Physics 231 Lab Syllabus
Section 231003, Fall 2011

Details

**Lab Time:** 8:00am - 9:55am Wednesdays
**Instructor:** Paul Thompson

**Lab Location:** Nielsen Building Room 510
**E-mail:** pthomp14@utk.edu

**Office Hours and Tutoring:** I will be available for tutoring in the Physics Tutorial Center (Nielsen Building Room 201) between 12:10pm and 1:20pm on Fridays. If you can’t make it at that time, you can e-mail me and we can set up a meeting. Feel free to e-mail me at any time.

Lab Manual

The laboratory manual for Physics 231 is *Contemporary Introductory Physics Experiments* by James E. Parks, Hayden-McNeil Publishing, ISBN 978-0-7380-3083-8 and is available at the UT Book and Supply Store. Please note that this is a **required text** and that you must bring it to every lab session.

Lab Guidelines

- **Attendance** - You must attend each lab session. Since attendance makes up 10% of your final lab grade, you must arrive by 8:15am to receive attendance credit for that session.

- **Quizzes** - Most lab sessions will include a (short) quiz on material from the current lab and occasionally the preceding lab. Quizzes make up 20% of your final lab grade. There will be no make-ups for quizzes.

- **Absence and Make-ups** - If you cannot attend a lab inform me as soon as you can so we can try and arrange for you to attend another section’s lab. Please bear in mind that I may require an official excuse, especially for repeat absences. There will be no make ups. If there are extenuating circumstances, contact me as soon as possible.

- **Participation** - Participation makes up 10% of your final lab grade. Each lab session everyone will be assigned one of four participation grades:
  - 0 - Absent or purposefully disruptive.
  - 1 - No participation.
  - 2 - Some participation.
  - 3 - Exceptional participation.

To obtain the full 10%, you need to score at least 25 participation points.

- **Finishing** - Clean up your area and leave it as you found it and have me initial your data sheet(s). If you complete the experiment and the required tasks before the lab is over, you may be allowed to leave early.

- **Lateness Policy** - Lab reports are to be handed in at the beginning of the next lab. I have a generous lateness policy where I allow each student 2 days free without questions. This means each student may hand in either one lab report two days late, or two lab reports each one day late. Because of this, any other late lab reports will be given a 0 unless in extenuating circumstances. If this is the case, e-mail me as soon as possible.
Grading

This lab section accounts for 20% of your total course grade for Physics 231 and is divided up as follows:

- Lab Reports - 60%
- Quizzes - 20%
- Participation - 10%
- Attendance - 10%

I will be dropping each student's lowest grades from both the Lab Report and the Quiz sections. This means you can miss one lab session without penalty.

Schedule of Labs

24-Aug ................................................................. Electric Fields
31-Aug ................................................................. Ohm’s Law I
7-Sep ................................................................. No Labs – Labor Day Holiday Sept. 5
14-Sep ................................................................. Ohm’s Law II
21-Sep ................................................................. Wheatstone Bridge
28-Sep ................................................................. Resistance vs. Temperature
5-Oct ................................................................. Electrical Energy
12-Oct ................................................................. e/m Ratio
19-Oct ................................................................. Ampere’s Law
26-Oct ................................................................. Oscilloscope
2-Nov ................................................................. RC & RL Circuits
9-Nov ................................................................. AC Circuits I
16-Nov ................................................................. AC Circuits II
23-Nov ................................................................. No Lab
Lab Report Guidance  (From P11 & P12 of the Physics Teaching Assistant’s Manual)

Your lab write-ups are to be turned in at the beginning of the following lab session. Begin each of the following topics on a separate page using additional pages as necessary. It should contain the following information:

**Title page:** A title page should include the following: (1) the name of the experiment, (2) your name, (3) the name of your partner, (4) the course name and number, (5) the section number, (6) the name of your lab instructor, (7) the date the experiment is performed, and (8) the date the report is submitted. Make sure the partners listed on this page are those with whom you performed the experiment. As an alternative to save paper, the title information can be included on the first page instead of a separate page.

**Purpose and method:** This should be short: a paragraph or two describing what measurements were made and for what purpose. You are trying to show that you understand the relationship between the experimental procedures and the theory. This can sometimes be fairly obvious or simple and may only take a sentence or two. Procedural details should not be given, unless they are in some way original or non-standard.

**Data tables:** The original or photocopies of the original data sheets, collected in class and initialed by the instructor, should come first. Neatened or expanded versions of the data with additional derived quantities may come next. Once again, remember labels, units, and uncertainties.

**Calculations, including Error analysis:** Whenever possible calculations should be done in the lab. Include in your calculations the units associated with any variable and, where appropriate, cancel units or change them to derived units (e.g., change kg•m/s^2 to N). Describe and show all work. If you do the calculations with the spreadsheet, remember to put labels and units on any additional columns, and state in the report how these columns were calculated.

**Graphs:** Graphs, when appropriate, should include a title, and axis labels with units. These should also be done in the lab, if possible. If straight line fitting is performed on the data, either by hand or with a linear regression program, remember to record the slope and intercept and their uncertainties. Draw in the regression line determined from the slope and intercept. Whenever possible put error bars on each graph point. This is too tricky to do with the spreadsheet program – so you may have to add them after the printout from the spreadsheet has been made. If the error bars are too small or data points are difficult to see on the graph, put a small circle around each one.

**Conclusions:** This should include a brief discussion of the main findings. For example: “We found that there is a linear relationship between the measured variable ... and ... This can be seen from the graph and is predicted by the theory.” Also state whether your results agree with expectations to within the uncertainties of the measurements: For example: “The slope of the graph of ... versus ... as determined by (linear regression, hand fitting) was ...±... (units). This value, together with Eqn. ..., and the measured quantities ...=...±... (units), allowed for a determination of ...=...±... (units). This is within ... standard deviations of the accepted value of ... (units).” Discuss the main sources of error. “The main sources of uncertainty in the determination of ... are ...”

**Questions:** Answer all questions posed in the handout.