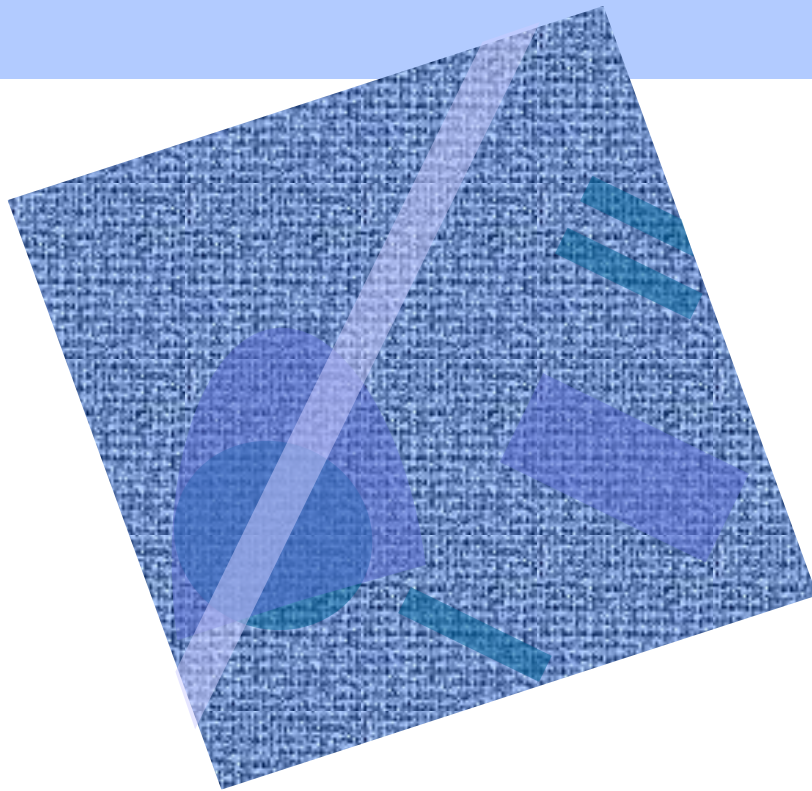


University of South Carolina



**An Introduction to the
200 Level Physics
Laboratories.
(201/202/212H)**

Eligibility

- ¶ To be eligible for enrollment in PHYS 2xxL you must satisfy any of three conditions:
 - ↙ A. Be currently enrolled in PHYS 2xx.
 - ↙ B. Already have a grade of C or better in PHYS 2xx.
 - ↙ C. Have a written waiver from the Undergraduate Director.
- ¶ You will not receive a passing grade in PHYS 2xxL if you do not meet one of these conditions at the end of the semester.
- ¶ **Warning: If your eligibility depends on current enrollment and you drop PHYS 2xx, you must independently drop PHYS 2xxL.**

Relation to your course

- ¶ If you are currently in a 200 level physics course (201/202/212H), you will find that the course and lab do not sync up.
- ¶ You may do experiments in lab that you have not covered the theory for in your course.

Objectives

- ¶ **Laboratory is organized to reflect the activities of scientific research.**
 - ↙ Preparation: textbook
 - ↙ Experimental trial and error
 - ↙ Collaboration
 - ↙ Presentation
- ¶ **We use physics as an example of science.**
- ¶ **Learn how a science is done, not only the results.**

Objectives

- ¶ **Develop experimental techniques.**
 - ↙ **Maintain laboratory notebook.**
 - ↙ **Prepare apparatus.**
 - ↙ **Observe and record.**
 - ↙ **Analyze.**
 - ↙ **Use the graph as an analysis tool.**
 - ↙ **Prepare a technical oral presentation.**

Course Outline

¶ Four 3-day *cycles*

- ↙ Two projects in progress during each cycle.
- ↙ Each student does each of the projects during the cycle.

¶ In each cycle students will form groups of two as directed by the instructor.

- ↙ Work on project “A” in day 1 of cycle.
- ↙ Work on project “B” in day 2 of cycle.
- ↙ Oral presentations on day 3.

Course Outline

¶ In each cycle every student will:

- ↙ Participate in the lab project.
- ↙ Take the necessary data (group).
- ↙ Submit a final project report for each project (group or individual).

¶ In each cycle 1/4 of the students will individually present one of their projects orally. Each student will make exactly one presentation during the semester.

