

Noon

16

**PHYS-2070\* (16) University Physics II (30246-Kaldon)**  
*Western Michigan University*

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Class: MTuThF Noon-1:40pm 1110 Reed Hall  
Office Hours: MTuThF @ 10:30am-11:45am, @ 2pm-4pm, MTuTh or by appt.

Summer-II 2010  
Version 16.03

<http://homepages.wmich.edu/~kaldon/classes/ph207-16.htm>

**PHYS-2080 (Laboratory) is a separate course.**  
**You must be registered for PHYS-2080 to take the lab.**  
**Lab start the second week of class (July 6 Tu); check outside lab door.**

**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-co- Receptor 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.

**Required Texts and Supplies:**

Physics for Scientists and Engineers (WJ/8th edition) / Serway and Jewett  
Volume 2 - Henceforth known as "Serway" in class.

Standard inexpensive calculator with trig functions and logs. **No TI-82/89s allowed!**

**Optional Materials:**

None, really. If you require an integral table or other math handbook, CRC Press' *Standard Math Tables* (or whatever it is currently called) is highly recommended; this is the source for the integral tables in the textbook. Study guides from Schaum's, or the textbook's *A Student Solutions Manual and Study Guide*, are available (or can be ordered) from the bookstore. These may be helpful for some people, but are not required and have not been used in the preparation of this course. There are also study software packages for Physics, but I haven't seen one that looked worth the money, so you might as well work the assigned Homework!

**Prerequisite:** PHYS-2050 and MATH-1210 (or equivalent) is required for PHYS-2070, with a grade of "C" or higher. A working knowledge of calculus, algebra, geometry and trigonometry is expected for this course. Since Physics is a kind of applied mathematics, if you feel uncomfortable about your math skills, don't delay getting help!

**Co-requisite:** PHYS-2080 (the lab) and MATH-2720 (or MATH-2300) are co-requisites for PHYS-2070.

\* This Syllabus may also cover anyone enrolled in PHYS-2150 *Electricity and Light Problems* (Pre-Requisite: PHYS-1150 and MATH-1210 and MATH-1720 (or MATH-2300) concurrently, or equivalent) – PHYS-2150 is the one-credit hour conversion course from the Algebra/Physics sequence to the Calculus Physics sequence. To register, you must get the CRN from the Physics Dept. Office, 1120 Everett Tower. (Other than registration, the PHYS-2150 course is the same as PHYS-2070, except that it only costs one credit.)

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**Course Descriptions from the WML Undergraduate Catalog via Registrar's Web Site**  
*(Course)*

**PHYS 2050: University Physics I (4 hrs)**

This first course of a sequence of three in general college physics employing calculus deals with mechanics and heat. It is required of physics majors, engineering students, and future physics teachers, and is strongly recommended for majors in other sciences. **Prerequisite:** MATH-1210 concurrently. Open to qualified first year students. A student may not receive credit for both PHYS-2050 and any of the following: PHYS-1070, PHYS-1090, or PHYS-1130.

**PHYS 2070: University Physics II (4 hrs)**

This course follows PHYS 2050 and consists of studies in electricity, magnetism, and electromagnetic radiation. A student can receive credit for only one of the following courses: PHYS 2070 or PHYS 1150. **Prerequisite:** PHYS 2050, MATH 1210 or MATH 1700, and MATH 2720 or MATH 2300 concurrently.

**PHYS 2080: University Physics II Laboratory (1 hr)**

This is a laboratory course which includes exercises related to topics covered in PHYS 2070. A student can receive credit for only one of the following courses: PHYS 2080 or PHYS 1160. **Corequisite:** PHYS 2070.

**PHYS 2150: Electricity and Light Problems (3 hr)**

This course is intended for those who have had 1150 General Physics II, or its equivalent at another school, and who need to show credit in 2070 Electricity and Light. The emphasis is on problem solving using calculus with the mathematical rigor required in PHYS 2070. This course plus PHYS 1150 is equivalent to PHYS 2070. **Prerequisite:** PHYS 1150 General Physics II or equivalent, MATH 1210 or MATH 1700, and MATH 2720 or MATH 2300 concurrently.

**Significant Dates:**

- July 1 Thu - PHYS-2070/2150 begins
- July 2 Fri - **Regular Daily Quizzes Begin** (Quiz 1 requires no studying)
- July 3 Mon - Fourth of July Recess (No Classes)
- July 5 Thu - Drop/Add Ends (100% Refund)
- July 8 Thu - Last Day to Drop without "W"
- July 16 Fri - **Exam 1**
- July 26 Mon - Last Day to Drop with "W"
- July 30 Fri - **Exam 2**
- Aug. 3 Thu - **Paper due (In Class or An Office By 3pm)**
- Aug. 9 Mon - **Grace Period for Topic 1 ends at 5pm**
- Aug. 12 Fri - **Exam 3**
- Aug. 20 Fri - Last Day of Class
- Aug. 20 Fri - **Final Exam Noon-2pm**
- Aug. 24 Tue - Grades Due at Noon

\*All Exam dates are fixed in stone.\* See Dr. Phil otherwise.

