August 22, 2012
Physics 120
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WELCOME TO THE EXCITING WORLD OF PHYSICS!

PHYSICS 120-1790

Lecture: W,F 11-12:15 in room PS 121
Homework session: F 1-2 in PS121; Lab: F 2-5 in PS 121
Midterms and Final: Midterms on Fridays during lab times:M1 September 20, M2 November 2, M3 November 30. Last day of class Friday December 7.
FINAL date Tuesday, December 11, 8-10 in PS 121

Office Hours in PS137: Monday1:30 to 2; T, TH: 12:30-2; Friday: 12:30-1; 7-8 e-mail.

Online Office hour at fwilhelm@dvc.edu or fredmaya@pacbell.net

Please use the second e-mail address fredmaya@pacbell.net when emailing me. It is easier to attach files etc.

PHYS-120 Course Outline

Prerequisite: MATH 121 or equivalent
Recommended: Eligibility for ENGL 122 or equivalent

First semester college physics for Life Science majors and others. A lecture and laboratory study of mechanics, heat and sound.

Objectives/SLOs for PHYS - Physics. Students will be able to…

A. Identify the forces acting on an object.

B. Draw free-body diagrams.

C. Apply Newton's laws to solve problems involving static equilibrium and accelerated motion in one and two dimensions.

D. Apply the appropriate skill sets to problems involving conservation of energy and/or momentum, fluid flow, and rotational motion.

E. Apply the appropriate skills sets to problems involving simple harmonic motion and oscillations and waves in elastic media including sound waves in air.

F. Apply the appropriate skills sets to problems involving thermal physics.

Apart from the text-book by **Giancoli, "Physics Principles with Applications" 6th edition**, you will need a scientific calculator with statistics functions and a storage device to save your work

during the lab. Bring your lab top (if you have one) to the lab session on Fridays. You will need a recent version of Microsoft Office, Word and Excel installed on your computer.

On my website www.heisingart.com you will also find paintings of my wife and wildlife photography by me: eagles, hawks, beavers, river otters, animals and landscapes from our very area around here. Don't forget nature over the study of physics. **Nature in its unpredictability is the ultimate reality and actuality and truth.**

> If, during and outside of the lectures, you want me to explain something in physics or mathematics, ask!

Also, you need the program "Mathtype" installed on your computer. You can download it from http://www.Dessci.com.
Mathtype is much easier to use than equation editor which is built into Microsoft Word. Download Mathtype and run it on your computer. It will integrate itself into Microsoft Word. It is an editor for mathematical and scientific equations and symbols, not a calculator.

I announce in class which homework problems you need to work on. We will solve them together during our discussion sessions on Friday's 1-2pm. I do not collect homework but expect you to try your best solving them. If you don't try to do this you will most certainly fail in the tests and therefore the class. For our first discussion session one week from today you need to download and print handouts "ch 0 Uncertainty Calculations.pdf", and ch 01 homework.pdf and ch 01 introductory formulas.
Here are the homework problems for the next chapters: chapter 2:7, 9, 11, 17, 19, 23, 25, 29, 33, 37, 39, 47; chapter 3: 1, 3, 7, 9, 13, 17, 25, 27, 31, 37, 47; chapter 4: 3, 5, 9, 19, 25, 29, 31, 37, 43, 47, 51; chapter 5: 1, 3, 7, 9, 13, 17, 19, 27, 29, 33, 37, 41, 51, 59; chapter 6: 3, 15, 17, 23, 27, 31, 35, 37, 39, 47, 49, 55, 63; chapter 7: 3, 5, 7, 11, 15, 17, 23, 25, 31, 35, 41; chapter 8: 1, 3, 5, 7, 9, 13, 15, 17, 25, 31, 33, 41, 45, 49; Chapter 9: 1, 7, 11, 15, 21, 41, 45; chapter 10:1, 3, 5, 9, 11, 17, 25, 43; chapter11: 1, 5, 9, 21, 29, 31, 37, 39, 55, 57; chapter 12: 3, 5, 9, 13, 21, 25, 49,

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When you hand in a lab report, midterm, or final, always write your **last NAME** first, then your middle and first name (do things in the way you register). Write your whole name legibly in **CAPITAL LETTERS**. This is important, because I do not want to have cases with mistaken identities.
As mentioned, I post homework problems on the website, if my time permits I will also post some crucial lecture notes. I expect you to do the homework problems and come with questions to the homework sessions. Problems I solve in class should get your special attention, as many of them reappear in midterms. During our discussion sessions I will discuss homework problems of the latest two chapters on which I lecture. During our very first homework session I lecture on uncertainty calculations and a few other things. **Website address:**

http://www.heisingart.com/120.htm

I want to help you as much as possible. By the way, I am not only a physicist but also a philosopher and poet, as you will soon discover.
My particular interest in physics is quantum mechanics and its relationship with thinking. I mention this to you to show that contrary to common beliefs, art, science, mythology, religion can go together. If you have any interest in some of this maybe we have some common ground to share. I have written a book called "Dancing with Maya" which shows how quantum physics limits all knowledge in a very fundamental way, thus leaving open the possibility of creative and

intelligent thinking as can be found in some poetry, mythology, and religions. If you are interested in this you can download a copy of "Dancing With Maya" from my website.

