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PHYS-1070 (18) Elementary Physics (CRN:20592-Kaldon)  Western Michigan University  
Dr. Philip Edward Kaldon  Summer I 2006  2203 Everett Tower  Version 18.03
1110 Rood Hall  http://homepages.wmich.edu/~kaldon/classes/ph107-18.htm

PHYS-1070 is the Physics Course You Missed in High School  
So Attendance is NOT Optional.  
BUT... There is Nothing to Be Scared of -- We WILL Get You Through This!

Three-Times Rule:  It is University policy that the number of times a course can be taken is limited to three (including withdrawals). A student whose current enrollment is in violation of this policy must drop this course as soon as possible and no later than the deadline for no refund of tuition.

C- or Better Requirement:  It is Department policy that a grade of “C” or better in a prerequisite course is required before enrollment is permitted in the next-sequence course. A student who does meet this requirement must drop this course as soon as possible and no later than the no-refund deadline.


Supplies:  A standard inexpensive calculator is recommended. One with trig functions (sin, cos, tan) will prove useful. (We can help teach you how to use this tool.)

Math Level:  It is perfectly normal to approach a course such as PHYS-1070 with a certain level of math anxiety. Science so often appears as a numbers game, yet there is a lot of information contained in those numbers. We will work toward a reasonable proficiency of reasonable calculations, consistent with the course content and the abilities of the class. Rote memorization of complex formulas is not part of this course.

Prerequisites:  MATH-1100 or equivalent. A previous high school knowledge of algebra, and some geometry and trigonometry is expected for this course, but we will go over the details in class. Since Physics is a kind of applied mathematics, many students feel uncomfortable about Physics because they are uncomfortable about their math skills. Although we do not have time to extensively review mathematics in this course, help is available on campus! Don’t delay if you need help.

Office Hours:  There are scheduled office hours every day of the week. A copy of Dr. Phil’s schedule is posted on the door to his office, so you can figure out when I am already committed to be elsewhere. You are perfectly free to make office appointments. If you are planning to stop by during a regularly scheduled office hour, I would appreciate a comment from you before or after class, but this is not necessary. Note: Office hours are provided for your benefit. They don’t do me any good, but I do get lonely from time to time. Which is really strange come exam time…

Grading Scheme:  

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<tr>
<th>Grade</th>
<th>Points</th>
<th>Percentage</th>
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<tr>
<td>A</td>
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<td>AB</td>
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<td>E</td>
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The Million Point Grading Scale:  There has been much talk about grade inflation in recent years. Well, here’s an example of grade hyperinflation: the total number of points this semester will be 1,000,000. Seriously, our modern society tends to use a lot of very large and very small numbers, and the million point grading scale is very useful to break some prejudices about grades and have some fun at the same time.

<table>
<thead>
<tr>
<th>Group</th>
<th>Points</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Final Exam</td>
<td>200,000</td>
<td>20%</td>
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<tr>
<td>3 One-Hour Exams (100,000 pts each)</td>
<td>300,000</td>
<td>30%</td>
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<tr>
<td>20 Quizzes (15,000 pts each)</td>
<td>300,000</td>
<td>30%</td>
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<tr>
<td>Special Topics (Papers, etc.)</td>
<td>200,000</td>
<td>20%</td>
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<tr>
<td>Laboratory (see PHYS-1080)</td>
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Total Points: 1,000,000 100.0%

“The Instructor reserves the right to curve grades.”

Note: This Syllabus is Updated from files for previous semesters and previous courses. Every attempt has been made to keep it current to the Summer I 2006 Semester and PHYS-1070 at Western Michigan University. Please Report any errors or inconsistencies immediately to Dr. Phil.
Catalog Descriptions: PHYS 1070 Elementary Physics – 4 hrs. – This course surveys physics from mechanics to modern physics in one semester. It is designed for students in curricula requiring a one semester course at the level of general college physics. Prerequisite: MATH 1100 or equivalent. Corequisite: PHYS 1080.

PHYS 1080 Elementary Physics Laboratory – 1 hrs. – This is a laboratory course which includes exercises related to topics covered in PHYS 1070. Corequisite: PHYS 1070.

