Physics 284 Modern Physics Laboratory

Spring 2019

Tuesdays : 11:00 am – 1:40pm; Faraday 121A or Faraday 129 on days we have lectures.

Instructor:
Professor George Coutrakon,
Office: Faraday Hall 218 (up one flight of stairs from lab room)
Office hours: Tuesdays and Thursdays - 4:00 pm - 5:00pm
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Web Site
http://webcourses.niu.edu (Blackboard course page)
Grades and class materials such as lab instructions will be placed on the Blackboard course page.

Lab Instructions
Instructions for all six labs for the course are available on Black Board and should be downloaded and read before starting the lab. Four of the six labs have instructions in the "Phys 284 Manual" in Black Board/General Information. The pre-lab questions are not required in the report but should be studied before you start the experiment. Note that the photo-electric lab and the Blackbody lab have separate instruction documents on Black Board which you can find in General Information.

Grading
The laboratory grade will be based on 6 experiments, one HW given in the first week, and one report (called the 7^{th} lab). Lab report #7 uses the results of 3 previous labs to determine fundamental constants, h, e, and m_e . Each of the main 6 lab reports will count as 1/7 of the grade. The first week's HW plus lab 7 report will count for the remaining 1/7 of the grade. The first week's HW is a dry lab to find the slope of a line and the error in the slope of a line from fictitious data given to you. The grade for each lab will be based on your writing of the four sections. Introduction, Procedures (also called Materials and Method of doing the experiment), Presentation of Data and Analysis , and Conclusions. *Data presentation and Analysis section must include your measurement errors and propagation of errors to state the error in the quantity you calculate*. There are explicit directions for calculating errors for each experiment in " Error Analysis for Phys 284 Labs". Error analysis will count for 15 percent of your lab grade.

Writing Lab Reports

The 6 reports should be approximately 4-6 pages in length (including figures and data tables). Limit the theory discussion to ½ page in the introduction and include all formulas that you need for the experiment. In each lab report (except Lab report #7) there should be a drawing or photo of your lab equipment with labels on relevant components that show how measurements are taken. The critical components in the drawing or photo should be labeled with arrows that can be referred to in the text. General guidelines for how to write lab reports are shown in in a documents labelled "Phys 284 Lab report Grading Policies" and "Lab report Instructions" under General Information in Black Board.

In addition, each lab has specific instructions on how to do each experiment. **Lab reports are due one week after the scheduled completion of the lab.** There will be 2 weeks allotted for each experiment. Reports submitted late without prior permission will be marked down 10% per week and may not be accepted more than 2 weeks after the due date. The last report must be turned in by Wednesday before final exam week.

Lab Notebooks

All students are expected to keep a lab notebook. Since students will work in teams of two, or occasional three, they should either purchase a lab notebook with carbon paper, or make photocopies at the end of class, so that each student retains a copy of the measurement data. It is each student's responsibility to make sure that they obtain a copy of all the notes from each lab.

Calendar:

Week 1	Lecture for 1st two Labs, lab writing, error analysis, and 1st assignment
Week 2	Photo-electric effect and spectrometer Labs with Na and H lamps (1st HW due)
Week 3	Photo-electric effect and spectrometer Labs
Week 4	Photo-electric effect and spectrometer Labs, 1st lab report due
Week 5	Photo-electric effect and spectrometer Labs
Week 6	Lecture for 3rd and 4th labs ; 2nd lab report due
Week 7	E/M and Black Body Labs
Week 8	E/M and Black Body labs, 3rd lab report due
Week 9	E/M and Black Body labs
Week10	Lectures for 5th and 6th labs; 4th lab report due
Week11	Michaelson-Morley and Radiation Lab , Lab #7 (dry lab) report due on e,m and h
Week12	Michaelson-Morley and Radiation Lab
Week13	Michaelson-Morley and Radiation Lab ; 5th lab report due
Week14	Michaelson-Morley and Radiation Lab
Week15	6th lab report due

Lab 7 – Calculation of h, m and e from earlier labs where you got h/e , e/m and Rydberg constant. See notes on Error Analysis in General Information.