MONTE VISTA CHRISTIAN SCHOOL
SCIE 4550 AP Physics C: Mechanics
Course Syllabus

Course Description:
This course is a calculus-based physics course. This course emphasizes Newtonian mechanics, focusing on Newton Laws, Forces, Linear and Circular Motion, Energy, and Simple Harmonics. This course utilizes the tool of Calculus to better understand how the laws are interrelated and to know when and how to apply equations to a diversity of circumstances and applications. The content will be similar to that of a typical Calculus-based, introductory Physics course at the college level. Additionally, students will gain an appreciation for the order of the universe in which we live and will develop an understanding of how to test, measure, and discover properties of the world around us.

Curricular Mapping:
This course will continue to develop student abilities and thought processes in the area of science and experimentation. This course will build on the topics learned in Chemistry and Algebra II and prepare students for future Physics courses in college.

Course Objectives:
Upon the successful completion of this course the students will be able to:

1. Form scientific hypotheses and design labs to answer scientific questions, identifying independent and dependent variables, and knowing how to hold variables constant for the purpose of discovering quantifiable physical relationships.
2. Use differential and integral calculus to identify assumptions within physical laws, using an understanding of approximated constants to accurately recognize situations in which equations are reliable predictors of physical relationships.
3. Solve a wide variety of problems involving the topics of Linear Kinematics, Newton's Laws, Work and Energy, Circular Motion, Momentum, and Simple Harmonic Motion.
4. Solve some problems involving the topics of Electrostatics, Electric Currents, and Magnetism.
5. Through the AP test or dual enrollment, satisfy a first semester of college physics credit.

Text:
Your necessary digital texts for this class will be part of a "Required Course Materials Fee" thru the EdTech bookstore. This is a bundle purchase of digital texts for your full schedule of classes and will be available for purchase after 7/18/16. For further instructions please visit the 16-17 School Year icon on the MVCS homepage. Please note: some courses may require additional purchases outside of the course materials fee.

Prerequisites:

- AP Calculus AB or Calculus *or*
- Physics and concurrent enrollment in AP Calculus AB *or*
- Precalculus (A- or better) and concurrent enrollment in AP Calculus AB

Course Outline:

1. Newton's Laws
    a. Kinematics in one dimension
    b. Kinematics in two dimensions
    c. Newton's three laws
2. Conservation laws
    a. Impulse
    b. Momentum
    c. Energy and Work
    d. Power
3. Rotational Mechanics
    a. Uniform circular motion
    b. Rotational kinematics
    c. Newton's Theory of Gravity
    d. Simple Harmonic Motion
4. Electricity and Magnetism
    a. Electric Fields
    b. Electric Currents
    c. Magnetism

Grading:

Grade Book Categories		**Semester Weighted Grading Configuration**	
Homework	10%		
Formal Labs	10%	Quarter	40%
Activities/Projects	20%	Quarter	40%
Quizzes	30%	Final Exam	20%
Tests	30%		

All student quarter grades will be weighted as follows:

1. Homework 10%: Homework is the place where the vast majority of the learning will take place. Allow one hour of homework per night for this class. Late work will not be accepted.
2. Formal Labs 10%: There will be at least one formal lab each quarter. This is where you will learn how a scientists communicates their findings with the scientific community.
3. Activities/Projects 20%: We will have hands-on activities every week. Students will be expected to turn in their own write-up for each activity. Late work will not be accepted.
4. Quizzes 30%: There will be regular quizzes to assess ongoing content understanding. The quizzes will be weekly and will cover the homework for that week.
5. Tests 30%: We will have two tests per quarter. The tests will be cummulative and will model the expectations of the AP exam.

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 online text and homework. Homework will be done online and will require the use of a personal computer.
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 the day before a test are required to take the test with the rest of the class. The policies set forth in the Parent-Student Handbook will be followed regarding make-up work for any excused 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. Any student not following the policies set forth for a particular assessment will receive no credit for that assessment.
5. Late work: Adhere to all deadlines. Late work will not be accepted.

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:

1. The bulk of the learning takes place through the homework. Commitment to understanding each homework problem assigned is necessary to have a solid understanding of the content of this course.
2. At this level, students are expected to take ownership of their learning. The online learning tools that accompany the text are excellent. This includes videos, simulations, and links to relevant Phet simulations. Take advantage of these resources to learn the material.
3. Ask questions! Self assess and know the areas in which you need assistance. Get the help that you need.

Required Materials:

1. Graphing calculator approved by the College Board for AP testing (link below). https://apstudent.collegeboard.org/apcourse/ap-calculus-bc/calculator-policy
2. Daily access to a personal computer for the online homework and flash simulations
3. Video Physics App $4.99
4. SparkVue App. Free