

June 17, 2014

Physics 111
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PHYSICS 111

WELCOME TO THE EXCITING WORLD OF PHYSICS!

Our classes meet: Section 1715 on Thursday 2-4:30 in room PS117

Section 1722 on Tuesday 2-4:30 in room PS117

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

Online Office hour at fwilhelm@dvc.edu or redmaya@pacbell.net on Friday 7 to 8 p.m.

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

The website for downloading files for the class is:

<http://www.heisingart.com/111.htm>

Objectives/SLOs for PHYS 111- Physics. Students will be able to...

- A. Perform and observe experimental laboratory work which demonstrates important principles of physics.
- B. Develop the ability to explain the results of experimental laboratory work using mathematical and intuitive reasoning.
- C. Develop the ability to independently analyze specific physics problems within the realm of this course and apply the acquired knowledge to new situations.

Bring your lab top to class if you have one.

Maya's World

"At the quantum level our universe can be seen as an indeterminate place, predictable in a statistical way only when you employ large enough numbers. Between that universe and a relatively predictable one where the passage of a single planet can be timed to a pico-second, other forces come into play,

For the in-between universe where we find our daily lives, that which you believe is a dominant force. Your belief orders the unfolding of daily events. If enough of us believe, a new thing can be made to exist. Belief structure creates a filter through which chaos is sifted into order."

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 and science can and should go very well together. If you have any interest in some of this maybe we have some common ground to share.

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.

This class goes together with a Phys 110 class, which teaches you the basic theories. Our lab class does not require a text book. You need a calculator with scientific functions.

You need Microsoft Office 2007 or later, specifically Word and Excel. You need the program Mathtype from

<http://www.dessci.com>

Download it and install it on your computer before the next lab. We will need it as you can see from the file you download for that same lab. It is called

You need a notebook though, in which you collect the information received during the lab periods. All information as written on the board by the instructor and all data collected during the lab must be in this notebook, to be copied later into Microsoft Word. Every student must record this data in this notebook during the lab-session and get my signature before leaving the class. It serves as proof that you were in class and performed the experiment. I will check it periodically.

You need a scientific calculator, a storage device (CD, floppy, USB key) or an e-mail address to which you can send your stuff from the lab computer. Bring your own lap top computer to class if you have one.

If you are interested in questions of mythology and want to find out its possible connection with physics you may want to check out the book "*Dancing With Maya*," written by myself. It deals with the question of what is physics as a world-view, and what is its relationship to ourselves, our thinking, human history and mythology. This book contains the "fun" part, including the most advanced ideas of modern physics. It goes also into questions of how physics relates to human consciousness, philosophy, and mythology. Among many other things, it 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. You can find the book on the website: www.heisingart.com/maya.htm

You can download the book chapter by chapter or as whole free of charge. Let me know what you think.

Attendance, Participation, and Official Record

I expect you to attend lab on time, because I explain the lab during the first hour. If you miss a significant part of this presentation you will have no idea what we are doing. If you come too late I may ask you to repeat the lab at another time. Every lab counts for 10 points. So, if we have altogether 13 labs, 130 points will correspond to 100%. If you come too late by more than 15 minutes without a viable explanation, you will get 1 unredeemable negative point.

For work not attempted or absurdly wrong, you will also collect a negative point. In other words, pay attention to what you write, don't just copy without comprehension.

LAB reports of Lab number N must be handed in **before the beginning** of Lab N+1, at 2:00 pm. For any lab turned in after the beginning of class I subtract 0.5 points from your total. For every day you turn in your lab too late you will get one negative point, up to a total of 10 negative points per lab. If you are not present during more than **2 lab sessions without a valid explanation like sickness you will get an F in the class or I will drop you**. Talk with me if you have problems! If you attend a lab, you must turn it in during the next lab, even if it is incomplete. You can make it up later. **If you do not turn it in (except due to sickness) you will get 0 points for it and it cannot**

be made up. Also, as I teach the same lab on Tuesday and Thursday, the Tuesday students can attend the Thursday lab to make up for a lab missed due to sickness.

There will be a makeup lab after labs 4, lab 8, and 12 where you can make up a lab you have missed due to sickness, or improve a grade of a lab **up to 8.5** (a B) points You can make up two of the preceding labs per make-up session. In other words, you can make up 6 labs and improve those labs up to 8.5 points, if your labs are otherwise deemed perfect by me. **Copying a lab from someone else is cheating and will have the serious consequence of getting 10 unredeemable negative points, or an F in the class.**

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.

Made up labs must have your notes with my signature, and original labs stapled to them.

At the end of the term I put all lab results on a 100 point scale and your grade will be as follows:

A = 90 points or more, B = 77 to 89.5 points, C = 62 to 77 points, D = 47 to 62 points,
F = 0 to 47 points.

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 two 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.

If you want me to explain something in physics or mathematics which you have not understood either in my class or another lecture, please ask me to explain once more. I want you to understand, not just to repeat recipes. If some personal problems are in your way, don't be shy to discuss them with me. I want to be helpful and accommodating; don't be afraid to send me an e-mail (identify yourself as a phys-111 student) !

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.

LAB PRESENTATIONS

ATTENTION!!!! Copy all the data from your notebook onto the lab report, written in Word. Your lab report must have the header as demonstrated during the first lab. Use Mathtype and/or equation editor in Word for your formulas. The proper use of Word, Excel and equation editor is an important part of this lab. We shall spend some lab time to learn these things.

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. Show the derivation of the formulas as shown on the blackboard by me. *Everything I write on the board during the beginning of the lab must be on your write-up in Word.* Therefore, take good notes and ask me when you don't understand something. Don't copy symbols and words that don't have a meaning to you. ASK ME!!!! Don't be shy! I don't bite (usually).**

Use EXCEL for graphs and statistics, whenever possible. Use "Word" to write up your notes and data. We will dedicate the first lab to learn how to use Excel and Word. Also, within Word, learn how to use equation editor, and enter the correct mathematical and physical symbols, like α (alpha); β (beta); Δ (delta); λ (lambda) μ (mu) v (nu) π , ρ (rho) ω (omega). Ask, if you have problems. The computers in the physics computer room have all necessary programs installed. Use them because some of the printers on campus don't work with formulas.

Learn how to move schedules and graphs from Excel into Word. Do not make photocopies of each other's work. 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.

- 2. Description of the experiment. Use drawings, by hand or using a program, or (optional) digital photos!**
- B. Organize your results in easily readable tables with explanatory headlines. Include error calculations or estimated errors as percentages and absolute errors.**
- 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.

Write your report by using the word-processor Word. (Use proper English with proper spelling and grammar. I deduct points for mistakes, bad presentations, and sloppiness! A wrong header leads to the deduction of 0.2 to 0.5 points.) A template with the correct header can be downloaded from my website.

Put all material used during the lab back to its appropriate place. The labs are all important for your grade. I want you to understand what you are doing! Ask questions. During the class I often give bonus points for correct answers.

I hope we all have a lot of fun together and you learn something relevant. If you are persistent, and do the work, it is quite easy to get a B, or even A, in this class.

Good luck to you all!

There are four pdf files in <http://www.heisingart.com/111.htm> for you to download: the first one explains how to write the lab reports. We use this in our first class. Download it and read it before our first lab. Download the three others as well. Download them, print them out and store them in your folder for this class for constant reference.

These files are on <http://www.heisingart.com/111.htm>

ch 0 Lab1 use of Word 111; ch 00 P111 uncertainty; 111Lab template; 111Using the Calipers.