

## Physics First 2010-2011

"Physics, which is a great part of human learning, is but the knowledge of God's admirable works; and hath any man the face to call himself God's creature, and yet to reproach it as vain human learning. [i.e. you can't speak ill of physics if you recognize you are God's creature]" -Richard Baxter, English Puritan

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text: "Physics: A First Course", Dr. Tom Hsu

Improved conceptual understanding -  
Keith Johnson. Physics for You. and Advanced Physics for You.

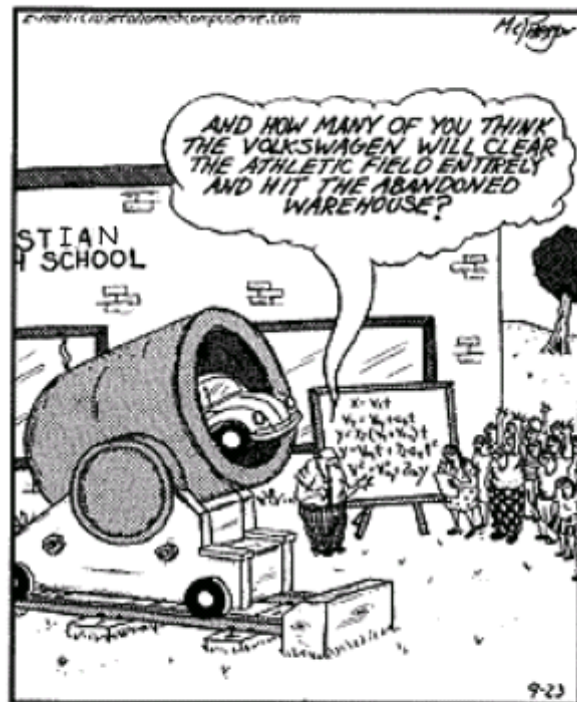
Paul Hewitt. Conceptual Physics.

### I. Rationale:

"The significant advantages of taking high school physics is one of the best kept secrets in American education. For most students physics is challenging. Many lack the confidence to attempt it unless encouraged to do so and all too often that does not happen. Part of the reason is the fact that relatively few high school science teachers, let alone counselors and administrators have had significant training in physics or are fully aware of its significance to career possibilities. Those students fortunate enough to attend a high school with a strong physics program should make every effort to take advantage of it for a multitude of reasons." \*

"Physics - the study of matter, energy and their interactions - plays a key role in the future progress of humankind. The support of physics is important because: \*\*

1. Physics is an exciting intellectual adventure that inspires young people and expands the frontiers of our knowledge about nature.
2. Physics generates fundamental knowledge needed for the future technological advances that will continue to drive the economic engines of the world.
3. Physics contributes to the technological infrastructure and provides trained personnel needed to take advantage of scientific advances and discoveries.
4. Physics is an important element in the education of doctors, chemists, engineers and computer scientists, as well as practitioners of the other physical and biomedical sciences.
5. Physics extends and enhances our understanding of other disciplines, such as the earth, agricultural, chemical, biological, and environmental sciences, plus astronomy and cosmology - subjects of substantial importance to all peoples of the world.
6. Physics improves our quality of life by providing the basic understanding necessary for developing new instrumentation and techniques for medical applications



Thanks to the innovative labs of teacher Mr. Bird physics quickly became Covenant's most popular course.

## II. Course Aims and Objectives:

### *Aims*

Students learn how physics describes the natural world, using quantities such as velocity, acceleration, force, energy, momentum, and charge. Through experimentation and analysis, students develop skills that enable them to understand the physical environment. They learn to make predictions about natural phenomena by using physical laws to calculate or estimate these quantities. Students learn that this description of nature can be applied to diverse phenomena at scales ranging from the subatomic to the structure of the universe and include every day events. Students will learn the orderliness of creation that began when it was spoken into existence, and is continually sustained by Christ's powerful word. Students will be able to communicate what they have learned orally, mathematically, using diagrams, and in writing.

Students gain understanding of how the scientific enterprise operates through examples of historical events. Through the study of these events, students understand that new ideas are limited by the context and philosophical presuppositions in which they are conceived, that these ideas may be rejected or modified for a more general application, that these ideas sometimes spring from unexpected findings, and that they grow or transform slowly through the contributions of many different investigators.

### *Specific Learning Objectives:*

By the end of this course, students will:

- communicate on understanding of physics concepts orally and in the written form. This will include proficiency with lab reports.
- enjoy God and admire the works of His hand, which is what physics is;
- collect data, analyze it, identify the source of our limitations, and evaluate the error;
- know the basic concepts of physics and be challenged to apply this knowledge to a variety of problems;
- collaborate on group laboratory activities and take responsibility for their results. Students will also design, plan, build, test, and evaluate an egg launch container and a mousetrap spring-powered vehicle.

