Spring 2015 Physics 112.02 GENERAL PHYSICS I LABORATORY
Tuesday 9:35 – 12:20 (TH 118) Final Exam: Tuesday May 12 in TH118

I. Instructor: Polin Yadak
Office Location: SCI 386 E-mail: poliny@sfsu.edu
Help session & Office Hour: M 11:00 – 12:00 pm & T 8:00 to 9:00 am in SCI 386

II. Materials Needed:

- *General Physics Laboratory Manual, Physics 112 and Physics 122, Revised 2011*, is on sale at the bookstore.
- Hardbound, Quad-ruled lab notebook : Roaring Springs #77475 is fine; so is Roaring Springs 77591 = National #43-592=53108.
- Calculator (Scientific preferred) NOT A CELL PHONE
- Ruler, glue stick, and a black or blue pen

III. Attendance:
You may miss one lab meeting without penalty, as your lowest lab grade and lab quiz will be dropped. There will be no opportunities to make up missed labs.
PLEASE NOTE: Lecture/lab co-enrollment is required. **If you drop lecture, you will also be required to drop lab.**

IV. Lab Notebooks:
Your lab notebooks are to be turned in each week, **at the end of the lab**. Your lab notebook should be an organized, legible, complete account of your lab work.

Please note:
1.) Include any lab notes taken at the beginning of class in your notebook, on separate pages from your lab write-up. Make sure to number the pages in your notebook, in order, and keep a table of contents in the front of your lab notebook, noting the page numbers for each lab assignment.

2.) Start each experiment on a new page; include the date, time, experiment title, and lab partners. For example:
09/09/2015 Computer Data Analysis and Plotting Janny; Kevin

3.) Use permanent pens only, no pencils or erasable pens or red pens, etc (make them black or dark blue). If you make a mistake simply cross it out neatly with a horizontal line through it, do not use whiteout. I will not grade you down for a mistake that is neatly crossed out and corrected.

4.) A common mistake is to include too little, or too much, in your first few lab write-ups. If you do not include enough information, it makes your write-up incomplete. If you include too much, you are probably including non-essential details, and you may not be able to finish within in the allotted lab time. A complete but succinct lab write-up can be finished within the lab period.

5.) When you're finished, the question you should ask yourself is this: "If I read my lab book in 6 months, could I understand what was done in this experiment without referring to the lab manual? Could my lab partner do the same using my lab book alone?"

6.) Be sure to answer all questions asked in the lab manual. Put a box around each answer.

7.) At the end of the lab period, leave your lab book on the table at the front of the room. There will be no work required outside of class except reading through the next experiment.

Format to follow:
****Before you start the experiment, write down:**
1.) Purpose (Very briefly)– What are you trying to accomplish with this lab? 1-3 sentences should suffice. Think "big picture", not "well-first-I-did-this-then-I-did-that" cookbook style.
2.) Set-up – A **brief** description of the important aspects of the setup. You can use mostly schematic diagrams with appropriate variables labeled. **Don't recopy the lab manual.** This section should not be hugely time consuming— the three next sections are the main thrust of your write-up:
****While doing the experiment, write down:**
3.) Data – You should present your data clearly. Always box all important results. Data tables (hand-drawn or Excel printout) are usually best. Always include units. Include uncertainties if available. Keep only three digits after the decimal point.

4.) Analysis – Clearly write down a formula first and double underline it, before you use it. Show how you worked through calculations. (If the calculations are repetitive, you only need to show an example.) It can be especially beneficial to write out the

unit analysis for all calculations; I suggest you do this. If you are having Excel compute formulas for you, write the formulas on the printout, or type them into the column headers. Include graphs (hand-drawn or computer printout.) I will give you further information on how to make proper graphs (labeling axes, including units, scaling axes to fit data nicely onto the graph area, etc).

