

# Syllabus for PHYS 113/213 and 114/214 Laboratory

## Physics Laboratories I & II

PS 114, PS 127, CHE 209

***Be sure to download a copy of this syllabus and bring it with you to your lab orientation.***

**PHYS 113/213** Corequisite: PHYS 111/211. Topics: vectors, kinematics, dynamics, energy, mechanical waves, thermodynamics. **You must have already completed or must currently be enrolled in PHYS 111/211 to enroll in this lab.**

**PHYS 114/214** Corequisite: PHYS 112/212. Topics: electricity, magnetism, optics, modern physics. **You must have already completed or currently be enrolled in PHYS 112/212 to enroll in this lab.**

PHYS 113/213 are prerequisites for 114/214. Please be sure to check with your lab instructor if you are taking these labs out of sequence.

**Time:**

**Lab Instructor:**

**Lab Instructors office/office hours:**

**Lab Instructor's phone/email:**

**Lab Supervisor:** Mr. Martin Hackworth, campus 4439, [hackmart@physics.isu.edu](mailto:hackmart@physics.isu.edu)

**Note:** This syllabus is the binding document for these courses. Your instructor does not have the authority to waive any of the following requirements. Only the Lab Supervisor may grant exceptions to these policies and procedures and this is very unlikely to occur.

**MATERIALS:** Lab notebook (Roaring Spring® Brand Computational Notebook, #77648), TI-30Xa scientific calculator (these are available for use in the lab), C-Thru ruler (M-100), protractor. The lab manuals for these courses are available on-line at:

<http://www.physics.isu.edu/~hackmart/physspl1.htm> (113/213)

<http://www.physics.isu.edu/~hackmart/physspl2.htm> (114/214)

**GRADING:** These labs will be graded on a point system. You may acquire points from the following sources:

1. **QUIZZES** - A short quiz will be given at the beginning of each lab. Questions will be selected from the lab of the previous week as well as the lab to be done the day the quiz is given. If you arrive late you will not be allowed extra time to complete the quiz nor will you be given time later to take the quiz.
2. **LAB NOTEBOOK/LAB PERFORMANCE** - Your lab notebook should consist of  $11\frac{3}{4} \times 9\frac{1}{4}$ ,  $4 \times 4$  quad engineering paper without carbons, with numbered pages, in a *permanent* binding. A notebook of this type comes with the Physics Lab bundle available at the campus bookstore.

A lab notebook is a journal of what you do each week in this lab. Your lab notebook is to be used only for this course. You are to write your observations and measurements in a legible manner, in ink, directly into your lab notebook without recopying. Mistakes in an experiment are part of the game. *You should never erase or recopy lab notes, or tear pages out of your lab notebook, or make an entry in your lab notebook prior to beginning an experiment or exercise.* All of the

material in your lab notebook should be original (i.e., no photocopies, paste-ups, etc., or copying directly from the lab manual) and should pertain directly to what you have done in each procedure. You are not permitted to use anyone else's lab notebook in preparing your own. You are not permitted to use a lab notebook that you have previously used for the same lab (you may use the same notebook for continuing labs, e.g. 113-114. 213-214).

Each week your lab instructor will evaluate your notebook, your performance in lab, take an inventory of your lab materials and you will receive points based on this. If you arrive on time with a copy of the lab procedure for the week and all of the materials you are supposed to have, follow directions, produce a good notebook, and put forth a good effort, you should receive most of these points. If you come to lab unprepared, fail to read the instructions before asking for help, work in a group of three or more without explicit permission, miss lab, arrive late, leave early, fail to clean up after yourself, produce a poor notebook, show up without a notebook, calculator, etc., or damage lab equipment you will receive very few, if any, of these points.

