PHYS-3701
Intermediate laboratory-Electrons and Photons
Fall 2024, Call number: #1480

Instructor: Dr. Julie Roche (rochej@ohio.edu, 740-593-1982)
Roche's Office hours: To book an appointment in person in my office or over video-conferencing, use Bookings (this link)
Teaching Assistant: Ali Abbas (fa295519@ohio.edu)
Class time and location: Tu & Th, 2:00 to 3:50 pm, in Clippinger #285.
Class web site: Canvas (this link)

All information in this syllabus is subject to change. I will announce changes to the syllabus in class and by email. You are responsible for keeping up to date with the changes.
I care about you being successful in this class. Let me know if something in this syllabus makes learning difficult for you. We will find a solution to maximize your training.

Goals and learning outcomes of the class

The two goals of this laboratory class are to develop your experimental skills and reinforce Modern Physics concepts. At the end of this class, you will be able to:

- Plan experiments considering the type, amount, and accuracy of data needed to give reproducible and accurate results.
- Make several different types of common laboratory measurements, including, for example, small-signal measurement and resonance measurement (if we get access to the laboratory room)
- Use a computer to make plots and tables, do curve-fitting, do basic statistical analysis proficiently, and relate the fit parameters to physical quantities.
- Identify the claims, theoretical background, experimental evidence, and logical connections that make up a scientific argument.
- Communicate results ethically and effectively in the oral form authentic to Physics and Astronomy.

Schedule

You will work on five different activities during this class: one introductory module and four experiments (noted lab 1, lab 2, ...). Table 1 gives the agenda of the class as well as the date on which assignments are due. Table 2-bottom assigns partners and topics to be studied on a specific day.

Assignment

I will gladly help you with any assignment before the official due date: come and talk. All assignments are due on Canvas at 8 am, as Table 1 indicates. Good-quality scans or photos of handwritten work are acceptable, but typed work is preferred.

Answer to Preliminary Questions (APQ)

Individual assignment.
Those questions are listed in section 4 of each Lab chapter of the Lab Manual. Answer those questions as you would homework questions. Each question is graded in a 3-point scheme: 0: absent, 1: unsatisfactory, 2: satisfactory. You can resubmit answers for which you scored less than satisfactory once before Tuesday, December 10, at 12:20 p.m.

Run Plan

Group assignment: one note per group. The person listed first in Table 2 uploads the group's Run Plan on Canvas. Every member of the group gets the same grade. Let me know if you have trouble working with your partner; we will make alternative arrangements.
Answer the questions listed in Section 1.3 of the Lab Manual as you would homework questions. Each question is graded in a 3-point scheme: 0: absent, 1: unsatisfactory, 2: satisfactory. There is no resubmission for this assignment.

Analysis note

Group assignment: one note per group. The person listed second in Table uploads the group Analysis note on Canvas. Every member of the group gets the same grade. Let me know if you have trouble working with your partner; we will make alternative arrangements.
Each lab has a "Lab Objectives" set in the Lab Manual in section 3 of each Lab chapter. Present your data and analysis in a typed note as you would a homework question. The main author of the note uploads the note on Canvas. The other author presents the note during the Analysis Discussion time listed in Table 1. Each group will be assigned A specific meeting time. The discussion will take place in Roche's office. If your analysis is satisfactory, you get a 100%. If your analysis is unsatisfactory, you get a 60%, and you are invited to correct and resubmit your note. If your second analysis is satisfactory, you