Course Goals: TO BECOME KNOWLEDGEABLE and FUNCTIONAL in using physical science concepts and conceptual relationships to describe, predict and explain events in the everyday world. TO UNDERSTAND the basic nature of science, that it consists of two kinds of truths, some observationally true and other truths that are accepted because of supported theories. TO UNDERSTAND how scientists talk about the world and to understand how this differs from how non-scientists talk about the world. TO ACCEPT the importance of the knowledge of “how we know something is so” in science. TO UNDERSTAND the importance of prior conceptions about the physical world in learning (and teaching) physical science and how it interacts with Nature.

Lab: Lab is an integral part of any serious study of Physics. Lab is handled separately by your lab instructors, and for Summer 2006 is once again registered for as a separate 1-credit course, PHYS-1080. Unless Dr. Phil is your lab instructor (which won’t happen this semester), don’t bug Dr. Phil with specific questions about the lab.

The Textbook: You will very quickly learn that Dr. Phil does not drone on and on, reading straight out of the textbook (O & B). In this class, the textbook serves as a “second voice” so that you can see the same material presented in a different way, with different examples. We will not necessarily go in a linear fashion through the book, despite the Topic calendar on the last page of the syllabus. You should keep up with where we are in the textbook as part of your daily study habits. Reading ahead to the next section may significantly improve your comprehension of lecture. In addition, you should make it a habit to check the class web site, which also includes a brief discussion of what was covered in class, along with some important examples and equations. The time to ask questions about differences between what is in your notes (which may or may not be what was on the blackboard) and what you find in O & B, is the next class period. Most of the differences come from differences in notation, or from errors in transcribing Dr. Phil’s enthusiastic but sometimes illegible scrawl on the board. Occasionally mistakes crop in – you’ll notice that Dr. Phil doesn’t work from prepared notes, preferring to work “without a safety net” – we try to correct them As Soon As Possible. Bottom line? You always have something to do when you use your notes and your books to good advantage. DON’t get behind – the next test is sooner than you think!

New or Used? There’s no denial – buying a Physics textbook is expensive. The Old Rule was that it was a Significant Investment, part of your growing library of reference tools that you will keep and use throughout your career. One look in Dr. Phil’s office should convince you that I have never sold a single textbook. But today, most students “rent” their texts, selling them as soon as they are “out of here”. But for a new edition, like O & B 5th edition, there’s not a huge number of used copies around. So should you buy New or Used? Here’s a hint: You want CLEAN. There have been studies that show that previously marked-up or highlighted textbooks may do you a real disservice: (1) Your eye will be drawn to whatever the previous reader marked, not what is emphasized by the author – remember the author and publisher are PAID professionals, the previous reader is NOT; (2) Different readers mark or highlight differently – some mark only what is important, some mark what is difficult or obscure, some are trying to cross out what they don’t need – any way you cut it, it is unlikely you would mark it the same way; (3) Simple statistics should convince you that the average marked-up copy you pick up was marked by a less than ace student – we don’t hand out A’s in Physics, you earn them. Now Dr. Phil is NOT trying to tell you to buy new books, but he is urging you to invest your money wisely. Remember, relying on someone else’s marking, when it is YOUR career, your grades and your tuition money you’re dealing with, you should really give this some thought. As far as your own marks – hey, it’s your book. But remember that light pencil erases and Post-it® notes are removable.

Homework: O & B provides a variety of thought questions and exercises, which are very useful as warm-ups – this should not take a huge amount of your time! Additional problems will come on handouts in the form of Sample Exam pages – actual Dr. Phil PHYS-1070 exams given to actual Dr. Phil PHYS-1070 students. Which problems should you do for homework? Well… “all of them”. Or at least all that you need to do. It’s part of the daily work you need to do to keep up. The study of Physics is also a study of problem solving and practicing the manipulation of variables and formulas. This H.W. will not be turned in, but you will be responsible for it. It does no good to just hand out detailed solutions for all the problems, because then people tend not to actually work on the H.W., they just study the solutions. That’s like only reading a book about running in order to prepare to run a race.

