

Tree of Life School

*"Wisdom is a tree of life to those to those who embrace her."
Proverbs 3:18*

Physics Course Outline

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Course Outline Introduction

This course is a general introduction to physics, the study of the physical world of forces, motion, energy, sound, and light as created by God. The topics in physics are inescapable and applicable everywhere in real life as you walk down the street, play sports, use an Ipod, and sing in the choir. The variety of assignments and test will focus on factual information, skills in calculations, practical experiments, research, and writing. **This course carries a strong dependence on math skills because so many concepts in physics are quantified.** The goal of this course is to introduce the student to the language and the systematic study of physics as well as to instill an appreciation and wonder of God's creation.

How to Work Through The Course

This course has been divided into a **140 day schedule**. This will allow the student to follow a **four-day school week** and still complete the course in a normal academic year. The **fifth day** of each week can be used to **catch up on assignments**, do **extra reading**, or simply **take the day off** from the course. If, however, a five-day school week is more desirable, the student is encouraged to pursue this course and will be rewarded by early completion of the material. Care has been taken to provide specific instructions for each day's work. Therefore, **all work is to be completed in the order presented in the daily schedule**.

Calculating Your Final Grade

Every module (chapter) of the course has either an assignment or a test to send for marking. **Please note that Tree of Life does not use the test package that comes with your textbook.** Your final mark in the course will be based on the following percentages:

7 Test - 50%

8 Assignments - 50%

How To Study Physics

Reading and Note-Taking

The backbone of the course is the textbook, which poses questions and provides scientific information and discussion in a very understandable and conversational tone. However, simply reading the textbook will yield little learning if there is no critical interaction with the material. One does not read science as one read novels of fiction, for example. Some people can read novels very quickly. But for science, you must slow down and sometimes read every word in the sentence to understand the concept. You might need to look back and forth five times between a diagram and a paragraph you are reading in order to “connect the dots”. This type of careful reading is necessary for learning science.

One very important learning method you should employ for this and following science courses is **note-taking** or **reading notes**. When reading a section of the textbook, you should always have at your side a notebook used for recording important terminology, definitions, explanations, facts, diagrams, and illustrations. The best time to write down notes is the moment your mind is on them. The purpose of reading notes is threefold. First, the act of note-taking forces you to think about what are the most important things in what is being said – that’s what to write down. Second, good notes give you a quick reference to the most important information from the textbook. You can find the main points more easily when studying for the test. Thirdly, as in the case of copying diagrams, note-taking causes you to look carefully and think harder about what you are looking at. If you take good notes while reading, you might accumulate 2-3 pages per module (not including practice questions).

How to use this Study Guide

This study guide is intended to provide a sequence of learning steps to pace you through the course. Each day gives a suggested number of pages for reading, practice questions, experiments, and tips. Some days will require more time and work; in this case, take an extra day if you need. If you are able to move faster, that’s fine too. However, good study habits are still important to develop, so following every lesson step is recommended. A good memory for terminology and concepts in science only goes so far, and a failure to develop study methods will eventually make learning harder or less enjoyable.

A few other tips and notes...

- Try to **follow the example calculations as closely as possible** - this includes numbers, units, chemical names/formulas, and equations. While different people have different ways of working out problems on paper, you should always follow a set procedure when you first learn things. Once you become comfortable and successful at the type of math in this physics course, then you can "skip" steps a bit.
- You should always check the **answers to the Practice Questions** (“On Your Own” questions); the answers are at the end of the module. Don’t “peek” if you aren’t sure of an answer; give your honest effort first, then check afterward.

- Keep up to date with the **Review Questions and Practise Problems at the end of each module**. If you wait until the day before the test, they will be of little value in preparation. Perhaps doing about 3 study guide questions per day will help keep the material fresh in your mind.
- It is a good idea to **review the lab supplies required for different experiments** *before* the day of the lab. That way, you can be prepared. It is very important to pre-read the entire procedure for the experiment before you start.

Why should we do the experiments?