**750,000 POINTS**

For many of you, the minimum grade you need in this course is a "C". That means you need to earn at least 750,000 points. Read this Syllabus carefully and keep current in class.

**Grading Scheme:** A AB B BC C CD D E

%-age: 100-95 94-90 89-85 84-80 79-75 74-70 69-65 64-0

Raw exam scores may be curved.

#### The Million Point Grading Scale:

Quizzes	(20)	300,000 points	23 given; 3 dropped
Papers	(1)	100,000 points	
Exams	(3)	300,000 points	
Final	(1)	200,000 points	
☛ Star Points		100,000 points	
		-----	
		1,000,000 points	

**ATTENDANCE IS NOT OPTIONAL:** You are expected to attend every class, and make arrangements to get notes, check the website and possibly come by Office Hours if you cannot. Western Michigan University will be in session every Friday this semester, which means you should be here, too. Exceptions are of course noted for official university activities, military duty requirements, religious observations, etc. Please note that Dr. Phil does not get any extra vacation days during the semester – and neither should you. Attendance is more than just showing up. You are expected to be prepared and to participate when requested. Please do not use this class time to work on homework for this or any other class – it is very distracting to both you and to Dr. Phil. In truth, though, we all have days where things happen, classes get missed. If you are sick, take care of yourself first and seek medical help if you need to. Our goal is to keep missed time to a minimum, but we want everyone healthy, too. 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 Textbook:** You will very quickly learn that Dr. Phil does not drone on and on, reading straight out of the textbook (Serway). 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. 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 Serway, 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!

**Homework:** Homework may be assigned for each chapter. Serway offers two kinds of problems at the end of each chapter: **Conceptual Questions** and **Problems**. The Conceptual Questions tend to be descriptive thought questions, rather than pound-equations-into-your-calculator problems. You should skim through these as a review, to see if you understand the material. A few of these are included in the H.W. assignments; they are marked **C** for Conceptual. Most quantitative problems keyed to each section, as well as Additional Problems, which tend to cut across sections. Each Problem has been coded in the text: black, blue and red (or **accy to hand**). H.W. will not be turned in, but you will be responsible for it. You are expected to be able to do the assigned Problems, but do not waste too much time if you can’t see how to solve a Problem. Odd-numbered problems have answers given in the back of the book; an

instructor’s solution manual (if I can locate one) will be brought to class for you to check out specific questions. 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.

**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 AND SECTION NUMBER MAY NOT BE GRADED!** **Staples:** Any papers turned in that are supposed to be stapled, but aren’t, are subject to a 3000 point penalty. Any papers turned in with a **fold-and-cover** corner will get an automatic 5000 point penalty. **Late Papers:** lose 10% (one letter grade) per day, but it is better to **do the work at all** than turn in nothing. **Late Quizzes:** Unless otherwise specified, you may turn in take-home quizzes to the Physics Dept. secretary (1120 Everett) after our class meets, but before any solutions are posted on the website. There will be a 1000 point penalty per day for late take-home quizzes.

**Writing Assignments:** There will be an outside reading and writing assignment: **IF YOU HAVE HAD DR. PHIL BEFORE, YOU MUST READ A DIFFERENT BOOK!** Complete instructions will be in the booklet handout. It is due Thursday August 5<sup>th</sup> by 5pm. There will be a penalty for each day a paper is late. *A grace period is included in the schedule. Be sure to read the assignment at the end of the booklet!*

**Quiz Schedule:** Expect to have a quiz twice a week (starting July 2<sup>nd</sup>). 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 points-though 15,000 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 zeros can be dropped.

**Exam Schedule:** There will be three hour exams, tentatively scheduled for: **Friday 16 July 2010, Friday 30 July 2010 and Friday 13 August 2010.** Each exam will cover about three weeks of material and you can have the entire period to work. 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 find is relevant or useful; a sketch or description of the setup is allowed, but you may not include scrawled out problems. Formula cards will be turned in with the exam, with a deduction for an illegal formula card. Each exam is worth 100,000 points (see note below on ☛ Star Points). Scores may be adjusted on a curve to meet the Grading Scheme noted above. Exam questions will vary, but will include some complex problems that will test your understanding of and ability to apply the material. You may be surprised to hear this, but I do not expect you to be able to do 100% of the exam; in all likelihood, you’ve probably never taken exams like this before. They won’t really get any easier, but you will get used to them. The Final Exam will be **Friday August 20<sup>th</sup> from Noon to 2pm** with a REVIEW class on Thursday August 19<sup>th</sup>. The Final is worth 200,000 points. It is cumulative and you can use your previous formula cards. It may emphasize concepts and relationships over number-crunching. If a curve is used on the Final, it will only bring grades up.