Work To Hand In: All work that is to be handed in (which includes Quizzes, Exams, Papers, Special Topics) must include your name (you’d think that would be obvious, but…) – PAPERS WITHOUT NAME MAY NOT BE GRADED! Staples: Any papers turned in that are supposed to be stapled, but aren’t, are subject to a 500 point penalty. Any papers turned in with a fold-and-tear or spiral bound note cards), you may write down any formula, physical constant, definition or a brief note on any historical figure that you feel is relevant or useful; short examples are allowed but unnumbered. These exams will be closed-book, but you will be allowed to bring a FORMULA CARD. On this “card” (includes cards, paper, spiral bound note cards), you may write down any formula, physical constant, definition or a brief note on any historical figure that you feel is relevant or useful; short examples are allowed but you may not include worked out problems. Quiz problems will be based on the assigned homework. UNITS, SIGN, POWER OF TEN and VALUE of your ANSWER will all be evaluated on numerical problems. Reasonable units and significant figures are required. You must CIRCLE your ANSWER. Work must be shown to receive credit, though the work itself may not be evaluated. There will be twenty-three 1,500 point quiz problems; the lowest three will be dropped. There will be no further adjustment of quiz grades. Quizzes may sometimes be graded on an “all-or-nothing” basis and cannot be made up, though up to three zeroes can be dropped.

Exams: There will be three hour exams, scheduled for 19 May 2006, 2 June 2006 and 16 June 2006 – all these are on FRIDAY. Schedule these dates and times now. Late Papers: There will be outside reading and writing assignments: this includes a science literacy opinion paper on a book from a booklist that will be provided in the first week. Complete instructions will be given in the Topic 1 handout. The full booklist will be available on the class website (to save trees). The paper is due Thursday June 15th by 5pm. There will be a penalty for each day a paper is late. A grace period is included in the schedule. A second assignment, Topic 2, deals with collecting some real-world data and will be discussed later in the course.

Writing Assignments: There will be outside reading and writing assignments: this includes a science literacy opinion paper on a book from a booklist that will be provided in the first week. Complete instructions will be given in the Topic 1 handout. The full booklist will be available on the class website (to save trees). The paper is due Thursday June 15th by 5pm. There will be a penalty for each day a paper is late. A grace period is included in the schedule. A second assignment, Topic 2, deals with collecting some real-world data and will be discussed later in the course.

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formulas. It may emphasize concepts and relationships over number crunching. If a curve is used on any exam, it will only bring grades up. If you have any special needs – see Dr. Phil early in the semester!

**Exam and Quiz Policy**

For all exams, you are expected to sit with at least one space between you and the next person in your row. If this is not possible, we will alternate versions of the exam. For all exams and in-class quizzes: You are allowed your “legal” calculator and formula card(s), and a pen or pencil (do not use red). Pre-printed commercial physics and math summary sheets, such as are available laminated in the bookstore, do NOT count as your self-made formula card. Dr. Phil can be very generous, but when he calls for all papers to be turned in, you must turn them in – if you want it graded.

**Make-Ups:**

Quizzes cannot be made up. You are expected to attend classes anyway, but this is especially true of laboratories and examinations. Provided you have a valid reason for missing class (illness, etc.), if you miss: (1) a lab you must contact the appropriate instructor as soon as possible to see if you can make up the lab; (2) an exam, you must contact me as soon as possible to let me know you won’t be there, and the later to arrange an exam within a few days. Dr. Phil dislikes having to write up new exams for people.

**Late Quizzes:**

Most take-home quizzes can be turned in by 5pm on their due date if they are not ready to turn in at class time. Some take-home quizzes may be made up, provided the solutions have not been given in class or posted on the class web site. If Dr. Phil starts going over a quiz problem you have not turned in, please turn it in immediately. If two or more quizzes are being turned in on any given day, PLEASE make sure that they are in separate piles.

**Catastrophes**

People do get ill, have deaths in the families or have a “really bad test day” from time to time. Dr. Phil is interested in teaching Physics and looking for progress from people. “It will all work out in the end.”