E-mail

- ¶ **Faculty, instructors, and staff associated with the labs have e-mail addresses posted on the Web.**
- ¶ **Students are presumed to have an active e-mail address.**
- ¶ **Primary contact with your instructor, outside of lab, will be through email.**

Required Materials

- ¶ ***The Student Laboratory Notebook, University of South Carolina, Physics 201L, 202L, 211L, 212L, published by Hayden McNeil – buy it at the bookstore***
- ¶ **A plastic ruler with both inch and metric units**
- ¶ **A protractor**
- ¶ **Print your project description and bring it to class.**
 - ↙ **Using a mobile device is accepted (laptop, tablet, etc.)**
- ¶ **The lecture textbook (optional, but encouraged)**
 - ↙ **This is your primary physics reference**

Laboratory Notebook

- ¶ **Key piece of equipment for any scientist.**
 - ↳ **It is valuable and irreplaceable: Guard it Carefully.**
- ¶ **You should record ...**
 - ↳ **Data and observations about the experiment.**
 - ↳ **Calculations.**
 - ↳ **Draft graphs and diagrams.**
 - ↳ **Draft answers to questions.**
- ¶ **In short, almost everything goes in the notebook. The exception being the final project report (typewritten).**

Project Description Format

¶ All project descriptions are available on the 200 level lab web page:

¶ www.uof.sc/physlabs

¶ ***Objective:*** describes the goal of the project

¶ ***Equipment:*** a list of the equipment used.

¶ ***Data collection procedure***

Project Description Format

- ¶ ***Calculations, Graphs and Diagrams:*** a list of required graphs and diagrams and the calculations necessary to produce them
 - ↳ 1a, 1b, ... indicate multiple data sets plotted using a common set of axes.
 - ↳ Graphs with differing numbers should appear in separate figures with independent sets of axes.
- ¶ ***Questions:*** to be answered in your report

Printing Project Descriptions

- ¶ Find project descriptions via
 - ↳ www.uof.sc/physlabsPrint or download just the ones you need.
- ¶ No project description is more than ten pages.
- ¶ Don't print too early.
 - ↳ Descriptions are subject to last minute revision.
 - ↳ One day before start of cycle is OK.
- ¶ Bring the print outs or use a digital device to have the project descriptions on hand.

Cycle Outline

¶ 1st day preparation

- ↙ Print all projects for this cycle from the webpage and read carefully.
- ↙ Study pertinent sections of textbook.

¶ 1st day in lab

- ↙ Assemble apparatus, take data, make preliminary graph (if required) for project “A”.
- ↙ Have lab instructor grade your lab notebook. This grade serves as a preliminary lab report grade for project “A” and does not include the questions.

Cycle Outline

¶ 2nd day preparation

- ↙ Review project “B” description from the webpage and read carefully.
- ↙ Study pertinent sections of textbook.

¶ 2nd day in lab

- ↙ Exchange between North and South sides of room
- ↙ Submit final lab report for project “A”.
- ↙ Assemble apparatus, take data, make preliminary graph (if required) for project “B”.
- ↙ Have lab instructor grade your lab notebook. This grade serves as a preliminary lab report grade for project “B” and does not include the questions.

Cycle Outline

¶ 3rd day preparation

- ✦ Prepare final project report for project “B”.
- ✦ Prepare presentation (presenters only).

¶ 3rd day in lab

- ✦ Submit final project report for project “B”.
- ✦ Deliver oral presentation (presenters only).
- ✦ Receive assignments for following cycle (determines partner and projects).

The Presentation Session

- ¶ Each presentation lasts 10 minutes or less.
- ¶ After presentation for one project the instructor will lead a discussion (if needed).
- ¶ The next presentation will prepare at the instructors request.
- ¶ Repeat.

Presentation Preparation

- ¶ Prepare presentation following guidelines in the “how-to.”
 - ↳ Organize your material.
 - ↳ Prepare the required slides
 - ⑨ PowerPoint suggested
 - ↳ Rehearse.
 - ⑨ Check that your material realistically fits within the allotted time.
- ¶ Presenters must be prepared for questions.

