Course Information
PHYS4373, Physical Measurements Laboratory, Fall 2016, MF 2:30-5:15, PHY 1.304

Professor Contact Information
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Course Description
Physical measurement forms the basis for every field of experimental science. Observation drives our theoretical understanding of the natural world while at the same time testing the falsifiable predictions of theory. Introducing you to basic measurements of various physical properties of nature, this course will prepare your further advancement in becoming scientists, engineers, or other professionals. The techniques covered in the course include spectroscopy, interferometry, microscopy, atomic and sub-atomic particle and radiation detection, laser properties and vacuum science. Furthermore, it is our additional goal to train you in effectively communicating the results and concepts in your written reports in a manner consistent with scholarly publication.

The labs require preparation work by all team members, usually a team of two or three. It is highly advisable to review experiments before coming to class so that your time is used efficiently. The TA or the instructor will quiz you during class to check your level of knowledge.

You will be receiving training on the use of potentially hazardous items such as power supplies, vacuum pumps, radioactive materials, and so on. We strongly emphasize safety within this course. As part of this, you are to complete online safety training through UTD Bioraft, as you will see in your email. You must complete this training before initiating experiments. Listen to and adopt the recommended operating practices so that you will be able to focus safely on scholastic excellence! I strongly encourage you to go beyond the confines of each experiment. However, if something seems out of place, please bring it to the attention of the TA or instructor.

Student Learning Objectives/Outcomes
Upon completing this course, students will:
1. Be able to use a wide variety of instruments to make measurements of various physical properties.
2. Determine specific characteristics of materials that are radioactive, optically emissive, or absorptive.
3. Understand the impact of quantum mechanical interactions in diffraction and interference.
4. Properly convey scientific results in writing and public presentation

Required Textbooks and Materials
Laboratory notebook—not loose leaf

Regular experiments/reports
There are 12+ pre-existing laboratory experiments around the lab that constitute the bulk of the course. Many experiments can be performed in a single class period, while some may take longer. In general, we allow three class sessions for each lab because we want you to have the time to do a thorough job on your report. Each team is required to complete a minimum of 7 different experiments during the semester. A

signup sheet will be available to reserve the apparatus for each experiment, and a calendar of due dates provided.

Project reports are to be created with the template provided on elearning and involve an introduction, experimental section, results and discussion, conclusion, and references. The first report is graded with high detail and criticism but typically scored highly (90-95), with the commentary serving as a metric for future reports, which are graded with greater scrutiny. ***Beginning with the fourth report, to earn a grade of 90 or better, you will need to do something beyond the standard experiment.*** We place a special emphasis in this course on proper data analysis and dissemination of results. Thus, it is insufficient to just get the right numbers; reports must exhibit considerable knowledge of the subject matter and scope of the results.

Self-directed project
Students are required to complete a project among possibilities provided by the instructor. Successful completion will involve—direct demonstration of the equipment/measurement, a written report, and cleanup. No later than Sept. 20, students should prepare a one page proposal outlining the physical property to be measured, the apparatus used/needed and the expected outcome.

It is actually a good idea to initiate the self-directed project ASAP. Given that these often involve setup and an untested approach, several attempts or modifications may be required to achieve satisfactory results. We may also need to order or modify components through machining, which take time. The experiment itself will likely take about twice as long as you think or longer, so it is wise to be forward-thinking. ***Experiments must be approved by the instructor before work starts on the project.***

Teams
The majority of the work will be done in teams composed of either two or three students.
Team membership will be rotated during the course if appropriate.

Grading Policy
Your grade is based on the quality and quantity of work done in support of your laboratory experiments and oral quizzes. This includes:

7 Regular Post-Experiment reports (80%)
Each team must submit a summary report on the experiments done in class. Reports are to be prepared in the template provided and should be a minimum of two pages in length. References must be provided for any material acquired outside of the class and used to support the experiment or its analysis. (e.g. cited publication or database information). Due dates for reports will be discussed in class. A single grade is given to the team for each experiment. The grade will be available one week after the report is handed in. Each student in each team receives the same grade for that report. All experiments carry an equal weight. If reports are not turned in on the due date, they may be turned in by the next class session at a 20% penalty. Otherwise, late lab reports will not be accepted. One opportunity will be provided to submit a revised report.

Self-directed Project (20%)
Similar to regular reports above, with additional scoring for the project proposal and physical demonstration.

Attendance & Grades
Given that performing the laboratory work is critical to this course, attendance will be taken for every class. You may miss two courses for undocumented purposes, and documented reasons can be discussed with the instructors to discern makeup opportunities. Otherwise, absences beyond these circumstances will result in 33% penalty against regular experiments and 17% penalty against self-directed projects in conjunction with the activity consistent with the course schedule, per day missed.

Comet Creed

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

"As a Comet, I pledge honesty, integrity, and service in all that I do."

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus.

Please go to http://go.utdallas.edu/syllabus-policies for these policies.

These descriptions and timelines are subject to change at the discretion of the Professor.