**The Professional Concerns Committee of the Faculty Senate recommends that all faculty include the following paragraph in each syllabus that they prepare for the upcoming semester:**

“You are responsible for making yourself aware of and understanding the policies and procedures in the Undergraduate (pp. 274-276) [Graduate (pp. 25-27)] Catalog that pertain to Academic Honesty. These policies include cheating, fabrication, falsification and forgery, multiple submission, plagiarism, complicity and computer misuse. If there is reason to believe you have been involved in academic dishonesty, you will be referred to the Office of Student Conduct. You will be given the opportunity to review the charge(s). If you believe you are not responsible, you will have the opportunity for a hearing. You should consult me if you are uncertain about an issue of academic honesty prior to the submission of an assignment or test.”

**Introductions**

**Hello, World**

In computer programming, one of the first programs you learn to write in a new computer language is a simple one that has the computer printing “hello world” so that you know that you can get information out of the computer. Here are a few thoughts and comments that I include to give you some things to read and think about from the beginning.

**Dr. Philip Edward Kaldon** - Born western upstate New York; Junior High near New York City; High School in Greensboro, North Carolina (1976). B.A. Integrated Sciences, Northwestern University (1980); M.S. Physics, Michigan Technological University (1986/88); Ph.D. in Applied Physics, Michigan Technological University (1989). Physics Teaching: WMU, KVCC, GVSU, Hope College. Former President—Michigan Section of the American Association of Physics Teachers (MIAAAPT). Dr. Phil pursues many science and science literacy efforts, and on the first day of class, he is on Day 3054 of writing a massive science fiction romantic epic novel. A fourth readable draft of a complete novel, The Devil’s Coffin, set in the same sci-fi universe, is on Day 1872. No – it’s not ready for you guys to read yet. After sending out thirty-seven short stories one-hundred times, Dr. Phil has two stories published in anthologies and four more slated for publishing in 2006-7. “The Pulse of the Sea”, Dr. Phil’s first commercial sale, was published in September 2005. No – Dr. Phil has no intentions of making you read his fiction. But he did attend the prestigious 2004 Clarion Science Fiction and Fantasy Writers Workshop, an intensive six-week boot camp for SF writing, so he is well on his way to becoming a real science fiction author!

**What Do We Need A Calculator For?**

Although much of what we are trying to accomplish is hands-on experience, we need to use numbers sometimes. And most of you can’t tell me what 4/5ths of 137 is off the top of your head anyway... <grin> (me neither). On the other hand, we’ll be doing things with calculators that many of you have never seen done before! So, it is very important to make sure that you can do all the neat things we have to do.

**The First Thing You Should Do Each Day When You Come Into Class…**

(after getting comfortable and pulling out your notebook and pencil)

… And Turning OFF The Ringer Of Your Stupid Cellphone and Pager…

(but being a clever and caring student in 2006 you thought of that already, right?)

… Is To Take OUT Your Calculator And Have It Ready At All Times

(it doesn’t do you any good all closed up in your book bag, or at home)

**Small Group Work**

If you are expecting dull lectures that you can either skip or use to catch up on your sleep or ignore while you work on the homework for your 1:00 class – forget it. This class has an interactive component to it. But more than just making you do some work in class, you will find yourself a part of a larger team who will try to work through our fun & games!

**Study Groups**

You may find that studying by yourself can be difficult. As is stated elsewhere, we are trying to change the way that you think – sometimes this means you need a different perspective. This is where working with someone may prove useful. Gosh, maybe that Small Group you’ll be working with for the first time of class may be made up, provided the solutions have not been given in class or posted on the class web site. If Dr. Phil starts going over a quiz problem you have not turned in, please turn it in immediately. If two or more quizzes are being turned in on any given day, PLEASE make sure that they are in separate piles.

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(it doesn’t do you any good all closed up in your book bag, or at home)
It’s a small point, but the front lab table is divided in Dr. Phil’s mind between “my side” and “your side”. Please do not ever pick up papers from Dr. Phil’s side of the table. Sometimes they are not for your class, sometimes they may be your papers that have not yet been recorded in my grading spreadsheet. (If they are never recorded, then they are still 0’s.) You may think that it makes sense to grab graded papers from both sides of the lab table, but that blocks my access to my mailboxes and the blackboard, which slows things down for everyone. So, “stay on your own side of the table” will make things move smoother for all.

What’s My Grade?

