Physics 10164: Lab Syllabus

Important Info

Instructor Name: Dr. Hana Dobrovolny
Teaching Assistants: Joe Kimball, Pankaj Kumar, Sebastian Requena, Puskar Chapagain, Anastasia Nemashkalo
Semester/Year: Spring 2013
Office: SWR 320
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Textbooks: Lab Manual is available on eCollege

General information

Objective: The labs reinforce theoretical concepts introduced in lectures by giving students hands-on experience with electrical, magnetic and optical devices.

Labs meet once a week. The labs will be run in the order listed below, however, since there will sometimes be two experiments running simultaneously you should ask the lab assistant which experiment you will do on the next lab. The experiments will be conducted in groups of two or three students. Each student should submit his/her own report. The lab manual is available on eCollege.

Lab schedule

Week of:

Jan. 21* Electric field mapping
Jan. 28 Electric measurements
Feb. 4 Series and parallel networks
Feb. 11 Superconductor **or** Temperature coefficient of resistivity
Feb. 18 Superconductor **or** Temperature coefficient of resistivity
Feb. 25 Transformer
Mar. 4 AC circuits and electrical resonance
Mar. 11 Spring Break
Mar. 18 Measurement of the mass of the electron **or** Magnetic force on a current-carrying conductor
Mar. 24 Measurement of the mass of the electron **or** Magnetic force on a current-carrying conductor
Apr. 1 Microwave optics **or** Spherical lenses
Apr. 8 Microwave optics **or** Spherical lenses
Apr. 15 make-up lab Reflection and refraction

*Students in the Monday section only will do this lab on January 14 since January 21 is a holiday.

Grades

Students are expected to complete a minimum of 10 experiments. Even though the lab portion of the course is only worth 20 percent of your overall grade, you must complete 10 different labs. If you fail to complete 10 different labs, you will lose one letter grade from your overall course grade per lab you are missing. Thus, if you have a "C" average in the lecture and miss one lab, your grade will drop to a "D". If you have a "C" average and miss two labs, your grade will drop to an "F". Be sure to check with your TA regularly to verify there hasn't been a mix-up in your lab grades. Keep your graded lab reports when they are returned as they serve as proof that you completed the lab should there be any mix-up.

The lab grade consists of two parts: the lab pre-quiz is worth 20% and the lab report is worth 80% of the grade for each lab.

Pre-quiz: Students are expected to prepare for lab by reading the appropriate section of the lab manual in advance of their lab. The pre-quiz will be taken at the beginning of each lab session and will consist of several questions on material covered in the lab manual.

Lab report: The lab report is a summary of what the student has observed and understood during the lab. Although you will work in twos or thress in the lab, lab reports are to be done individually. The format is as follows:

1. Type your name, date, lab section and the name of your teaching assistant. (5 points)
2. Introduction: (20 points) Briefly give a general overview of the experiment, your expectations (a hypothesis) and the theory behind it. Summarize the main point of doing the lab. Your introduction should be about a page long.
3. Results: (25 points) Present the data in the form of a table or a graph. Usually you will give details of what you observed in the lab. Only important information pertinent to the lab should be presented. Show any calculations carried out etc. Remember to add units.
4. Discussion/Conclusion: (50 points) Discuss in your own words and from your point of view your results. Example: Looking at your results, tables or graph, can you see any general trend? For example, does the resistance of a wire increases with temperature? What is the behaviour of the graph/line? What was the aim of the experiment? Have we achieved anything? If not, how large is the error? Does your result make sense? Can you compare your result to those from the books? What does the book say? Is your observation justified by the relevant equations from the test? Be sure to answer all questions asked in the manual.

Lab reports are due one week after the lab class. Late labs will have ten points deducted for each day they are overdue.

During the last week of the semester the students will have the option to do an extra lab to replace the worst grade and/or to run a make-up lab. At this time, any student who missed a lab, regardless if the absence was excused or unexcused, can make up one lab.

Safety

Students should read these laboratory safety guidelines which are not all inclusive but provide necessary information for the more common situations that may be develop. However, the laboratory safety is based on each student's exercising common sense and caution when conducting an experiment. Report all injuries to the instructor or lab assistant, and if medical assistance is necessary call Health Center 7940.

All experiments are safe if conducted according to the manual. Safety glasses or lab coats are not required in this laboratory, however, if a student desires to wear safety glasses, they are available upon request. In the lab you will use a low power helium-neon laser. This laser may be used without safety glasses, but you must not under any circumstances look into the laser beam or its reflection off metal surfaces. Especially dangerous are reflections off jewelry and watches. Do not use mirrors to reflect laser beam.

In most of the experiments you will use electric power. Be careful not to touch simultaneously electric wires and water or gas outlets since they form a ground. When water is spilled on your workbench, turn off all electric equipment and wipe up the water. Never work on electric circuits with wet hands or while standing on a wet floor. Even low voltages can be dangerous in such situations. Some of the power supplies used in the laboratory have low voltage output, but the current that can be pulled from these devises may be strong enough to cause severe burns.

Eating, drinking and smoking are not permitted in the laboratory. Liquid nitrogen is safe if handled properly. While pouring nitrogen into dewars avoid splashing. To protect eyes you may want to wear safety glasses. Do not touch liquid nitrogen. If your clothes get wet with liquid nitrogen, take the clothes off immediately. Forget modesty. In most cases liquid nitrogen will evaporate harmlessly, but when once the clothes get wet, nitrogen may cause severe frostbite.

When a fire alarm sounds, all the students must leave the building and may not return to the lab unless told by campus police or fire officials. Before leaving the laboratory turn off all equipment. In a case of emergency notify the lab instructor or the Chairman of the Physics Department, 308 SWR Building.

Other important stuff

Disabilities Statement: Texas Christian University complies with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973 regarding students with disabilities. Eligible students seeking accommodations should contact the Coordinator of Student Disabilities Services in the Center for Academic Services located in Sadler Hall, 1010. Accommodations are not retroactive, therefore, students should contact the Coordinator as soon as possible in the term for which they are seeking accommodations. Further information can be obtained from the Center for Academic Services, TCU Box 297710, Fort Worth, TX 76129, or at (817) 257-6567. Adequate time must be allowed to arrange accommodations and accommodations are not retroactive; therefore, students should contact the Coordinator as soon as possible in the academic term for which they are seeking accommodations. Each eligible student is responsible for presenting relevant, verifiable, professional documentation and/or assessment reports to the Coordinator. Guidelines for documentation may be found at http://www.acs.tcu.edu/disability_documentation.asp. Students with emergency medical information or needing special arrangements in case a building must be evacuated should discuss this information with their instructor/professor as soon as possible.

Academic Misconduct: Academic Misconduct (Sec. 3.4 from the Student Handbook) Any act that violates the academic integrity of the institution is considered academic misconduct. The procedures used to resolve suspected acts of academic misconduct are available in the offices of Academic Deans and the Office of Campus Life and are listed in detail in the Undergraduate Catalog (Student Policies¿Academic Conduct Policy Details; http://www.catalog.tcu.edu/current_year/undergraduate/).

Netiquette: All members of the class are expected to follow rules of common courtesy in all email messages and chats. If I deem any of them to be inappropriate or offensive, I will forward the message to the Chair of the department and the online administrators and appropriate action will be taken, not excluding expulsion from the course. The same rules apply online as they do in person. Be respectful of other students. top