General Physics Lab II
PHY 104
Syllabus

Le Moyne College
Spring 2018

The Faculty of the Department of Physics
Le Moyne College
January 2018

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PHY 103 - 104 General Physics I and II Laboratory

These are the laboratory courses that go with PHY 101-102 *General Physics I & II* and PHY 105-106 *General Physics for Scientists and Engineers I & II*. PHY 103 is offered in the Fall semester along with PHY 101 and PHY 105; PHY 104 is offered in the Spring with PHY 102 and PHY 106.

If you are enrolled in PHY 101 or PHY 105, you must also enroll in PHY 103. Similarly, if you are enrolled in PHY 102 or PHY 106, you must also enroll in PHY 104.

Where is the General Physics Laboratory?

The lab is room 123 of the Coyne Science Center.

Lab Instructors

You are welcome to visit any of us anytime we are in our offices, even outside of the posted office hours. Should we not be free when you come, we will make an appointment for a later time.

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What is required for participation in PHY 103 - 104?

1. *Text* The *General Physics Laboratory Manual* by the Le Moyne physics faculty.
   a) Purchase this during the first lab meeting.
   b) Any lab descriptions not in the package will be handed out as the semester progresses.
   c) You *must* buy the lab manual in order to receive the lab descriptions and participate in the general physics labs.
   d) Once you open the shrink-wrapped lab manual, you cannot return it.
2. *Scientific calculator* Any calculator with square root, trigonometric functions, logarithms (base *e* and base 10), and exponential functions (e^x and 10^x).

What labs happen when?

A schedule of labs is included in the lab manual.

Pre-lab questions

Almost all lab handouts have pre-lab questions as their last page. You must answer these questions and hand them in as you enter the general physics lab. You may not participate in the lab activities unless you have handed in the pre-lab questions for the lab.

Most pre-lab questions are worth three points each. Pre-lab questions that involve graphing are usually worth five. Points deducted for incorrect answers to pre-lab questions lower your grade for the lab. Since lab reports will be graded out of 100 points, this means that the pre-lab questions are usually worth somewhere between 30–50% of each report's final mark.

Tests

1. There will be two lab practical examinations, a midterm exam and a final exam. Both exams will have equal weight in calculating the final grade.
2. See the *Schedule of Labs* for the dates of the midterm and final.

How is the final grade calculated?

1. Pre-lab questions are graded and count toward the score for a lab.
2. First we average your scores on the individual labs. This gives a lab score.
3. The final score for the lab is calculated from the following formula.

$$\textit{Final Score} = 60\%\ \textit{Lab Score} + 20\%\ \textit{Midterm} + 20\%\ \textit{Final}$$

4. The final grade for the lab is obtained by applying a curve to the final score.

Everyone is expected to be present when lab begins

If you arrive at lab three or more minutes late, your lab instructor may give you a warning. After a first warning, at the discretion of the lab instructor you may not be allowed to participate in the lab. In such a case, it is your responsibility to arrange a time to makeup the lab.

Attendance policy for lab sessions

1. Attendance at the lab sessions is required and is a prerequisite for handing in a lab report.
2. You must attend the lab section for which you registered unless you receive permission from the lab instructor to do otherwise.
3. In case you are unable to attend the lab section for which you are registered but can attend another lab section the same week, both lab instructors must agree *in advance* to allow you to attend the other section in place of the section for which you are registered.
4. If, for reasons beyond your control, you cannot attend any of the lab sections during the week, you must either arrange to make up the lab with the lab instructor as soon as possible – typically the same week, if possible – or receive a grade of zero for the lab.
5. Labs are **not** cancelled for Dolphy Day: you are expected to attend your lab section if it falls on Dolphy Day, and you cannot make it up by going to another section that week.

The General Physics Laboratory

Lab partners

1. Some lab instructors may assign lab partners; others may permit you to choose your partners yourselves.
2. Your instructor will change your lab partners several times during the semester.
3. Groups of two or three are required to do the lab activities.
4. Normally you must not do a lab alone, but if you are making up a lab and there is no partner, the lab instructor will assist you as necessary.
5. Groups of four or more lab partners are not allowed.
6. Groups of two will be used unless some groups of three are necessary as determined by your instructor.

Can I talk to people in other groups during lab?

Yes. Often one group of lab partners will have a question about experimental procedure that can be answered by someone in another group. Laboratories are a shared learning experience; take advantage of it!

Lab etiquette

1. During lab period, the computers are for lab use only.
2. Upon closing Logger Pro or MS Excel, you may be asked if you want to save your data. Normally, the appropriate answer to this question is, "No." In case you really do need to save something, please save it on the u: drive.
3. When you have finished an experiment, clean up. Leave the work table as you found it.
   a) Return equipment to its original location.
   b) Turn off equipment left on the lab table.
   c) However, the PC can be left on.
4. Water and other liquids can be a problem. There are paper towels in the lab you can use to clean up tables and equipment.

Lab reports

Pre-lab questions

Unless explicitly stated otherwise, pre-lab questions are collected as you enter the lab.

Who turns in a lab report?

1. For each lab, you must complete and hand in your own lab report. (For some labs, joint or group lab reports will be acceptable.)
2. However, feel free to consult with others while preparing your lab report.
3. You may not turn in a lab report if you did not attend the lab. For this reason, the lab instructor will monitor lab attendance.

Who writes the lab report?

Everyone writes and hands in his or her own lab report. It is never acceptable to hand in a copy of a report you yourself did not prepare.

Here is what you may and may not do in writing your lab report.