3. FINAL EXAMINATION - A comprehensive final will be given on the last day of your lab. It is given at the same time and in the same place your lab normally meets. Notice that the point value of the final is such that it is an important component of your grade. **No "make-up" finals will be given.** If you miss the final you must make arrangements with your lab instructor to take the final before the end of the week in which it is given. Generally this is not a problem but it is up to you to contact your lab instructor and make plans. You have essentially a 1-week window of opportunity to take a lab final but be aware that no lab finals are given after this time. The lab final covers all of the physical concepts covered in the lab and is therefore lengthy and involved. Your quiz questions are not necessarily the same as the problems you will encounter on the final exam. The calculations done in lab each week and the questions at the end of each exercise are a much better indicator of what is likely to appear on the lab final.
4. LAB REPORTS (113/114) - **One** lab report will be due. The lab report will be compiled primarily from your lab notebook. An outline of what is expected on all lab reports accompanies this syllabus but your lab instructor may require additional information or formatting. You may share data accumulated during an experiment with your lab partner. You may not, however, submit the same lab report. You may not submit tables, graphs, figures, or any other parts of a report that are duplicates of someone else's work. Lab reports will be graded on *originality* as well as *completeness* and *correctness*. You are not allowed to photocopy material from any source for inclusion into a lab report. It is extremely important that you understand what defines plagiarism. I suggest that you look it up in your student handbook. Five points per day will be deducted for late lab reports. Lab reports are due at the beginning of the lab on the due date.

**(213/214)** - Two lab reports will be due. Criteria are the same as listed above

ATTENDANCE - Although attendance has no point value by itself it should be obvious that you cannot earn points if you do not attend lab. You should not commit yourself to anything that may interfere with the time allotted for this lab. If you arrive after the quiz has been given or leave before the procedure is complete you not earn full points. You will not be allowed to make up missed quizzes if you are late. *In extenuating circumstances your lab instructor may allow you to make up a missed lab by attending another section of lab the same week.* You should make arrangements with your lab instructor to make up a lab before the end of the week in which it is scheduled. Some form of written documentation may be required to substantiate the reason for your absence. You should consider the opportunity for credit lost if you fail to make up the lab by the end of the week. As there are many extra points built into the grading structure there will be no opportunities for makeup quizzes or exams other than outlined above (generally missing a single quiz, or even an entire lab, will not precipitate a grade catastrophe). Please don't ask about makeups.

You should attend only the lab that you have registered for. *All arrangements to switch labs must be made through the Registrar's office.* It is your responsibility to make sure that you are

registered for the lab you are attending and are on the class roll for that lab. If you go through the semester in a lab in which you are not registered you will receive a grade of "F" at the end.

**Available Points (113/114):** Quizzes are worth 10 points each, Lab Notebooks are worth 10 points per procedure, Lab Performance is worth 10 points per procedure (of these points: lab notebook – 3 points, lab procedure – 3 points), a lab report is worth 80 points, and the final exam is worth 100 points.

|                        |   |
|------------------------|---|
| <b>Totals:</b> Quizzes | 1 @ 20 points, 10 @ 10 points each = 120 points |
| Lab Notebook           | 10 @ 10 points each = 100 points                |
| Lab Performance        | 10 @ 10 points each = 100 points                |
| Lab Report             | 1 @ 80 points = 80 points                       |
| Final                  | 100 points (minimum)                            |

**500 points available**

**Available Points (213/214):** Quizzes are worth 10 points each, Lab Notebooks are worth 10 points per procedure, Lab Performance is worth 10 points per procedure (of these points: lab notebook – 3 points, lab procedure – 3 points), two lab reports are worth 80 points total and the final exam is worth 100 points.

|                        |   |
|------------------------|---|
| <b>Totals:</b> Quizzes | 1 @ 20 points, 10 @ 10 points each = 120 points |
| Lab Notebook           | 10 @ 10 points each = 100 points                |
| Lab Performance        | 10 @ 10 points each = 50 points                 |
| Lab Reports            | 2 @ 40 points = 80 points                       |
| Final                  | 100 points (minimum)                            |

**500 points available**

Final grades will be tentatively based upon the following scale:

"A" > 380 points  
"B" > 320 points  
"C" > 260 points  
"D" > 200 points

Students on the +/- scale will have final grades awarded based on position within each grading range. A cumulative spreadsheet is maintained on the website for each lab which shows the points you have accumulated through the semester. You may access your points at any time provided that you give us a codename on the general information/quiz 1 form you will be asked to fill out during the orientation lab.