The experiments in this course are very important to do for several reasons. First, many experiments can help turn abstract scientific concepts into observable events and memorable pictures in your mind that help develop understanding. Another reason for the experiments is that they are fun and sometimes entertaining! They give variety to the course. Thirdly, experiments are an important activity of working scientists who make hypotheses about their observations in nature, and then set out to test their predictions within controlled conditions. Although you must learn the foundations of science before practicing like real scientists, the kind of experiments in this course emulate the same thinking processes in natural science. **You should do as many of the experiments in this course as possible, regardless of whether it needs to be evaluated.**

Daily Schedule

Module #1: Motion in One Dimension

DAY 1 - _____ (<write the date here)

- ⤴ Welcome to this study of Physics! This course guide will help you through the course and the evaluated assignments and tests. Before starting the learning material, you should read the introductory pages in this course outline (pages 9-10) so that you understand what is expected. You can also read the student notes in the textbook (pages i-iv) **but remember that the requirements to complete this course with Tree of Life are contained in this course outline, not the textbook.**
- ⤴ Read pages 1-4. This is a summary of basic mathematical skills necessary for the course. For example, you should be able to convert the following quantity using the factor label method and metric conversions. Try it now (Answer = 2016.18 kL/decade):

$$\frac{23 \text{ L}}{\text{hour}} = \frac{?? \text{ kL}}{\text{decade}}$$

DAY 2 - _____

- ⤴ Read pages 5-8. Carefully work through the first example in your notebook. It is recommended that you copy out examples as you study them to make sure you understand each mathematical step.
- ⤴ Answer On Your Own problem 1.1 in your notebook.

DAY 3 - _____

- ⤴ Read pages 8-13. Work through the examples.
- ⤴ Answer Problems 1.2 and 1.3 in your notebook.

DAY 4-5 - _____

- ⤴ Prepare for and complete Experiment 1.1 today. Record measurements in your notebook and write 2 sentences to summarize your conclusions about measuring average velocity. Although this experiment is not for evaluation, you should complete it to experience the concept and anchor it in your memory.
- ⤴ Read pages 13-21 (up to "Velocity is Relative").
- ⤴

- ✦ Answer Problems 1.4-1.6.

DAY 6 - _____

- ✦ Read pages 21-23 (top) including the example.
- ✦ Begin working on Assignment #1 (see the end of this course outline).
- ✦ Preview Experiment 1.2 for tomorrow.

DAY 7 - _____

- ✦ Complete Experiment 1.2 and record measurements in your notebook.
- ✦ Read pages 23-27.

DAY 8 - _____

- ✦ Answer On Your Own problems 1.8-1.10.
- ✦ Read pages 27-29.
- ✦ Check your answers to the On Your Own problems at the end of the module.

DAY 9 - _____

- ✦ Complete Assignment #1 and submit for evaluation by mail (or scan + email). Assignment #1 is a practice of important calculations. Remember that you must show all steps and work in each answer.

Note: the textbook contains plenty of Review Questions and Practice Problems at the end of modules and Extra Practice Problems at the end of the textbook. Although this course guide doesn't say to answer all of them, it is recommended that you complete most or all of these questions in your notebook at some point while learning. This will depend on your level of understanding and available time. If you reach the end of this module and are still having trouble with questions or concepts, then you need to spend more time with the review and practice questions. As well, these questions and problems will be useful when preparing for the tests that generally cover 2-3 modules.

Tree of Life School
Physics

Assignment #	Test #	Description	Mark
1		Module 1: Calculations Assignment	
	1	Test 1 (Modules 1-2)	
2		Module 3: Lab Report	
	2	Test 2 (Modules 3-4)	
3		Module 5: Lab Report	
4		Module 6: Calculations Assignment	
	3	Test 3 (Modules 5-7)	
5		Module 8: Lab Report	
6		Module 9: Lab Report	
	4	Test 4 (Modules 8-10)	
7		Module 11: Lab Report	
	5	Test 5 (Modules 11-12)	
8		Research Assignment	
	6	Test 6 (Modules 13-14)	
	7	Test 7 (Modules 15-16)	
		7 Tests (50%)	
		8 Assignments (50%)	
		Final Mark	