1. *Data taken during lab* Data is shared by all people present during data acquisition. If you were participated in taking data, you may make your own copy of the data. If you did not participate, you must arrange with the lab instructor to make up the lab.

2. *Hand drawing and hand graphing* You must do your own hand drawing and hand graphing, if drawings or hand graphs are required for the lab report. You may not submit a copy of a drawing or a hand-drawn graph made by someone else.
3. *Spreadsheets* The goal is that you learn to make your own spreadsheets, a skill well worth acquiring. You will be expected to create your own spreadsheets during the lab practical exams.
4. *Answers to questions* In your lab reports, your answers to questions must reflect your own understanding. In preparing an answer, you may discuss the question with anyone. It is usually best if you write your answer in your own words, but we also accept jointly prepared answers in which two or more people have agreed on a common wording.

When are lab reports due?

a) Lab reports must be handed in before you leave the lab unless your instructor indicates otherwise.
b) For some labs there may be problems to be addressed after the lab period is over.

Graphs

1. Graphs are done with Logger Pro or Excel except in rare cases where some hand work may be needed.
2. All graphs must have correct and meaningful descriptive titles.
3. All axes are labeled with the names and units of the quantities being graphed.
4. The names of the quantities being graphed always have units attached, unless the quantity is dimensionless or does not have meaningful units.
   For example, if an axis represents distance, there is a big difference between distance in meters and distance in centimeters — a factor of 100, to be exact. Anyone looking at the graph would need to know which it is.
5. If there are two or more curves on one graph, each curve must be distinguishable in some way and labeled.
   Excel makes this straightforward. It is just an item in a menu.
6. If the graph is a straight line with a least squares fit, the equation of the fit must be shown on the graph.
   Excel makes this straightforward as well, via a check box in the line fit dialogs. Just do not forget to do it.

How are lab reports graded?

7. The grade earned by your lab report is based on your lab work and participation and on your answers to questions.
   a) Inaccurate results, if they are the result of error on the part of the experimenter, carry a fairly severe penalty.
   b) Skipping something the lab manual or a supplement says needs to be done can really hurt.
   c) Answers to questions must be accompanied by full explanations and/or calculations.
8. Lab reports that are late are subject to a penalty.
9. When appropriate, group reports will receive a group grade.

What lowers lab report grades?

1. Incorrect procedure
2. Mistakes in measurements
3. Mistakes in recording measurements
4. Missing the obvious See "Ensure that your analysis results make sense," in the next section.
5. Calculation errors
   Arithmetic mistakes, using the wrong formula, using the right formula wrongly.
6. Leaving units off physical quantities

7. Stating an answer to a question without justifying or explaining
Answers lacking justification or explanation are graded as if the question were not answered at all.
8. Unlabeled graph, incorrectly labeled graph, no units attached to the names of the graph axes
9. Messy, disorganized, unreadable work
Such should never happen when using spreadsheets and word processors, but you have been warned anyway.
10. Poor grammar and spelling errors
11. Turning a lab report in late
Nevertheless, it is *always* better to turn in something rather than nothing. What helps get a good grade on a lab report?
12. **Be prepared before you come to lab**.
Before the lab period, read the manual and, perhaps, look up the subject of the lab in your text.
The Schedule of Labs comes with the General Physics lab manual.
The excuse "I did not know what lab is next" carries no weight.
13. Do your laboratory work carefully.
14. Do not hurry.
15. Lab partners should check each other. You are all in this together.
16. Check spreadsheet calculations with a hand calculator.
You are responsible for the accuracy of the spreadsheet calculations in the report you turn in.
Only by checking them with a calculator can you know the formulae are entered correctly.
17. Ensure that your analysis results make sense.
Example If your analysis of the data says a glider sliding down an inclined air track is going slower at the bottom than at the top, something is very wrong with your analysis. Things like this you must notice and fix.
18. Graphs are a powerful tool for seeing errors in data.
19. **Re-do any part of the lab that seems suspect.**
Because you are using spreadsheets, usually you can see your graphs and analysis results very quickly after you finish working in the lab. If anything seems off, return to the lab and fix it. After you leave the lab, it is too late.
20. **Before handing in your report, review the instructions for the lab — both the lab manual and any supplemental material — to ensure you did not leave anything out.**

Course goals:

1. Conversance with fundamental bodies of physical knowledge.
2. Development of analytical and mathematical skills.
3. Development of fundamental laboratory skills.

Course objectives:

Become familiar with:

1. Basic physics concepts.
2. Methods of inquiry.
3. Units & magnitudes.
4. Problem-solving with basic math skills.
5. Software as tool.
6. Experiment & uncertainty.
7. Data analysis & reporting.
8. Data acquisition & analysis.

Academic Standards:

Students are expected to observe at all times the highest ethical standards as members of the academic community. Any form of dishonesty makes a student liable to severe sanctions, including expulsion from the College. For details, see the Academic Standards[1] section in the

[1] http://collegecatalog.lemoyne.edu/AcademicInfo/Standards

Academic Information area of the College catalog or in the Community Standards[2] area of the Student Handbook.

Special needs

In coordination with the Academic Support Center (ASC) and the Office of Disability Support Services, reasonable accommodations are provided for qualified students with disabilities. Please register with the ASC office for disability verification and determination of reasonable accommodations. After receiving your accommodation form from the ASC, you will need to make an appointment with me to review the form and discuss your needs. Please make every attempt to meet with me within the first week of class so your accommodations can be provided in a timely manner. You can either stop by the ASC, located on the first floor of the Library, or call (voice: 445-4118, TDD: 445-4014) to make an appointment.

[2] http://www.lemoyne.edu/Compliance/Handbook/Community-Standards