Project Report

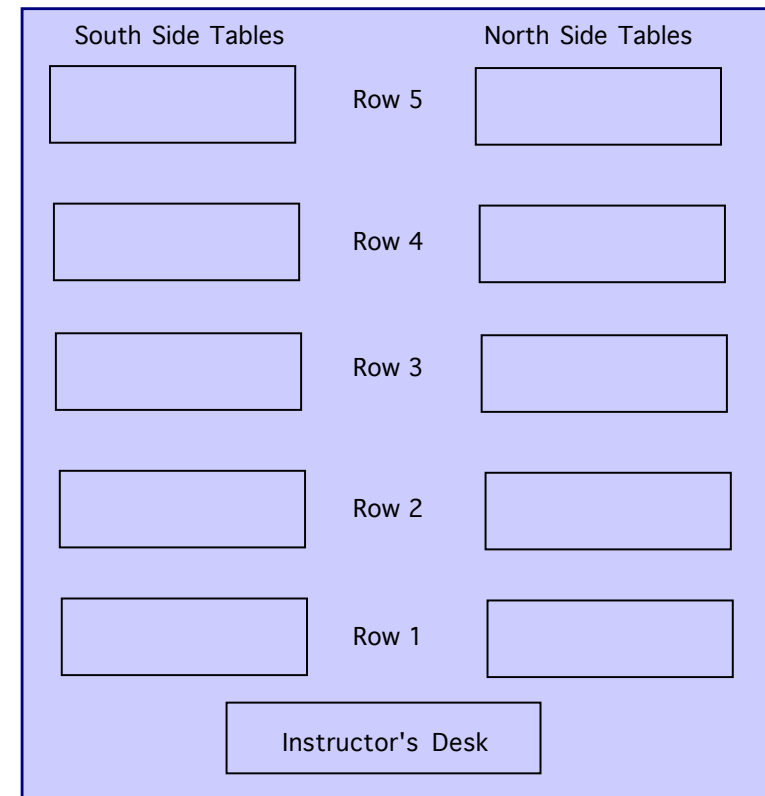
- ¶ **Text, including major equations but exclusive of endnotes, data, and figures, must not exceed 150 lines in a font no smaller than 10 pt (may not be hand-written).**
 - ⚡ **You face a tough challenge to distill your report to fit this requirement — demands thought and skillful writing.**
 - ⚡ **Use endnotes for attribution of sources.**
 - ⚡ **Optionally include ancillary material in appendices, but your instructor is under no obligation to read them.**
 - ⚡ **Graphs and figures may be hand-drawn, but legibility is essential.**

Project Report

- ¶ A group may by agreement submit a single project report with signatures of both partners on the cover.
 - ↳ Partners will receive identical grades for the report.
- ¶ Partners may independently submit project reports.
 - ↳ Partners will receive independent grades.
- ¶ Be respectful of your partner — try to capitalize on his strengths, compensate his weaknesses, and stimulate him to do his best work, **i.e. collaborate.**

Rotation

- ¶ The tables in a row will never have the same project (although some equipment may be in common).
- ¶ To switch from project “A” to project “B” students will cross the aisle from north to south or vice versa remaining in the same row.
- ¶ At the 1st working session of a cycle, if not sooner, the instructor will assign the presenters for the cycle and the projects they are to present.



Rotation

- ¶ Today your instructor may assign you to a table for cycle 1.
- ¶ At the end of cycles 1 and 2 your instructor may **reassign** you to a table and a new partner for the following cycle.
- ¶ To the extent possible students will work with a new partner in each cycle.
- ¶ Students will be presenters exactly once.

Grading

- ¶ 8 prelim reports(each out of 12, up to 96 pts.)
- ¶ 8 final reports (each out of 30, up to 240 pts.)
- ¶ 1 oral presentation (50 pts.)
- ¶ Each unexcused absence a penalty of -15 pts. plus loss of credit for missed work
- ¶ Class participation (up to 14 pts.)

Grading

¶ Scoring

↙	Score	Grade
↙	360-400	A
↙	340-359	B+
↙	320-339	B
↙	300-319	C+
↙	280-299	C
	240-279	D
	0-239	F

¶ Late submissions

- ↙ Tardy receipt of documents will be considered the fault of the student no matter what the reason.

Grading

- ¶ Your instructor will strive to be as **fair** as possible in their grading, but
 - ⚡ The grades are in the last analysis **subjective**.
 - ⚡ Do try to impress your instructor with your knowledge and your skill — they can't credit what they can't see.

Attendance Policy

¶ Attendance is mandatory

¶ Excused absences

- ⚡ 1 or 2 has no direct effect on grade.
 - ⑨ You are nonetheless responsible for work missed.
 - ⑨ Discuss missed presentations with your instructor.
- ⚡ **More than two excused absences may result in an incomplete (I) for the course.**
- ⚡ Absences exceeding two may be excused if they are provably attributable to a communicable disease.