**Miscellaneous:** PHYS labs are 1 credit hour courses. For each credit hour taken the standard amount of effort expected is three hours. So three hours per week is the amount of effort expected for this course. For a 16-week semester you should *expect* to spend 48 hours on this course. What you will probably spend is:

|               |                    |
|---------------|--------------------|
| Orientation:  | about 1½ hours     |
| Ten labs      | less than 30 hours |
| Lab report(s) | 6/12 hours         |
| Final         | 2 hours            |

**Total** **39.5/45.5 hours**

A well-prepared student should usually not need the full time allotted for the lab (3 hours). The amount of time required in this lab is well below what is normally expected for the credit hours associated with this course. The extra time should be more than enough for you to read over the procedures before coming to lab, and to prepare you for the quizzes and lab final.

Read through the experiments in the lab manual before coming to lab. **Bring your textbook** (for use as a reference) **and a scientific calculator with you to each lab**. Be sure that you know how to calculate simple statistics (e.g., mean, standard deviation, etc.) on your calculator. Be as thorough as possible in examining the physical principles involved with the experiment being performed. You will enjoy this course and be more successful in it if you come to lab each week having prepared for the experiment by reading the procedure.

Every effort has been made to construct a laboratory that is relevant to the lecture course. This does not mean, however, that the lab is coordinated with the lecture. It is simply not possible to do this. That is why labs and lectures are separate courses. The laboratory exercises are reasonably self-explanatory and not unduly difficult. The lab is designed to give you a perspective that is slightly *different* from that given in the lecture to aid in your overall comprehension of the physical world.

The equipment used in these laboratories is expensive and difficult to replace. As aspiring professionals you are expected to conduct yourselves with an appropriate degree of decorum in the lab. Any abuse or misuse of laboratory equipment may result in your suspension from this course and a grade of "F". If you damage lab equipment we will send you a bill. Some of the experiments and exercises you will be performing this semester make use of microcomputers. You are welcome to use any of the software on these machines whenever you are in the lab. You are not permitted to load files onto these machines or to copy software from them.

If you have any problem with this course you should first discuss it with your lab instructor. Lab instructors are here to help you and you will find that they are generally willing to assist any way that they can. In the event that you encounter a problem that you are unable to resolve with your lab instructor, you may feel free to contact me at my office during office hours, or by email. Please be aware that I expect you to contact your lab instructor first. Generally I will not discuss issues of grading, policy or procedure with you until you have spoken with your lab instructor about it. An exception will be made if you have an issue with your lab instructor that you feel the need to discuss in confidence. Please contact me via email and I will make an appointment to see you. Matters concerning lab policies and procedures are not open to negotiation. Our policies and procedures have been in place for many years and are driven by what we believe to be best for you rather than what you believe to be best for you.

Martin Hackworth, Physics Laboratory Supervisor

## Lab Reports

A lab report should consist of the following, each section beginning on a new page:

### Title page

- Name
- Partner's name
- Title of experiment
- Date due/date performed

### Abstract

- Purpose
- General description

### Theory section

- Physics theory

### Procedure

- Tell what you did
- Include sketch/schematic

### Data tables and graphs

- Neat and complete

### Sample calculations

- Must be neatly done
- Sufficient to follow your work

### Discussion of errors

- Must be realistic
- Give % error

### Results and conclusions

- Report findings

The style manual you should use as a reference for writing your lab reports is ***A Writers Resource – A Handbook for Writing and Research* by Elaine P. Maimon and Janice H. Peritz**. This is the style manual adopted by the Center for Teaching and Learning at ISU.

Your lab instructor will fill you in on the details that they expect to see in your lab reports. Avoid plagiarism. Include a reference page if necessary. If you are unsure of what constitutes plagiarism I suggest that you look it up in your student handbook. If plagiarism is suspected, in any form, your lab report will be returned to you ungraded (no credit given) and may be referred to the Physics Department for further action. Generally any clear style of writing that is grammatically correct is acceptable although your lab instructor may require that certain stylistic conventions be observed. Lab reports are due two weeks after the lab has been completed over which they are assigned.