Syllabus for
Physics 222-009 Recitation and Laboratory

1 Instructor: Joshua Braverman

2 Office Hours: Tutoring center (Nielson 201): Friday 1:15-2:20 or by appointment (please contact me at the beginning of the week if you wish to meet later that week): Neilsen 609

3 Recitation time: Friday 10:10-11:00 AM Physics 608

4 Laboratory time: Friday 11:15-1:10 PM Physics 510

5 The laboratory manual: Selected Introductory Physics Experiments by Dr. James E. Parks

6 Email: joshua.braverman@utk.edu

Purpose of the Lab:
The purpose of the recitation is to give you a chance to go over what you want to. I will prepare a lecture of some practice questions, but the recitation should be driven by your discussion/questions.

The purpose of this laboratory is to give you with some direct experience with the concepts that you will learn in the lecture portions of this course. In addition, you will be exposed to the techniques that are used to obtain and analyze the experimental data, which are used to construct or test physical theories.

Recitation Assignment:
There may be a 5-10 minute quiz sometime during the recitation session (except the first meeting), and you are expected to be prepared for these quizzes. They cannot be made up. The quizzes will usually focus more on subject material matter than testing your ability to do problems; recitations should be where you learn and become comfortable with the material, not be tested on it. However, since I expect lots of feedback during the recitation section, if we go over something and everyone says they understand it, I may give a quiz on that material. I expect you to make it clear if you don’t understand something so we can use class time effectively. The quizzes can contain material from reading for the upcoming lab, so make sure you read the lab manual before the lab period. After each quiz, we will work on your specific questions if there are any; otherwise, I will work on some problems or concepts, which are related to the course material and/or to your assignments.

Laboratory Assignment:
You are expected to read the experiment before coming to the lab session. Generally, you will work in pairs while performing experiments; however, both partners will collaborate in filling out the data sheet. At the end of the lab, the data sheets can be
printed out and attached to the reports that must be written *individually*. Reports are due at the beginning of the following lab. If a lab is not turned in at the beginning of class I will deduct 10 points for that day, and 10 points for each additional day until you put it in my mailbox.

I expect both lab partners to be able to use excel and perform the lab, so you should make sure you are comfortable with each aspect of the lab.

**Attendance:**
It is expected that you attend every recitation and lab period. There are no lab makeups, but at the end of the semester I will drop your lowest lab grade. This gives you one free lab to miss, but any after that will receive a zero with no makeup.

**Grading:**
Lab grade is primarily based on your reports. Quizzes in the recitation and attendance will count for 15% and lab reports for 85% of your grade.

**Students With Disabilities:**
Students with disabilities should contact me as soon as possible in order to make necessary accommodations.

**Academic Dishonesty**
Academic dishonesty will not be tolerated, and any incidents will result in a failure of that assignment and a referral to Professor Joo whose policy is a failure for the course and any other penalties allowed by the university.

I want you to use the recitation to your advantage; the best way to learn physics is to struggle through problems and ask questions. Ill reward effort or explaining your logic through physics along with correct answers (This means using words to show your thoughts in addition to math!)

*** Good luck. ***

**The Report (taken from Teaching Assistant’s Manual)**
Your lab write-ups are to be turned in at the beginning of the following lab session. I do not require each lab report to be typed, but make sure if you write it up it is completely legible and neat. Begin each of the following topics in their own sections with headings. It should contain the following information:

Each lab report will be worth 100 points. Each report will contain the following sections.

1) **Title section** will be worth approximately 5 points. This section should include:
   a) Your name
   b) Your partner’s name(s)
   c) Title of the experiment as written in the lab manual or on the lab schedule
d) Date of the experiment (The date should be the date the experiment was performed, not the date turned in!)

2) **Procedure and method section** is worth approximately 25 points. This section should include:
   a) The title “Procedure”
   b) One or two sentences describing the general purpose of the experiment. For example, “The purpose of this experiment was to measure the acceleration due to gravity, g.”
   c) A description of the materials and setup used to perform the experiment. This will be a short list or a descriptive paragraph depending on the experiment.
   d) A description in your own words of how the experiment was performed. This will be the bulk of the procedure section and should be half a page to a full page in length.
   e) A description of what data was recorded and how it was used. For example, “Time for the car to pass through the first photogate was recorded to find the car’s initial velocity.”

The procedure section should be in depth enough so a person who has not read the lab manual could understand your experiment and repeat your findings. However, this section should not be so in depth that it overwhelms the reader with useless information. (An example of useless information would be, “The time elapsed was entered into cell C3 in the Excel spreadsheet.”)

Write professionally and avoid complaining or talking about your feelings. For example, don’t say “I had fun.” or “I learned a lot from this experiment.” It is however okay to say something like “Next, we used this law of physics to calculate...”.

Lastly, copying and pasting the lab manual or Wikipedia is plagiarism and should not be done. This will be addressed as cheating and you will be reported for academic dishonesty.

3) **Graphs and tables section** will be worth approximately 30 points. This section is the data sheet that you print out during lab. Make sure any graphs or tables have:
   a) Titles
   b) Units

   If you get an error larger than about 15% on most labs then you probably did something wrong; if you have a large percent error you should look for a mistake and fix it. The two most common mistakes are not using the correct units or typing a formula into Excel incorrectly. If you get a large error and you cannot find the source then you should ask for help!

   If you used a calculation to produce a number in the tables then you must show the calculation in the Formulas section.
4) **Formulas section** will be worth approximately 10 points and should include:
   a) The title “Formulas”
   b) Formulas you used during the experiment to produce numbers in the tables in the data section. Write your formulas as you would see them in a physics or math book, not as you would type them in Excel. (Write F=ma, not D3=A$1*B2)
   c) Where or why you used the formula. “We used the following formula to find the initial velocity of the cart.”
   d) Definition of all the variables in the formula as they apply to the experiment. For example “t” should be described as “the time it took for the flag on the cart to go through the first photogate” not just “time”.

5) **Conclusion with Error Analysis section** will be worth approximately 30 points and should include:
   a) The title “Conclusion with Error Analysis”
   b) The final result of the experiment. “We measured the acceleration due to gravity, g, to be 9.71 m/s^2.”
   c) The percent error found in the experiment or a discussion on how the results agreed or disagreed with the accepted values or your intuition
   d) A discussion about any likely errors that occurred and why they happened or a discussion about any conclusions you drew. Don’t use the following excuses for a high percent error: “human error”, miscalculations in excel, misentering of data, etc. I want you to talk about the physics of what is going on. For example, on the conservation of energy lab, some energy is lost to friction and thermal energy. Do not say “the physics is wrong”, or “human error is why energy was not conserved”. Discuss how energy was lost through other means and why your values reflect this.

   This section should be between three sentences to half a page and should not be more than a page in length.