****After you're done with the experiment:**

5.) Results/Conclusions: This section should generally be 1-2 short paragraphs, where you briefly summarize what you did and the main thrust of your results. What do the results tell you? How well did your results agree with the predicted result? Mention specific numerical results if they're centrally important to your experiment. If the results did not agree with theoretical predictions, give some possible reasons for the disagreement. Describe what you think were your greatest sources of error.

Result Sheet: Sometimes I will ask you to fill in the result sheet (from your lab manual), and paste it into your lab notebook.

V. Grades:

- Quizzes: Short quizzes will be given at the start of each lab and will be worth 20% of your final grade.
- Lab notebooks: Will be graded weekly, and be worth 60% of your final grade, all previous aspects will factor into this grade as well as neatness and your participation.
- Lab Final Exam: A written exam will be given and is worth 20% of your final grade.
- The lab coordinator will determine the letter grades given for the lab course, based on the numerical scores given by the lab instructors.
- **You will be able to use your lab notebook during the final, so keeping a good lab notebook usually leads to a good grade on the lab final.**

VI. Course Objectives:

You should:

- Learn the scientific method as applied to physical experimentation.
- Observe important physical phenomena on which the laws of physics are based.

VII. Learning Outcomes:

a. You will use a variety of instrumentation and measurement techniques to measure physical quantities, determine the uncertainties in those measurements, and determine relationships between measured quantities.
b. You will use computer software and computer-interfaced measurement hardware to collect and analyze data.
c. You will use statistics, propagation of uncertainties, spectral analysis, and curve-fitting to analyze experimental results.
d. You will record scientific observations and analysis in a lab notebook following accepted scientific practice.
e. You will practice the scientific method of testing theory by experiment.
f. You will carry out measurements and observations permitting you to verify some of the physical laws presented during the lecture part of the course.
g. You will observe fundamental physical phenomena in the fields of mechanics, heat and oscillations.

VIII. Dropping and Withdrawal

If you drop or withdraw from the lab, you will have to drop the lecture PHYS 111 at the same time.

- Jan26 – Feb 6: you are free to drop Phys 112 and Phys 111 during this period on your own.
- Feb 7 – Apr 24: during this period students can only withdraw with "W" using Withdrawal Procedure
- Apr 25 – May 15 withdraws can be approved only with "serious and compelling reasons."
- See the Physics and Astronomy Department policy on withdrawal at http://physics.sfsu.edu under *Department Policies.*

IX. Accessibility

- Students with disabilities who need reasonable accommodations are encouraged to contact the instructor. The Disability Programs and Resource Center (DPRC) is available to facilitate the reasonable accommodations process. The DPRC is located in the Student Service Building and can be reached by telephone (voice/TTY 415-338-2472) or by email (dprc@sfsu.edu).

X. Plagiarism

- Representing work done by others as your own work is expressly forbidden. See the Physics and Astronomy Dept. Plagiarism policy on http;//www.physics.sfsu.edu under *Department Policies.*

XI. General

- I want to encourage everyone to use my help session and office hours, not just for lab questions, but for lecture questions as well.

Physics 112 Lab Schedule – Spring 2015

Week	Lab#	Experiment
1/26-28	No Lab	Introduction & syllabus
2/2-4	Lab 1	Data Analysis on the PC
2/9-11	Lab 2	Velocity and Acceleration in Free Fall
2/16-18	Lab 3	Projectile Motion
2/23-25	Lab 4	F= ma
3/2-4	Lab 5	Inclined Plane – Force and Friction
3/9-11	Lab 6	Centripetal Force
3/16-18	Lab 7	Simple Harmonic Motion
3/23-25	No Lab	Spring Break
3/30-4/1	No Lab	Cesar Chavez
4/6-8	Lab 8	Collisions; Conservation of Momentum
4/13-15	Lab 9	Rotational Inertia
4/20-22	Lab 10	Archimedes' Principle
4/27-29	Lab 11	Calorimetry
5/4-6	Lab 12	The Ideal Gas Law and Absolute Zero
5/11-13	Lab Final	