Part of keeping up with the workload in PHYS-1070 is knowing where you stand in the class. There is a delay, however, between when work is handed in and when it gets back to you. We endeavor to get Exams back to you within one week of when they are given. Quizzes have tended to get batched and backlogged - a new system for Fall 2004 should get quizzes turned around faster. Grades are recorded in a Microsoft Excel 7.0 spreadsheet. After the first exam is graded, Dr. Phil will create The Predictor, which basically fills in all the final grade columns with estimated answers, even though most of the work of the semester has not been actually done yet. The Predictor uses actual Exam and Quiz scores to estimate what their final values will be, based on your past performance. By the time 10 to 12 quiz grades are recorded, The Predictor will start dropping your three current lowest quiz grades. The Topics (such as the Book Report) are automatically given the lowest “B” grade of 85%. Once The Predictor is set up, you can always stop by office and see what your current projected grade is, or send me e-mail (along with your PHYS-1070 Personal ID number [PID]) and I will e-mail your current projected grade. Posting grades on Dr. Phil’s office door or at the back of the lecture room is usually done around the exams, sorted by your 5-digit PID, but this information has a short shelf-life. Check the Post date on the printout. During Spring 2001, someone kept stealing (or just throwing out) my printouts, which is very odd behavior.

What’s the Answer?

I am currently making available solutions to the Exams, so that you will know what the correct (or at least Dr. Phil’s version) answer to a problem is. Most quizzes will be gone over the next class period, again so that you will have the correct answer. (Check the class website!) This is easiest for the in-class quizzes – take-home quizzes have a tendency to dribble in over a few days, so there’s no point in giving people the answer before they get their papers in! I do not usually give out answer sheets to the Sample Exams Problem, but the theory that you don’t have the answers on a real exam, so you need to learn how to PTPPH – and it encourages students to study together, compare notes or even come to Dr. Phil’s office hours. Sometimes I feel like the Maytag™ repairman – it’s lonely in my office at office hours.

Extra Credit:

I don’t “do” extra credit. Students who wish extra credit primarily do so because they aren’t using their time effectively already, so why would I wish you to divert even more of your valuable time on additional work?

Email

The university is in the process of changing how e-mail is handled on campus. The following language has been suggested for inclusion in Fall 2004 Syllabi: "The only email address that should be used by WMU students and WMU faculty and staff is the email address that typically takes the form "firstname.middleinitial.lastname@wmich.edu" or "firstname.lastname@wmich.edu". An example isbuster.h.brnco@wmich.edu. Email users will not be able to automatically forward email from this address to other addresses. Students and faculty can access this email account via their BroncoNet ID or get instructions for obtaining a BroncoNet ID at GoWMU.wmich.edu."
Physicists are capable of driving other people crazy, as we can happily work all day with equations without ever once feeling the need to plug in a number. The concepts and the theory frame the question and the answer, it is the equations that supply the tools for our solution. It all looks like shorthand because in reducing numbers down to letters, we are limited by the number of upper and lower case letters in the English and Greek alphabets. Having said that, it won’t end up being “all Greek to you” in PHYS-1070.

Theory
The theories presented in this course have a long and colorful history that is interesting in its own right. Much like case law to the legal profession, current Physics theory has been “tried and proven” over the years. Unlike law, however, it isn’t how slick or well-paid your physicist is versus mine, here the burden of proof falls on experimental verification. Even so, “proof” is too strong a word for some in science, rather one might say that something is true within these limitations. The material covered in PHYS-1070 has been around for some time. While some modern material may creep into the later chapters of this course, new editions of books like Osstidek & Bord come out because of the editors, publishers and authors, as well as advances in science education theory, not because the Physics is changing, unlike the situation you might face if you were trying to teach a course called “Eastern Europe Today”.

Experiment
Years ago I saw a T-shirt that said “If it’s Green and Wriggles, it’s Biology; If it Stinks, it’s Chemistry; And if it doesn’t work, it’s Physics”. We say that the theory developed in Physics has been verified by Experiment, but surely we cannot mean Physics Lab! Still—reading, thinking and calculating can only take you so far; sometimes you have to see and measure for yourself. The purpose of lab is to put the scientific method into practice and see where event, observation and theory meet. But remember! The theory we develop in class has simplified and “cleaned” up Nature, so we cannot expect perfect experimental results; but careful and repeatable experiments will go a long way to helping you “see” the Physics.

