**Syllabus**

**Physics 221 – Elements of Physics**  
Recitation and Laboratory

**Semester:** Fall 2004

**Instructor:** George Drafta (you can call me George);  
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[http://www.phys.utk.edu](http://www.phys.utk.edu)

**Times:** Section 73244: Tuesday @ 14:30 – 15:20 (Rec.) / 15:35 – 17:30 (Lab.);  
Section 73260: Thursday @ 08:00 – 08:50 (Rec.) / 09:05 – 11:00 (Lab.);

**Classrooms:** Section 73244: PHY 608(R)/PHY 508(L),  
Section 73260: PHY 306(R)/PHY 508(L)

See also:  
[http://www.phys.utk.edu/Assignments/Teaching_2004_3_Fall.pdf](http://www.phys.utk.edu/Assignments/Teaching_2004_3_Fall.pdf)  

**Office hours:** section 73244 on Tuesday: 17:30 – 18:10, and section 73260 on Thursday 11:05 – 12:00, right after our classes (let me know during the lab if you will need help after class), or any other mutually convenient time - by appointment.  
The office hours will be held in room PHY 609, desk 12, unless otherwise specified.

**Grading policy:** Lab reports: 80%  
Quizzes: 20%  
Total = 100%.

A lab schedule can be found at:  

**Before labs:**  
1) Read from the textbook the theory that is necessary for the recitation,  
2) Read about the experiment in the lab manual (refer to the textbook for theory if necessary),  
3) Do the pre-lab assignment (if there is one).

**Lab reports (typed):** are due at the beginning of next class (beginning of recitation).  
**Late reports will not be accepted.**

**Quizzes:** There will be a quiz approximately every two weeks during recitation and you can drop the lowest quiz grade. Any missed quiz will count as zero. Quizzes will cover class material as well as lab questions.

**Missed labs:** One lab only can be made up during the make-up session. However, you should have a legitimate, official excuse to miss a lab ("mom’s note" won’t work). Any lab missed and not made up will count as zero.
Work habits: Good work habits include (but are not limited to) the following:

- **Recitation attendance is obligatory.** Attend all the recitation sessions. Bring your textbook with you.
- **Be active during recitation:** answer questions and be ready to go to the board and solve problems.
- Pay attention to the introductive mini-lecture at the beginning of the actual lab session.
- You will work with a partner, so do your share of work (no “slackers”). Partner roles should alternate each lab.
- When you leave, make sure that every piece of equipment is turned off.
- Organized lab reports.
- Make sure that you turn in all the tables, graphs and calculations together with the report.
- Carefully staple your lab report together.
- **Always** bring with you in the lab:
  - Lab Manual and scratch paper,
  - A No. 2 / HB lead mechanical pencil (0.5 mm) and an eraser,
  - A ruler and a protractor,
  - A “pocket” calculator (you will need it, even though the lab is equipped with computers),
  - A flexible diskette (3.5” floppy disk), PC formatted (1.44 MB), to save your work at the end of the lab.
- Good manners and considerate behavior towards your colleagues:
  - **Turn off your cell phones during class:** don’t take or make any phone calls
  - **Do not** eat or drink in the lab (we really have to enforce that - for safety reasons)
  - Loud talking and disruptive behavior will not be tolerated
- Be punctual and come to class on time.

**Tentative schedule of quizzes** (see lab schedule on-line):

**Quiz # 1** (at the beginning of lab # 3) will test the following: lecture course material + labs 1 and 2.

**Quiz # 2** (at the beginning of lab # 5) will test the following: lecture course material + labs 3 and 4.

**Quiz # 3** (at the beginning of lab # 7) will test the following: lecture course material + labs 5 and 6.

**Quiz # 4** (at the beginning of lab # 9) will test the following: lecture course material + labs 7 and 8.

**Quiz # 5** (at the beginning of lab # 11) will test the following: lecture course material + labs 9 and 10.

*This syllabus is subject to adjustments and changes. Students are responsible for any changes announced in class.*

Good luck and do well !!!
Guidelines for writing lab reports

Lab reports:
- Are due at the beginning of next class (beginning of recitation). **Late reports will not be accepted.**
- Must be typed. **Exception:** equations, calculations, and answers to questions can be handwritten (make sure that your hand is legible!).
- Should contain the following:
  - A **cover page** or a **header** on the first page containing: course’s name and number, section’s number, author’s name, the name of author’s partner (specify which one is which), instructor’s name (mine), date when the experiment was performed, date when the report was due, date when the report was turned in.
  - **Title** of the experiment: goes both on the cover page and on the first page (for cover page format); or right below the header (for header format).
  - **Purpose** of the experiment (its objectives)
  - **Theory:** - definitions and explanations of the concepts used or introduced in the lab (if applicable)
    - equations (**explain** the significance of **all symbols** except the mathematical ones such as \( \pi \) or \( \Sigma \)). Write them using an equation editor or by hand; don’t try to write them as text only.
  - **Procedure** = short explanation of the experimental method, (i.e. explain how you measured the raw data). Raw data = data that was measured directly; not yet processed in any way.
    Sometimes (only when specifically indicated so by me) it will be enough to say that you followed the procedure outlined in the lab manual.
  - **Data tables** (sometimes provided in the lab manual; if not, create your own on the computer). May contain both raw and processed data.
  - **Data analysis** = explanation of how you derived your results - intermediary and final - from the raw data. This section should contain:
    - graphs (write your names on them, as well as on the data tables). **Don’t forget to label the axes and give a title to your graph.**
    - a short explanation of the data processing, including what quantities you graphed (what vs. what) and what information was extracted from them (e.g. slope and its physical significance, etc.)
    - calculations (only one example of each type of calculation should be worked in detail on paper; for the rest, specify the result or indicate their place in the data table)
    - computation of the relative error with respect to the accepted value
    - statement of your final results together with their respective relative errors (in the end).
  - **Conclusions.** They should include (but not necessarily be limited to):
    - answer to the purpose section (i.e. were the purpose/objectives achieved or not?),
    - discussion of results (findings) and comments: how close they are to the accepted values, possible sources of errors, etc. Try to assess whether the errors are systematic or random ones.
    - what did you learn from this experiment
  - **Questions and Answers:** answer to the questions in the lab manual (if any) for that particular experiment. You do not need to reproduce the questions in your report.
**“Rule of thumb” for writing lab reports:** write it in such a way that a person that knows his physics and experimental devices but is not familiar with this particular experiment, (i.e. experimental set-up, procedure and data analysis), could understand the theory and principles behind it and could reproduce the experiment, just by reading your report.

**Must do-s:**
- Make sure that in your lab report **every physical quantity has a unit**. Many points will be taken off for missing units.
- **Be brief and concise (avoid redundancy), but without omitting important things.** Your lab report should be a summary, an outline of the most important points.
- Read carefully the introductory part of the lab manual, the knowledge about the information within can be tested during the quizzes.

**Don’t-s:**
- Your lab report should not be a mere transcription of the notes that you take during the introductive mini-lecture; it should reflect your understanding of the subject acquired from multiple sources: lecture course, textbook, lab manual, and the introductive mini-lectures.
- Do not turn the notes that you took during the introductive mini-lecture instead of a lab report. You should keep those notes as study material for quizzes.
- Although you are supposed to perform the experiment and acquire the data working in teams - when close collaboration is strongly encouraged - the **writing of lab reports should be your own work.** Therefore:
  - Do not turn only one lab report per team. Each student must submit his own individual lab report.
  - Do not turn identical or partially identical lab reports for all members of the team. These “twin reports” will not receive any credit and might even be considered cheating or plagiarism.