1<sup>st</sup> semester units

Introduction to Physics

Motion & Force

Energy & Systems

Matter & Energy

***Egg Launch after school Thursday, October 28, 2010***

See [http://covenantchristian.org/bird/physics\\_1st\\_year.htm](http://covenantchristian.org/bird/physics_1st_year.htm) for details

2<sup>nd</sup> semester will include

Energy & Change (including some Rotational Motion)

Electricity & Magnetism

Vibration, Waves, and Sounds

***Mousetrap spring-powered vehicle competition in February***

***Research Paper and Presentation in April***

**III. Grading Procedures:** Grades are not weighted, except the final exam is 20% of the semester grade. The final is based on old tests. So if you don't get a question right the first time, learn how to understand it so you can get it right the next time.

Homework will generally be worth 10 points. You may typically have the opportunity to earn 110 out of 100 points on tests. Labs will be worth 20, 50 or 100 points. A quiz or test will occur most every week.

Do your homework! Turn it in to the green tray when it is due (i.e. generally the next day after it is assigned)! For WebAssignments you will have an extra day to do an assignment. I want you to learn. I want you to be successful and get a great grade.

*Late Work:*

1. Turn assignments in on time! They are generally due at the beginning of your class period. If you turn it in later in the period (i.e. you were doing last night's homework in class) or at the end of the day, you will not likely get full credit.
2. If an assignment is late you will get an "NC" = not complete. With too many NCs you will not get credit for taking the course. This is especially true if you have NC on labs or other big point assignments.
3. For each day an assignment is late you may lose 10 points. So if a homework assignment is late one day you could earn a zero. (You should at least be deducted some points.)

Do *your* best and ask questions. I like it when students ask questions, especially if they ask questions before class time.

#### **IV. Expectations**

**Laboratory Safety** (room orderliness) – Do not touch any lab equipment until taught how to use it and given permission to do so. Some activities are difficult to set up and students can mess things up for themselves and others if they don't follow instructions. Please help clean up and put things back when you are finished.

- *Turn you assignments in on time.* Many homework assignments will be done on weassign.net and you will be given at least two evenings to complete it. Get started on it as soon as possible so you can ask questions. Generally, your username will be your first initial and last name, institution is covenantchristian.in, and password is first initial and first three letters of your last name. For example, username: sbird, institution: covenantchristian.in, password: sbir
- *Come to class prepared.* Bring your book, binder, paper, pencil (and/or pen), and brain ready to learn. The TI-Nspire CAS will be used nearly every day in this class. You may also use your TI-Nspire if you have one. Try to be logged in to the TI-Nspire Navigator before the bell rings.
- You pay for 45 minutes of Christian education so **BE IN YOUR SEAT WHEN THE BELL RINGS** ready to learn. If you are late, then you are tardy. Quietly listen to the announcements.
- Honor the teacher, your peers and your family who have sent you here by not disrupting class. Class time is not social time, even during times of group activity. *Work efficiently and effectively.* Teaching and learning can be FUN, but if you do not show respect or self-control then work will be more serious.
- *Do not touch* lab equipment unless given permission. Reason: safety and sanity. Please do your best to put equipment back where you got it or where it really belongs. Be a blessing ☺
- *Only water* in a clear water bottle is allowed in the classroom – no food or other beverage. Bring your own bottle.
- Do NOT be late. Don't come to class and ask to go to the bathroom. Get it done on the way to class.

***The Code of Academic Integrity*** – Academic integrity is expected from each student. Any work submitted by a student in this course for academic credit will be the student's own work. [For this course, collaboration is allowed with your lab partner(s) and you are also encouraged to help each other out on homework.]

1. A student shall in no way misrepresent his or her work.
2. A student shall refuse to be a party to another student's failure to maintain academic integrity. Students will notify an authority if they become positively aware of cheating.
3. A student shall not in any other manner violate the principle of academic integrity.

#### *Examples of Violations*

The following actions are examples of activities that violate the Code of Academic Integrity will result in discipline. This is not a definitive list.

1. Knowingly representing the work of others as one's own.
2. Using, obtaining, or providing unauthorized assistance on examinations, papers, or any other academic work.
3. Fabricating data in support of laboratory or field work.
4. Forging a signature
5. Plagiarism (You must cite your sources.)

You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give "consulting" help to or receive "consulting" help from such students.

However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e-mail, an e-mail attachment file, a hard copy, etc.

Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for violation of this Code can also be extended to include failure of the course and school disciplinary action.

During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and school disciplinary action.

#### **V. Accommodations for students with disabilities**

I am available to discuss appropriate academic accommodations that may be required for student with disabilities. Requests for academic accommodations are to be made during the first two weeks of the semester, except for unusual circumstances, so arrangements can be made. Let me know as soon as possible if you need extra time for tests or if you don't have Internet access at home.