Time Management (Studying)
Since we have a lot of material to cover, and it is probable that you won’t have time to work out ahead of time any Physics problem in the book, it becomes important to manage your study time wisely. It is very common to end up spending hours banging your head against one stupid little problem. Don’t do this! Mostly this involves doing the same solution over and over again, or dragging in every conceivable (and inappropriate) formula under the sun. Most of the textbook problems have only one or two elements in them, so in general you may need to simplify your work, not make it overly complicated. Problems numbered in black are considered easy — if you are having trouble with a black problem and used up as much time as they care to (for good or bad) it should have no bearing on your test. Do look through the whole test when you get it, making sure that yours is complete. Do keep units with your numbers and check to make sure that (a) the numbers and (b) the units of your answers makes sense. Don’t leave any parts blank if you can help it.

Time Management (Exams)
Staring at an exam page is not the time to learn how to do Physics. Good exam time management starts with being familiar with the homework problems, the basic concepts and the formulas on your formula card. Beyond that, you should remember that most parts of the test are equally important, so don’t spend all your time on one problem or part. Go on to another problem that you can do. Don’t worry about what other students are doing. The student who gets up and hands their paper in halfway through the hour has used up as much time as they care to (for good or bad) it should have no bearing on your test. Do look through the whole test when you get it, making sure that yours is complete. Do keep units with your numbers and check to make sure that (a) the numbers and (b) the units of your answers makes sense. Don’t leave any parts blank if you can help it.

Killer Equations
There is no one equation to “Life, The Universe and Everything”. Every equation developed has been built-in limitations and some very real restrictions on when you can and can not use them. There are plenty of examples done in class and in the text which result in equations to solve a particular case. Students are inevitably tempted to use such “killer equations” for any problem that involves those quantities, because they think that the work has been done for them. The range equation is a classic example in ballistics, but this equation cannot be used unless the launch points and landing points are at the same height. Despite that warning, freely given in class, the range equation will be used to find out how far away a arrow will land, even if the archer is standing on a hilltop. In most cases, you are better off using the more basic, more general, more useful equations than searching for that “killer equation” that will solve the problem with one plug-in. Somehow the latter hardly seems like the kind of examination that would prove that you had learned anything.

Graphing Calculators
Just in the years that I have been in school, I have seen the rise of the calculator, the decline of the slide rule, and a definite drop in the ability to do simple error-free mathematics. The current crop of graphic calculators, typically Texas Instruments TI-81 through TI-89 models, seem to be more than a little bit of trouble to many students. As a result, Dr. Phil is NOT a fan of these machines. Worse are the keyboard type of “calculator,” such as the TI-92 family. They are too much for this course. If you are fighting your calculator — then it is no friend to you. Get rid of it. Sell it. Give it to your kid brother or sister.

The Only Calculator You Need
All you really need is a calculator that can do the following: the standard arithmetic functions (add, subtract, multiply and divide), the standard trigonometric functions (sin, cos and tan – don’t even worry if you don’t know what they mean, just look to see that your calculator has these buttons), the standard physics math functions (x², √x, log x, ln x, 10x, e^x). The current model of the TI-30 series calculator has all those functions and costs about $15. Dr. Phil is “this close” (imagine Dr. Phil holding two fingers really close together) to imposing a Required Calculator for his courses.

“IT Must Be The Pretzels”
My view of the situation is this: Very few students, who buy a fancy calculator in order to substitute its power for their studying, do very well. Frankly, from what I’ve seen, most of their built-in solutions are either too general, too specific or just too inconvenient to be useful, and most students find that either they use that big brick like a regular calculator, or they write their own functions, just as you would write out your own formula card. Those who master the capabilities of a powerful calculator generally end up knowing or learning the subject anyway, so it’s not the calculator. I wouldn’t worry one iota about whether they were still never built to survive more than a year or two. While I can appreciate that no one wants to spend more money, we do depend a lot on our calculators in a course like this, and having a calculator that has keys that don’t work right is just begging for trouble. Do yourself a favor: if you need a new calculator, buy it now, before a change becomes unsettling. At the very least, many older
calculators need new batteries right about now. You’ll thank me later. Dr. Phil last changed the AAA’s again in his 1995 HP-48GX in 2005 – one set of batteries seems to last me 2½ years… not forever.

