Modern Physics Laboratory Syllabus: PHYS 3304

Spring 2010, Science Building 301
Instructor: Luis Grave de Peralta, Luis.Grave-de-Peralta@ttu.edu, Tel: 742-3773
Office Hours: Monday-Friday 2:00-5:00 PM or by appointment, SC016.

Course Textbook: I have prepared a draft of a book for this course and we will use these notes to guide our work. There will be updates and correction to these notes as we go along. There are several reference books we will also make use of for this course. You need not purchase them and copies will be available in the lab.

Topics covered: Some experiments will draw upon your knowledge gained in lecture courses and some will require learning anew. The error analyses will be the first task. Based on data, we will focus on data analyses methods with emphasis on error treatment, fits, etc. Several experiments in nuclear and particle physics will follow. We will also work on experiments in electromagnetism, condensed matter and chaos. In the Notes that I will distribute, there is a discussion of each topic and a set of questions that follow each experiment. Each of you must perform the experiments and answer these questions in the elog (http://meathead.phys.ttu.edu). This elog is our central documentation. The exact schedule for each experiment will be made in the first week of the course.

Requirements:
1. Logbook: Each student will keep his/her work in elog. All work, description of equipment, measurements, calculations, analyses, plots, etc will be contained here (including the answers to questions at the end of each experiment). The instructor will check your elog entries frequently.
2. Attendance: Attendance is required. You will also need to work in the lab outside class hours.
3. Exams and Final Grade: There will be two individual presentations (25% of the total grade each). 25% will be based on the grading of the elog entries. The remaining 25% will be based on the analyses of a particular experiment, chosen in consultation with the instructor. This will be written as a formal scientific paper (APS Revtex format). The final grading metric is 100-85:A, 85-70:B, 70-55:C, 55-40:D and 40-0:F.

Outcome and Assessment: Understanding of modern physics phenomena at a deeper level by conducting experiments to reinforce physics concepts; appreciating the tasks of a experimental scientist where the issues range from designing an experiment and making sense of the results; proficiency in error analyses; understanding of basic principles of an experiment from which a proposal for a Senior Thesis can be developed; solid grasp of experimental instrumentation and analyses tools (use of digital scopes, data acquisition cards, LabView, MathCAD, MatLAB, etc. Assessment is achieved by discussions of theory and the obtained results with the student throughout the semester, review of students’ logbook, and discussions of student project presentations.

Disability: Any student who, because of a disabling condition, may require some special arrangements in order to meet the course requirements, should contact the instructor as soon as possible, so that the necessary accommodations can be made. Proper documentation must be presented from the Dean of Students’ Office.