#### 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. Hmm... We are stuffed into a small room here. We’ll work it out. 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 – it will be returned with a grade of ZERO). 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.

# ★ Star Points:

**[Read more than once – no one seems to understand this concept the first time!]**

In addition to the normal scoring of the 5 Exams and the Final, each of these tests will have four parts designated with a star (★). These are 100,000 Star Points that will be awarded on a primarily all-or-nothing basis (in addition to any partial credit you earn during normal test scoring) (20,000 Star Points on each regular Exam; 40,000 Star Points on the Final). All Star Problems will involve the use of calculus, and Star Points will be awarded on the basis of a correct calculus set-up and evaluation (if required). A quick analysis of the points and the grading scale, should convince you that it will be impossible to get an "A" (and hard to get a "C") in the course on the basis of using algebra, trig and geometry alone. This is intended to keep everyone honest, including Dr. Phil, and to identify some of the key points of the course. *You may be very surprised to find that working, practical calculus is not like what you did in work class!*

**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 with me if you are uncertain about an issue of academic honesty prior to the submission of an assignment or test."

## Sorta Important Stuff

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

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

**...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)**

### **Grading:**

The process and the concepts are so important, that getting the correct numerical answer is sometimes the least important part of a calculation. Therefore, there will be some partial credit on some exam problems for taking the correct line of reasoning, even if the answer is wrong. This does not excuse you from taking reasonable care in a calculation. (Grading this way is very labor intensive, but your patience will be rewarded.) You can argue all day long that you had the "right answer", but if you did not show sufficient work or physically correct work, you will not get the points. Your answer is a dialogue between you and the grader – it must be intelligible and "legal" math and physics – we cannot grade "what you meant".

### **Units, Numbers and other parts**

For a business that relies so heavily on numbers, it is very rare that the answer to a Physics problem is just a number, like "five". "Five what?" is usually a reasonable question, so units are a very important part of a number. Units will save your life, if you bother to keep them with their numbers and learn to reconcile them. Otherwise, you will be doomed to getting useless results because you plug  $9.8 \text{ m/s}^2$  into a length or a velocity, or end up with a resistance in meters instead of ohms.

So many errors in Physics problems can be traced back to the use of the wrong "thing" in a variable, sometimes to the point where even I can't figure out what you were doing, that we are going to be **very, very, very** hard on units this semester. So here's the new rule:

## **UNITS ARE TO BE CONSIDERED PERMANENTLY STAPLED TO A NUMBER.**

Every time you write down a number, you write down the units as well. This means (a) when you write down the numbers in the beginning of the problem, (b) when you write down your answer and (c) **never, never, never**, what Dr. Phil calls **Deserted Units** – that means when you are writing down a number in an algebraic expression before you haul out your calculator. There will be no alternative here, because otherwise you won't be scoring any points here on quizzes and exams. You'll notice that Dr. Phil always includes units with his numbers on the blackboard – take that as a hint.

Likewise, the sign of an answer can be very important in some problems. Your bank has no trouble with telling the difference between having a **\$500** checking account balance and being overdrawn with a **-\$500** balance, for example; these are very different answers. One must also watch out for powers of 10, since the metric system is based on a decimal system, just like the American money system. Another number problem: 4.97 is a number that is about five, but 4.97 is not the same as 5.00. Your calculator is not very intelligent, so you must determine which numbers in the display represent significant figures, based on the actual numbers you used as input to your calculations. This is particularly important in lab; in lecture and discussion, you will find that we tend to use "reasonable" numbers in answers. I cannot guarantee that you will get exactly the same answer as I do, since the order you do math operations and the brand of calculator can have some impact on the final result. As a general rule, **do not truncate or round numbers too much in intermediate calculations or dump your entire calculator display into a final answer.**

Also – we do not normally deal in fractions. 1.25 is 1.67 to three significant figures.

### **Laboratory:**

Lab is an integral part of any serious study of Physics. You may or may not be taking the lab course, PHYS-2080, at this time. I can help you with general physics questions, but I am neither responsible for the laboratory nor inclined to help you write-up your results.

### **Make-Up:**

In-class 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 arrange an exam within a few days. There are no guarantees that late exams will be the same (or of the same difficulty) as the in-class exam.

This is summer in Michigan – Land of Construction. Dr. Phil has a long commute (154 miles/day) and Lake Michigan is a powerful force of nature. 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... Strog**. Physics is important, but if you or your vehicle can't make it, then you can't make it.

### **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. 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.

### **"My Side" of the Table**

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 spreadsheets. (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