



# 12<sup>th</sup> Grade Honors Physics

## Contact Information:

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## Course Overview:

The content of the twelfth grade Honors Physics course focuses on the classical physics and modern studies of physics interpretations about God's creation. This course takes a critical approach to the history of science, the relationship of science and religion, and the application of physics in electricity, magnetism, forces, gravity, energy, astrophysics, and geophysics. There will be various experiments conducted by students to understand well established elements in the physical universe and test current models for rational consistency. Students should be able to define science, its limitations, and its importance in glorifying God by understanding all that He has created.

## Course Content:

- A. Participation (35%)- Students are expected to engage in classroom discussion with thoughtful dialogue.
- B. Homework (15%)- Students will have to turn in homework material the day of the tests.
- C. Lab Reports (30%) - Students will conduct various experiments in class and there is an accompanied lab form that needs to be completely filed out after each lab.
- D. Tests (20%)- All tests will be taken from notes in class and are an accumulation of quiz questions from throughout the week or weeks. Students will be given a study guide, and/or we will review in class prior to a test.

**Nature of the Course:** This class is taught from the understanding that students are in the rhetoric stage of learning. In this stage, students are generally beyond the grammar/informative and dialectical level of understanding and desire to question/reason out their prior understandings of science. Students will be challenged to engage in self-examination to uncover if they understand their conclusions from the data collected and have if they have rational justification for these conclusions. By God's grace, through the challenges provided by the nature and content of this course, students will establish a defense of their faith and know how it relates to scientific inquiry and claims to the modern challenges to secular academies.

## Course Texts:

- A. *ESV Bible*
- B. *Conceptual Physics (NASTA Edition), 12/E by Paul G. Hewitt published by Pearson*

## Course Policies:

1. Make up/Late Work: Students must make up homework and quizzes missed on an excused absence. For everyday school day work is late will result in 10% deduction of points.
2. Integrity: plagiarism on any test, paper, project, or homework assignment will result in a grade of a zero for all persons involved. Parents and Headmaster will be notified of the incident.
3. Extra Credit: There is **NO extra credit**. But there is an opportunity to earn *Insurance points* on a test where the student may add more information of what they know about the question and with teacher's discretion, might help to compensate for a poor answer elsewhere on the test.

## Assistance Procedures:

- a. Ask thoughtful questions in class and be attentive in discussion
- b. Check Notes/Reviews/Packets online but you will need to FILL IN any Blanks with another student
- c. Preprint outlined Notes/Reviews/Packets from my website to bring to class
- d. Attend Afterschool help if you do not understand (even if you have a good grade)
- e. Study Groups before or after school (maybe even use Skype with parent's approval)

## 2017-2018 Outline of the Year

Teacher reserves the right to modify the tentative outline of the year

### **I. Newton's laws of motion**

- ✦ 1<sup>st</sup> law – Law of Inertia
- ✦ 2<sup>nd</sup> law –  $F=MA$
- ✦ 3<sup>rd</sup> law – Law of Reaction
- ✦ Vectors
- ✦ One directional motion
- ✦ Two directional motion
- ✦ Acceleration Due to Gravity
- ✦ Displacement and Time
- ✦ Projectile Motion
- ✦ Frictional Force

### **II. Nature of Energy**

- ✦ Common energy types
- ✦ Transfer energy types
- ✦ Kinetic vs Potential Energy

### **III. Philosophy of Science**

- ✦ Define Science
- ✦ Applied science verses theoretical science
- ✦ Empiricism in Science
- ✦ Examine Astrophysics, Geophysics, Bio Physics in light of General Revelation
- ✦ Realism vs Antirealism Philosophy in Science
- ✦ Instrument development and scientific discovery

### **VI. Geometric Optics and Color**

- ✦ Is Black and White Colors or Non-colors?
  - Additive, Subtractive, Perspective Color theories
  - Where color is in a material object?
- ✦ Is Light a wave or particle?
- ✦ Experiments with light manipulation

### **V. Quantum Mechanics**

- ✦ Foundational principles of Quantum Mechanics
- ✦ Law of Thermodynamics to life situations
- ✦ Energy and work
- ✦ Insulators, Conductors, Semiconductors

### **VI. Electricity and Magnetism**

- ✦ Basics of an electric charge
- ✦ Coulomb's Law
- ✦ Electrostatic force of charged particles
- ✦ Electric field on charge
- ✦ Strength of the electric field
- ✦ Coloumb's Law to the Bohr Model of the Atom
- ✦ Faraday's Law of Electromagnetic Induction
- ✦ Magnetism operations

### **VII. Astrophysics**

- ✦ Gravity and Planets
- ✦ Centripetal force and acceleration
- ✦ Standard Model of the Universe and issues
- ✦ Distance of the planets from the Sun
- ✦ Orbital periods of satellites

*I acknowledge that I have read and understand the expectations to succeed in this course.*

*Student Name:* \_\_\_\_\_ *Signature:* \_\_\_\_\_

*Parent Name:* \_\_\_\_\_ *Signature:* \_\_\_\_\_