Some personal notes: I received my bachelor degree at the Sorbonne (Paris), and my Master's as well as my Ph.D. at the University of Karlsruhe in West Germany.

Attendance, Participation, and Official Record

I expect you to attend every class, lab, and work-session, and to catch up on any classes missed by getting lecture notes from classmates (not from me!). **Turn off your cell phones etc**. **Do not take notes with your lab top during classes. The attention to your computer distracts you and you miss to actually comprehend what I teach. The same holds for taking notes in the lab**.
NOTE: The worst thing you could possibly do to yourself is to miss a class.

If you must be absent, it is not necessary to call or explain. But if you miss three or more classes, your standing in the class may be endangered, and you should discuss your progress with me. I expect you to take notes during class and to work at home with these notes. Consult a dictionary and use the spell checker in Word! Make sure you understand everything in them, and, if necessary, make appropriate corrections, or ask me. It may be helpful to start a vocabulary book with foreign expressions and definitions. If you don't understand something in the lecture or in the book, let me know it, so that everyone can benefit from my explanations. I am interested in what you think and feel about physics, mathematics, my lecture, your educational process, and so forth. Let us talk! In that way we shall have a lot of fun together.

The responsibility for keeping your enrollment status straight with the college and with me rests on you. Note that you are not enrolled in the class until you have received a computer printout with this class printed on it. This is particularly important if you add the class late.

CLASS WORK

The class consists of 3 hours in lectures (two 75 minute sessions), work-sessions (1 hour), and lab-work (3 hours), 1 hour =50 minutes. Read every chapter and corresponding lecture notes before and after the lecture. Annotate your book with remarks using a color pen and or color markers.

Taking good notes is a skill you must develop as early as possible. I know that it is difficult to listen and to take notes at the same time. This is where your preparation comes in. Don't take notes of everything I say, but it is a good rule to copy at least all I write on the board. Slow me down, or at least you may try to. I know the required speed in order to cover the material.

I WANT TO HELP YOU! ASK QUESTIONS.

Do make a serious effort to solve the homework problems and use them as a study tool. **Seeing me solve them does not work for you**. We will solve most of them together in the discussion sessions. Again, some of these problems will show up in the midterms. **If you don't attend the discussion sessions you are setting yourself up for failure in the class**. The same

holds for not attending the lectures, in which I teach some material which is not contained in the text-book.

LAB reports of Lab N must be handed in **before the beginning** of Lab N+1. We will be able to have about 9 labs total. For every day you turn in your lab too late I will subtract one point out of ten; i.e. **after ten days you get a zero on your lab**. You must **complete the labs with at least a C** (62%) in order to receive a passing grade (C). If you are not present during more than 2 lab sessions without a valid reason (as determined by me) **and** without catching up during the make-up sessions (see below) you will not get a passing grade in the class. **Talk with me before it is too late, if you have problems**!

There will be two makeup lab sessions, in which you can make up one lab you have missed due to sickness, or improve the grade of two labs **up to** 8.5 (B) points. You can **improve** (not totally redo) *two* of the preceding labs per make-up session. If you fail to attend a lab without convincing me with a valid reason and proof for your absence, you cannot redo this lab. You will get 0 points for it. You must **hand in your lab-report at the beginning of the lab session (at the latest), even if you have not completed it**. You can only make up a lab if you have handed in a previous version. This must be attached to the back of your make up lab. Otherwise you get a 0 for it.

You cannot make up lab 1, 2, 3, 4 during the second makeup session. In other words, you can improve four labs total up to 8.5 points each, if your lab reports are otherwise deemed perfect by me. Copying a lab from someone else is cheating and will have serious consequences and will earn you 10 negative points. **Any made up lab must have your notes with my signature and the previously graded lab stapled to the back.**

When I correct your lab reports I also give negative points for grossly negligent stuff, like, for example having results with totally wrong dimensions, or having results which are contradicting what you just wrote. These negative points cannot be made up. I will keep track of them in a separate column, but in the end they will be added to your lab grade. Here is the good news, I also give extra credit points for outstanding work or extra challenges, which I announce, for example an error margin below 0.5%. Careful and diligent work will be rewarded.

