Physics P309 LABORATORY
Indiana University Northwest

Text: OnCourse
Prerequisites: P202 or P222

Reports: Reports are due by 7:00AM the following Monday. We will try to have 2 reports/week. They are to be submitted to TurnItIn.com. Sign in information is in Canvas. There will be a 10% grade reduction for late reports. Lab reports with over a 40% similarity index will be penalized 10%.

A formal report is required for all experiments. All formal lab reports **MUST** be **word-processed**. It should consist of the following parts:

I. Title Page:
Contains title of experiment, date performed, your name, & your partner's name(s).

II. Abstract:
A short (2-3 sentences) summary of the experimental procedure and **results**.

III. Introduction:
Start globally with the theory(s) behind the experiment. Then discuss how these apply or are demonstrated be the experiment. Should be at least a page. No pronouns allowed. Third person, past tense, passive voice. Include what variables were chosen to investigate & why.

IV. Purpose:
A BRIEF statement of the object of the experiment. Not more than 2 sentences.

V. Procedure:
Should be a set of instructions, which the reader should be able to follow. Be sure to include equipment used. You may NOT **just** reference source. THE PROCEDURE SECTION IS **NOT** TO BE COPIED DIRECTLY FROM THE SOURCE!!!!!! **THIS IS PLAGIARISM!!!!!** Be sure to include an explanation for **WHY** each procedure is done! Be sure to site your source. Procedures are to be written cookbook style. The person reading the repot should be able to do what you say to do (said you did) and get YOUR SAME RESULTS! Needs to include all sources cited including where the original idea for experiment came from

VI. Data:
TABLES of raw data. Do not combine with results. MUST be in table form.

VII. Sample Calculations:
Must be formula view of spreadsheet.

VIII. Results:
TABLES of results - Clearly showing final answers. Sig. figs & units will be checked.

IX. Conclusions:
(3 sections) - 1) Theory, 2) Conclusions, 3) Error Analysis. What are the pertinent theories & how do they apply to the lab? This should be a discussion & not just a listing. Discussion of your results. What were the expected results? How did your results compare with the expected results? What conclusions can you draw from the results? Where did you introduce error into thee experiment? Be sure to include mention of precision (standard deviation) & accuracy (% error) wherever possible.

Grading: Labs are worth 100 points each. There will be no make-up for missed labs. You may not use your partner's data: you must be in lab to take your own data. There will be 14 labs. Your grade will be the top 13 of them.

COURSE OBJECTIVES:

- Keep legible and complete experimental records
- Perform accurate and precise measurements
- Interpret experimental results and draw reasonable conclusions
- Analyze data statistically and assess reliability of results

- Design experiments
- Communicate effectively through written reports
- Demonstrate the ability to identify and explain how scientific theories are formulated, tested, and validated.
- Demonstrate the ability to integrate and apply scientific methods which include defining parameters of problem, seeking relevant information, subjecting proposed solutions to rigorous testing, and drawing conclusions based on the process.
- Work effectively in small groups and teams

Students must keep a permanent record of their experiments in a numbered, bound notebook. The work is to be entered in ink. The entire experiment must now be documented, **NOT JUST THE DATA!** The procedures must also be in the notebook. There is to be no removal or obliteration of any data. Any data thought to be in error can be corrected by drawing a simple line through the entry & recording the correct value next to it. A carbon copy is to be made of all data & submitted to the instructor at the close of each laboratory session. NEVER tear out any of the original numbered sheets.

RIGHT TO ACCOMMODATION FOR INDIVIDUALS WITH DISABILITIES

Indiana University is committed to creating a learning environment and academic community that promotes educational opportunities for all individuals, including those with disabilities. Course directors are asked to make reasonable accommodations, upon request by the student or the university, for such disabilities. It is the responsibility of students with documented physical or learning disabilities seeking accommodation to notify their course directors and the relevant campus office that deals with such cases in a timely manner concerning the need for such accommodation. Indiana University will make reasonable accommodations for access to programs, services, and facilities as outlined by applicable state and federal laws.

Campus support office: Davetta Haywood, Disabilities Coordinator, Hawthorn 237, 219-980-6942 Student Support Services Student Support Services www.iun.edu/~supportn

"What you should know about sexual misconduct: IU does not tolerate acts of sexual misconduct, including sexual harassment and all forms of sexual violence. If you have experienced sexual misconduct, or know someone who has, the University can help. It is important to know that federal regulations and University policy require faculty to promptly report complaints of potential sexual misconduct known to them to their campus Deputy Title IX Coordinator(s) to ensure that appropriate measures are taken and resources are made available. The University will work with you to protect your privacy by sharing information with only those that need to know to ensure the University can respond and assist. If you are seeking help and would like to speak to someone confidentially, you can make an appointment with a Mental Health Counselor on campus(contact information available at http://stopsexualviolence.iu.edu/employee/confidential.html). Find more information about sexual violence, including campus and community resources at http://stopsexualviolence.iu.edu/."

LABORATORY SCHEDULE

DATE			EXPERIMENT
June	M	29	Brownian Motion
July	W	1	Bohr-Hydrogen Spectra & Determination of Plank's Constant
	M	6	Michelson Interferometer
	W	8	Photoelectric Effect
	F	10	Speed of Light
	M	13	Milliken Oil Drop/ Expose Rutherford Scattering
	M	20	Radioactive Simulation /End Rutherford Scattering Exposure
	W	22	End Develop Rutherford-Dry/ x-ray scattering
	F	24	Count Rutherford Scattering / Cathode Ray Tube
	M	27	Cloud Chamber
			Automatic Withdrawal Deadline
	W	29	Geiger Plateau
	F	31	γ Detector Resolution & Energy calibration & Spectrum Analysis, Identification of an Unknown &Peak Integration & Peak Stripping & Determination of γ Detector Characteristics & Absorption of γ rays by lead
August	M	3	π, μ, electron decay
	W	5	Finish any experiments not previously finished

GRADING SCALE

90 A
80 B
70 C
60 D