Attendance Policy

- ¶ Ordinarily an excused absence must be arranged with the instructor **in advance**:
 - ↙ Use e-mail or telephone as necessary to be timely.
- ¶ An excused absence requires an explanation
 - ↙ On official stationary (letterhead, prescription pad, etc.)
 - ↙ Dated and signed by a person of authority (doctor, minister, judge, attorney, dean, professor, etc.).
 - ↙ **A note from a friend or parent is not sufficient.**
- ¶ An absence to be excused because of unforeseeable misfortune requires a letter from Undergraduate Student Ombuds Services. See “Exigencies” below.

Attendance Policy

- ¶ In case of demonstrable emergency, where the student shows convincingly that advance notification was infeasible, the **course supervisor may excuse the absence.**
- ¶ **Unexcused absences:**
 - ⚡ Each absence a penalty of -15 pts. plus loss of credit for missed work.
 - ⚡ **2 in same cycle or more than two total may result in a grade of F for the course.**

Tardiness Policy

- ¶ Tardy arrival at class by more than 40 minutes will constitute an unexcused absence.
- ¶ Tardy arrival by 20 to 40 minutes will be automatically excused on the first occasion.
- ¶ Tardy arrival by 20 to 40 minutes on the second and subsequent occasions will constitute an unexcused absence.
- ¶ Tardy arrival by less than 20 minutes will not be formally penalized, but it will not endear you to your lab partner nor to your instructor.

Exigencies

- ¶ Q: What if mid-semester you suffer some misfortune, e.g. illness, accident, or family hardship?
- ¶ A: Your TA may consider a request for some accommodation provided that you meet the following criteria.
- ✦ 1. At the earliest opportunity you have notified your TA about your situation.
 - ✦ 2. The Office of Student Advocacy has provided a letter in support of your request.
https://www.sc.edu/about/offices_and_divisions/student_affairs/our_initiatives/academic_success/ombuds_services/
 - ✦ 3. You are up to date in the course or nearly so at the time that the misfortune strikes.
- ¶ You must also satisfy these criteria in the case that you are requesting an Incomplete for the semester.

Safety

Always ...

- ↙ Turn off power supplies when changing electrical circuits;
- ↙ Power down and unplug all electrical equipment at end of class;
- ↙ Report broken equipment to instructor as soon as feasible;

Safety

⌚ Never ...

- ⌚ Shine a laser in anyone' s eyes;
- ⌚ Fire projectiles in the direction of others;
- ⌚ Bring food or drink into the laboratory;
- ⌚ Use equipment for other than the intended purpose.

⌚ **Disregard of these or other common-sense safe practices will result in dismissal from the course!**

Personal Safety

- ¶ If you are in a late lab and have safety concerns, you may also want to call 777-DUCK, APO Student Escort Service.
- ¶ Take advantage of your campus resources.
 - ↳ Carolina Shuttle evening routes

The Road to Success

- ¶ **Work safely.**
- ¶ **Preparation → Success.**
- ¶ **Take advantage of your resources.**
 - ↙ **The lecture text**
 - ↙ **Project descriptions and “how-to” documents**
 - ↙ **The library**
 - ↙ **Your partner and the other groups doing the same project**
 - ↙ **Your instructor**
 - ↙ **Web resources**

The Road to Success

- ¶ Your partner and other students are resources
- ¶ Generally two or more groups work on the same project. When you have a question ...
 - ↙ First, ask your partner.
 - ↙ Next, check the lecture text and project description.
 - ↙ Third, ask another group doing your project.
 - ↙ If you still do not have an answer, ask the laboratory instructor.

The Road to Success

- ¶ Realize that confusion is to be expected ...
 - ↳ If you are confused, then you have the opportunity to learn something!
- ¶ If you are taking the corresponding lecture course contemporaneously, you will encounter some topics **first in lab.**
 - ↳ It's more fun to learn it in lab.
 - ↳ You will be better prepared for the lecture course.
 - ↳ You can defer the lab to a later semester.

The Road to Success

- ¶ Much of what you can learn in this course is directly applicable to any line of scientific or technical pursuit. Engineers and pre-meds take note!
- ¶ Your instructors have fun doing science and especially physics. They aim to make a career of it. They would like you to share in that fun.

Closing Thought

If we teach only the findings and products of science - no matter how useful and even inspiring they may be - without communicating its critical method, how can the average person possibly distinguish science from pseudoscience?

Carl Sagan