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Physics 371   Fall 2011
Intermediate Lab I: Electrons (and Error)
Syllabus

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Office Hrs   1-2 pm Wed and by appointment
Class room   Clippinger 031 (Lab) Edwards 208
Class Time: Tues 2:10-4pm and Thurs 3:10-5pm.

Website: http://www.phy.ohiou.edu/~frantz/phys371/   This syllabus, homework, and additional information about the course can be found there. THIS SYLLABUS IS SUBJECT TO CHANGE DURING THE QUARTER: Please check the above weblink for the most current version. However, I will notify you of any important changes.

Overview: This is a lab course, and most of the time will be spent in the lab, however, the course will also include a seminar portion, probably up to about an hour a week.   Also, the first couple weeks will be devoted to lecture-like sessions to focus on introducing you to the background/errors/uncertainty information described in the Learning Outcomes and Material Covered sections.

Material to be Covered:
Experiments available to perform involve: The Hall Effect **,** Charge-to-Mass ratio of the Electron**,** Electron Diffraction, Millikan's Oil Drop Experiment**,** Franck-Hertz Experiment

Learning Outcomes
After this course you will be able to:
1. Recognize sources of random and systematic errors of a measurement.
2. Estimate uncertainty of a measured quantity.
3. Use functional fitting techniques such as linear regression to analyze data.
4. Test theoretical relationships (taking into account uncertainty), and
5. Write reports that follows the format used by professional physicists.
6. Describe, predict the behavior of, and recount personal experience of, the quantum and classical nature of the subatomic particle known as the electron in at least four advanced laboratory situations.

Groups and Lab Schedule: You will be working in pairs (or at most 3) on a total of four experiments during the quarter, during the last ~8 weeks of the lab. The schedule, which will evolve during the quarter, will be distributed separately but may eventually be attached to this document on the course website.
Late labs reports will have a cumulative effect, so I reserve the right to take off up to 20% per week late.

Lab (Technical Reports) and Code: For each lab project, you will be required to hand in a lab report. Each student will hand in their own lab report, which is completely original text, only sharing the same data, and possibly plots, as other "lab partner" students. Details of what should be in these reports will be discussed in class and separate documentation of guidelines and grading criteria will be provided.   At least 2 separate drafts of the lab report will be graded separately. The first draft will generally be due as soon as one week after the final in lab session for the lab project, while the second draft will be generally due as soon as two weeks later.
      A significant part of all the lab projects is production of plots and calculations which require computer programming ("code"). I may be introducing you a bit about one free analysis/programming tool called ROOT, but you are free to use any such tool, such as MATLAB, IDL, etc…even Microsoft Excel.   In addition to the lab reports, I will require all "code" that was used to perform such calculations to also be included in electronic form.

Lab Notebooks YOU WILL NEED A LAB NOTEBOOK FOR THIS COURSE, and you will need to bring it to every class/lab session. The lab notebooks may be inspected at random, and portions thereof may be required along with the final drafts of the technical reports. For a given lab project, the lab notebooks may count towards as much as 25% of the final grade for the lab project. All members of the experimental group should record the measurements in their own notebook, or tape xerox's of parts/plots there-in. Students will not receive credit for things appearing in the notebook of their partner(s) !

Attendance and In Lab Performance: . Attendance is crucial in this class. An official University Excuse (see O.U. Handbook) is required in order to miss without it affecting your grade. I may be able to accommodate a few exceptions to this rule with good reason, but in all cases make-up time will be required. Part of your grade in this course will be a partially subjective evaluation of your in-lab performance. This may include, but is not necessarily limited to, random questions to random group members during lab to make sure EVERYONE IN THE GROUP understands what is going on. If anyone fails such questions, it is likely to detract not only from the student who was asked, but probably also the other members of the group. This is because most lab work, including in this class, is collaborative work, and as such part of what I am trying to encourage and evaluate is the ability to work in a team, including the ability to effectively share information. And yes, often this means you need to take longer than you might have otherwise on your own.

Text and Reading Assignments: There IS a required text for this course: *Data Reduction and Error Analysis for the Physcial Sciences* 3 rd Edition by Phillip Bevington and D. Keith Robinson   McGraw Hill   ISBN:-13 : 978-0-07-247227-1 ISBN-10: 0-07-247227-8
There will be some required reading assignments, in addition to the lab manuals and materials, which will be provided.

Misconduct   I am required to remind you that academic misconduct is a Code A violation of the Ohio University Code of Student Conduct. If you are found to be involved in academic misconduct regarding this course, you will receive F on the pertinent work and possibly for the entire course and/or a referral to the Director of Judiciaries. Procedures for judicial actions will be invoked as described in the Student and Faculty Handbooks. See O.U. Undergraduate Catalog for more information.   YOU MAY NOT COPY ANY MATERIAL, (ESPECIALLY TEXT) FROM ANOTHER STUDENT, ANY STUDENT'S THESIS OR FROM THE WEB WITHOUT PROPER CITATION.

Grading

There are no exams in this course. Your grade will be determined as follows:

Lab Projects (2x 15% , 10-20% 25%)	70-75%
Preliminary Questions/In Class Work	10-15%
Lab Plans/Lab Notebooks	10-15%
Tutorials	10-15%

The individual numerical scores will be weighted as given above and added to give a total score out of 100. Letter grades will be awarded approximately as follows

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A- to A ≥ 90 or better
B- to B+ 80 to 89
C- to C+ 70 to 79
D- to D+ 60 to 70
F < 60.

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