics learned in previous laboratory based science courses and algebra courses in order to prepare students for future Physics courses in college.

Course Objectives:

Upon the successful completion of this course the student will be able to:

1. Develop curiosity and involvement with phenomena in their natural environment.
2. Develop appreciation for the contribution of science to the world around us.
3. Understand and utilize the close relationship between mathematics and physics.
4. Prepare for college level physics courses.
5. Most importantly, to develop a deeper understanding of the intricacies of God's handiwork in our universe.

Text:

Course material will be provided by your instructor and available in the classroom.

Prerequisites:

The nature of the material in this course requires that students have a considerable facility in mathematics. Therefore, the following courses must be taken and both semesters passed prior to enrolling in Physics:

1. Algebra II: passed with a B- or better for both semesters OR Algebra II Honors; passed with a C or better for both semesters
2. Chemistry: passed with a C or better for both semesters OR Chemistry Honors: passed with a C or better for both semesters – this does not include chemistry fundamentals.

The instructor *recommends* that the following courses be either previously taken and passed with a C or better for both semesters, or taken concurrently with physics:

1. Precalculus/Trigonometry OR Precalculus/Trigonometry Honors (full year)

Course Outline:

1. Measurement, Units, and Elementary Problem Solving
2. Newtonian Kinematics
 - a. One dimensional motion
 - b. Two dimensional and projectile motion
3. Newtonian Dynamics
 - a. Forces
 - b. The laws of motion
4. Work and Energy
5. Circular Motion and Gravitation
6. Linear Momentum
7. Rotational Motion and Angular Momentum
8. Simple Harmonic Motion
9. Electricity
 - a. Electric fields, forces, and interactions
 - b. Electric circuits and circuit elements
10. Magnetism
11. Light
12. Wave Motion and Sound
13. Thermodynamics and Heat Engines
14. Fluids
15. Modern Physics
 - a. Particle physics and the standard model
 - b. Astrophysics

Grading:

<u>Grade Book Categories</u>		<u>Semester Weighted Grading Configuration</u>	
Assignments	20%	Quarter	40%
Labs/Projects	30%	Quarter	40%
Quizzes	20%	Final Exam	20%
Tests	30%		

Explanation of Grade Book Categories

All student quarter grades will be weighted as follows:

1. Assignments 20%: Assignments are the place where the vast majority of the learning will take place. Many assignments will be done in class.
2. Labs/Projects 30%: We will have labs or projects on a weekly basis. These labs and projects are designed to illustrate how the principles of physics are at work in the world around us.
3. Quizzes 20%: There will be quizzes on a regular basis. These quizzes are short and are used to assess ongoing understanding of content.
4. Tests 30%: There will be tests on a semi-quarterly basis.

Homework Expectations:

Prepare for and expect 30 minutes of homework per week night, and 30 minutes of homework on the weekends.

Late Work Policy:

Students may turn in late work up to three class days late for partial credit. The breakdown on penalties is as follows:

- 1 class day late: 25% points deduction
- 2 class days late: 50% points deduction
- 3 class days late: 75% points deduction
- More than three class days late: no credit awarded

High School Standard Grading Policy:

Please refer to the policy and procedures posted online in our Parent-Student Handbook.

Class Policies:

The following class policies are non-negotiable. Please see the instructor if you have any concerns with your ability to follow these policies.

1. Textbook: It is the student's responsibility to obtain their own access to the textbook and homework. Reading and certain aspects of the homework will be done online and will require the use of a personal computer or iPad.

2. Tardiness: Class starts at the bell. Students are expected to have their pencils sharpened, have all required materials out on their desk, and be seated and ready for class when the bell rings.
3. Absences: Making up homework and tests is the responsibility of the student. Students absent on the day of an assessment (excused or unexcused) are required to make up the assessment in the ARC the day they return to class, starting at the beginning of the class period on the day of their return. In addition, students present in class on the day of an assessment are required to take the assessment regardless of any previous absences. The policies set forth in the Parent-Student Handbook will be followed regarding make-up work or test taking for any excused and unexcused absence. It is critical that each student find out what has been missed as soon as possible and plan accordingly.
4. Integrity: It is the responsibility of each student to establish and maintain integrity with each assignment and assessment. Collaboration is encouraged with homework, labs, and projects, but it is critical that students' seek to understand every part of these assignments on their own. Any student not following the policies set forth for a particular assessment will receive no credit for that assessment, copied homework will receive no credit. Absolutely no cheating will be tolerated on said assessments.

School Policies and Expected Student Learning Results (ESLRs):

Students are subject to all academic policies of the school as found in the Parent-Student Handbook. Furthermore, it is each student's responsibility to read and follow all academic policies of Monte Vista Christian School. In addition to addressing each ESLR every year, we target a specific ESLR each academic year for particular focus.

Tips for the Students:

Keep up with the content of the course. A commitment to completing and understanding daily assignments, lab assignments, and projects will result in a thorough understanding of the content and will lead to success in the course.

Miscellaneous:

The Required Materials:

1. Materials for projects throughout the course - \$60 (approximate out of pocket cost)
2. Video Physics App - \$4.99
3. SparkVue HD App - Free
4. E-Clicker Audience App - Free
5. Paper
6. Pencil
7. Notebook or folder to keep notes, homework, and quizzes