"I Understand the Physics, I Just Can’t Do The Problems"

This is a refrain that is heard all the time. So you’re in a Physics class… what do you do? Well, besides coming to class, reviewing you notes, opening your textbook occasionally, the best advice is to do some Physics problems. Start with the assigned (i.e. recommended) problems. If you have problems, don’t just race to the answers in the back of the book, or look for posted solutions, try looking at the worked out examples in the text or from the class and reproduce that work.

PTPBIP (Put The Physics Back Into the Problem)

So you’ve read the problem, figured out what’s given, determined what is being asked for, decided on what equation(s) you need and played plug-’n-chug on your calculator. So you’re done, right? Well, how do you know if the answer is right? Well, first off, you can check to see if the answer makes sense. This is what I refer to as “PTPBIP”, Putting The Physics Back Into the Problem. It is very important, “real” physicists do it all the time. You needn’t write anything extra down, but if you expect that the block should go to the right, then it is very satisfying if your answer also says that the block will go to the right. It may be that the block will go to the left, and that the Physics is trying to tell you something, but rarely will a horizontally moving block travel up. That would be a hint that something funny is going on.

The Physics Keeps on Building!

One of the most remarkable things about Physics is that the everything we learn, keeps on depending on everything else we’ve done. In a History class, once you’ve learned that the Battle of Hastings was 1066 (or whenever it was), that’s it. That’s the answer. While today’s history depends on what happened before, in a History class you might be able to get away with ignoring the 11th Century when you get to the Industrial Revolution. But not so here. You might be worried about having a comprehensive Final Exam. But if you’ve been awake all semester, you’ll find that this isn’t a crisis – you’ll have been using it all along anyway.

Expectations:

Make a mental note of two things: (1) the grade you realistically would like to get in PHYS-1070 and (2) the minimum grade that you have to get. If you aren’t sure of the latter, now is the time to check with your department (or your school, for those of you not full-time WMU students). These two grades should represent attainable goals, and given your quiz and exam performance you can plan your study schedule accordingly. Week 6 is not the time to realize that your GPA is too low for you to keep your scholarship.

Dr. Phil to English Translation:

Speaking of Dr. Phil’s handwriting, you should realize that writing on the blackboard is not the same as writing on a piece of paper. I’m only a few inches from my writing – I can see it and read just fine. If you can’t, then either (1) put on your glasses, (2) sit closer or if you’ve already done that, (3) jump up and down and shout “Dr. Phil, I can’t read THAT!”; and Dr. Phil (after he climbs down from the ceiling) will cheerfully go back to writing larger and more legibly. You’d be amazed at how many “lurkers” in the back of the lecture hall have faulty equations on their formula cards, terrible notes and oh-by-the-way have stinky Physics grades. Don’t be embarrassed if you can’t read my handwriting – I probably can’t read yours either! (This is an occupational hazard of typing on a PC so much – I never write anymore!)

Drop Dates:

You may wonder why drop dates are so prominently mentioned in this syllabus. Actually it is to make everyone’s life easier. Let’s face it: most of you aren’t so interested (right now) in learning some Physics as in surviving the course and putting that grade in the bank. You will have just gotten your second exams back before the last possible drop date. If you are concerned with passing the course, I would be happy to consult with you to give you a quick read on where you stand.

Overloads:

It’s a Y2K6 college fact: You are probably taking too many classes and working too many hours. In a perfect world, the best way to do Physics is to abandon everything else and just do the Physics. Since you probably can’t do that, now is the time to figure out what you can cut out of your schedule. Hey, you’ll thank me later if you at the very least arrange a day off before each exam, especially the final.

Office Hours:

It will take a few days to shake down everyone’s schedule and get into a rhythm. Frankly, I don’t get enough business during office hours, but boy do I hear the kvetching about how hard Physics is and how awful the Quizzes are. If my office hours are not convenient to your schedule, then it is up to you to make an appointment.