I give three midterms at 100 points each. Each lasts 120 minutes. There will be a comprehensive final for 200 points. I have the following Grading Policy: The labs (L) and each of three midterms (M1, M2, M3) count for 100 points; the final (F) counts for 200 points; **I drop the *worst of the first two midterm grades (called "Min"), in case that is of advantage to your final grade.*** I also reward outstanding participation in the class with extra points (at my discretion)!

On a 100 scale your class grade will be determined by this formula:

M=the best of the two possibilities M1+M2+M3-Min or 2/3(M1+M2+M3); F = final.
a) if L>80, (M+L+F)/5; or b) (M+2L+F)/6 if F>119.5; or c) if F>100, (3M+F/2+L)/8; or
d) (M/2+3F+L/2)/7.5 if L>75.0 and (M+F)>240; e) [2(M1+M2+M3) +L+F/2]/8 if F>100; f) if L>80 then F/2 is your final number of points.
I use the best of all the choices. As you can see, in formula d) the final accounts for 80% of the grade; in f) it counts for 100% but only if your lab average is better than 80.0. If your labs are very good they also influence the grade heavily (up to 33%), but only if your final is at least 120/200 points. If your midterms are very good I will count them as 2/3 of the grade in c). For

those who take all three midterms with good results, formula e) might be of advantage. I'll share the Excel formulas with you during our first meeting. You can download the examples from my website. The file is called

Do not let your lab reports slip. The last day to hand in made up labs and have them counted will be the day of the last regularly scheduled class before the finals week.

A = 90.0 points or more, B = 77.0 to 89.0 points, C = 62.0 to 76.0 points, D = 48.0 to 61.0 points, F = 0 to 47.0 points.

I will not grant special opportunities to make up a grade or a lab outside of the rules laid out here for everyone. There will be no exceptions. Specifically, don't send me e-mails explaining how hard you worked and how much you need a C, or B, to maintain your GPA or to get into a specific college. Your grade is in your hands for a whole semester. **I will not respond to any such e-mails**.

After the first midterm, feel free to discuss your progress individually with me. It is relatively easy to get a C, it is much more difficult to get a B or even an A grade. Remember that you must not only have decent grades but that above all you must have a comprehension of the material presented. I test for comprehension, not for plug-in skills. Comprehension is of utmost importance if you want to succeed later during your career.

If you have questions during the class, ask immediately. It is much more fun to work together! If you work hard, you will be successful and enjoy the class. Don't wait with your studies until the day before the midterms, it will be too late. Work regularly and do the assigned homework problems as much and as well as possible.

PHYSICS 120 LAB PRESENTATIONS

You need Microsoft Word and Excel for your lab work. **Do not take notes with your lab-top but write on paper. Attach these notes always to the printed version of your notes**.
All mathematical formulas must be written with the " MS Word" equation editor or better yet with the program Mathtype which I introduce to you during our first lab session. Bring your lab top (if you have one) to the first lab-class.
Visit the website DESSCI.com and get a trial version of Mathtype to use for one month. If you like it, I urge you to purchase a copy. It is very helpful.

Here are some rules to follow for the lab presentations:

Most important for your reports is a clean, logical, and comprehensive presentation of your lab work. Use the following approach: Divide your presentation into three major parts:

A. Purpose and theory.

1. ***Everything I write on the board during the beginning of the lab must be on your write-up in Word*.** The computers in the computer room have all necessary programs installed. Do not make photocopies, or other copies, of each other's work **This is cheating and will result in 0 points for the student who copied and the student who allowed the copy.** Staple your dated and signed lab notes and raw data to the back of your report. It is proof that you have done the lab. Otherwise, I must assume that you copied it from someone.
2. Description of the experiment, as shown by me with your added comments. Use drawings, either by hand or with Word, or through photos.

B. Organize your results in easily readable tables with explanatory headlines. Include error calculations or estimated errors as percentages and absolute errors. A most important part of all our labs is the calculation of relative and absolute errors. Knowing these will determine the correct number of significant figures in your results. This is a major part of all labs.
C. Concluding remarks, only if meaningful.
Every report must have your name, the name and number of the lab, your class and section, the date, as well as the names of your partners. A template of the lab report is on the website.

Put all material used during the lab back to its appropriate place. Note that the labs are very important for your grade.

GOOD LUCK AND SUCCESS TO YOU ALL

There will be pdf files on many chapters on the web, covering topics in class in the way I teach them. Download them and study them, together with your notes.
http://www.heisingart.com/120.htm