Physics is Phun:

No one ever believes that on the first day. And for some, it never is fun. But we can try! Really!

Why We Do All This:

As science literacy n. An exposure to science in a historical context that serves to allow a person to observe the world around them with understanding, deal with technological applications at home and work, appreciate the distinction between fact and speculation in the media and politics, have a working knowledge of numbers and the scale of the universe, and be able to pursue more information if desired, as a function of everyday life.

Philip Edward Kaldon, Fall 1995

This is summer in Michigan – Land of Driving Adventures. Dr. Phil has a long commute (154 miles/day) and we are in the middle of massive construction projects and we are still waiting to see what new paving contracts blow into town. Dr. Phil will make gallant efforts to be here on time every day – but ultimately all of us have to be intelligent enough to make decisions between trying to get to class and oh, say… living. Physics is important, but if you or your vehicle can’t make it, then you can’t make it.

We Are Here To Change The Way You Think

There Are No Stupid Questions · (Just Ones That Half The Class Wanted Asked Anyway)

UNITS Will Save Your Life

PTPBIP !  (Put The Physics Back Into the Problem !)

Physics is Phun
Chapter assignments are approximate – actual chapters will depend on our actual pace.

<table>
<thead>
<tr>
<th>Week</th>
<th>Class Dates</th>
<th>Topic (Ostdiek &amp; Bord, 5th edition)</th>
<th>Special</th>
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<tbody>
<tr>
<td>1.</td>
<td>8,9 May</td>
<td>Inquiry Into Physics</td>
<td>Topic 1 Assigned</td>
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<tr>
<td></td>
<td>11,12 May</td>
<td>Ch. 1 - Study of Motion</td>
<td>Quiz 1,2</td>
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<td>2.</td>
<td>15,16,18 May</td>
<td>Ch. 2 - Newton’s Law</td>
<td>Quiz 3,4,5</td>
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<td>19 May</td>
<td></td>
<td>Exam 1 - 5/19 Fri.</td>
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<td>3.</td>
<td>22,23 May</td>
<td>Ch. 3 - Energy &amp; Conservation</td>
<td>Quiz 6,7</td>
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<td></td>
<td>25,26 May</td>
<td>Ch. 4 - Physics of Matter</td>
<td>Quiz 8,9</td>
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<td>4.</td>
<td>29 May</td>
<td>Memorial Day &lt; No Classes &gt;</td>
<td>Quiz 10,11</td>
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<td>30 May, 1 June</td>
<td>Ch. 5 - Temperature &amp; Heat</td>
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<td>2</td>
<td>2 June</td>
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<td>Exam 2 - 6/2 Fri</td>
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<td>5.</td>
<td>5,6 June</td>
<td>Ch. 6 - Waves &amp; Sound</td>
<td>Quiz 12,13</td>
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<td></td>
<td>8,9 June</td>
<td>Ch. 7 - Electricity</td>
<td>Quiz 14,15</td>
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<td>6.</td>
<td>12,13 June</td>
<td>Ch. 8 - Electromagnetism &amp; EM Waves</td>
<td>Quiz 16,17</td>
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<td></td>
<td>15 June</td>
<td>Ch. 10 - Atomic Physics</td>
<td>Quiz 18</td>
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<td>Topic 1 due - 6/15 @ 5pm</td>
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<td>16</td>
<td>16 June</td>
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<td>Exam 3 - 6/16 Fri</td>
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<td>7.</td>
<td>19,20 June</td>
<td>Ch. 10-11 - Atomic &amp; Nuclear Physics</td>
<td>Quiz 19,20</td>
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<td>22,23 June</td>
<td>Ch. 12 - Special Relativity &amp;</td>
<td>Quiz 21,22</td>
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<td>Elementary Particles</td>
<td>Topic 2 due - 6/23 @ 5pm</td>
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<td>8.</td>
<td>26 June</td>
<td>PHYS-107 Course Review</td>
<td>Quiz 23</td>
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<td>27</td>
<td>FINALS</td>
<td></td>
<td>Final Exam - 6/27 Tue - 2:00-3:40pm (2 hours)</td>
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<td>9.</td>
<td>3 July</td>
<td>Grades due on Monday at Noon</td>
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