Week	Date	In class activity	Assignment due on Canvas 8 am
1	Aug 27	Introduction Presentation Tips	
	Aug 29	Tools: Python + taping yourself	
2	Sep 3	Intro to error analysis	Presentation
	Sep 5		
3	Sep 10	Python tutorial	
	Sep 12		
4	Sep 17	**Lab 1**	APQ
	Sep 19		Runplan
5	Sep 24		
	Sep 26	Analysis discussion	Analysis note
6	Oct 1	Analysis discussion	
	Oct 3	Presentation Workshop	Presentation
7	Oct 8*	**Lab 2**	APQ
	Oct 10*		Runplan
8	Oct 15		
	Oct 17	Analysis discussion	Analysis note
9	Oct 22	Analysis discussion	
	Oct 24	Presentation Workshop	Presentation
10	Oct 29	**Lab 3**	APQ
	Oct 31		Runplan
11	Nov 5	No class: Election day	
	Nov 7*		
12	Nov 12*	Analysis discussion	Analysis note
	Nov 14*	Analysis discussion	
13	Nov 19	Presentation Workshop	Presentation
	Nov 21*	**Lab 4**	APQ
14	Nov 26		Runplan
	Nov 28	No class: Thanks Giving break	
15	Dec 3		
	Dec 5	Analysis discussion	Analysis note
Exam week	Dec 10, 12:20pm	Final Presentation on Lab 4	

Table 1: *Tentative schedule for the PHYS-3701 Fall 2021 sessions.*

Experiment	Lab 1	Lab 2	Lab 3	Lab 4
A	1,2, 17	5, 7	9, 10	13, 15
B	3, 4	6, 8	11, 12	14, 16
C	5, 6	1, 4	13, 14	12, 17
D	7, 8	3, 2	15, 16, 5	11, 10
E	9, 11	12, 17	1, 3	4, 5
F	10, 12	11, 14, 13	2, 4	6, 3, 9
G	13, 16	10, 15	17, 8	2, 7
H	15, 14	9, 16	7, 6	1, 8

1. Colton 2. Avipsha 3. Tyler 4. Luke 5. Isaac 6. Samuel
7. Joey 8. Sofia 9. Parikshit 10. Jackie 11. Sean 12. Damien
13. Alex 14. Naylan 15. Greg 16. Hunter 17. Airton

Experiment	Physics topics
A	Photo-electric effect
B	Diffraction
C	Light Polarization
D	Zeeman effect
E	Hall effect
F	NMR
G	Black Body radiation
H	High-temperature super-conductor

Experiments you will perform			
Lab 1	Lab 2	Lab 3	Lab 4

Table 2: *List of experiments to be performed during PHYS-3701 and assignments. You will work in pairs; if you do not want to work with a given partner, please talk to me.*

score a 90%. If your analysis is still unsatisfactory, you still score 60%. Each time you resubmit your analysis note, your maximum score decreases by 10%. You can resubmit an "Analysis note" as many times as you want before Tuesday, December 10, at 12:20 p.m.

Presentations

Individual assignment.
For this class, you are asked to present a 10-minute presentation of your work and be prepared to answer questions about your work for an additional 5 minutes. You are asked to prepare between 5 and 7 slides that motivate your experiment, present your measurement and results, and evaluate the significance of your results. You can use whichever software you want to produce your sides and tape yourself presenting it. The grading scheme used to evaluate your presentation is shown in Figure 1 of the Lab Manual. During the first workshop, we will focus on sections A&B only, the second on section C, and the third workshop on sections D & E. You submit a full presentation on Tuesday, December 10, at 8 am.
How to record a presentation: using Power-Point, or screen capture with Quick Time on Mac, or using Panopto integrated within Blackboard, or ask Roche for help.

Grading policy

The overall course grade will be based on many assignments. The weight for each component is as follows:

Attendance	:	20%
APQs	:	10%
Run Plans	:	10%
Analysis notes	:	40%
Presentations	:	20%

Grading scale :

A: 100-90%	D: 69-60%
B: 89-80%	Failed: below 60%
C: 79-70%	

Policies and practices

Attendance Policy

Attendance at all class meetings is required unless Roche explicitly excuses you by emailing you. Attendance is evaluated at each class meeting (0: absent, 1: unsatisfactory, 2: satisfactory). If you have enough data for one lab, work on your analysis note: there will be no leaving the lab early.
Because of the structure of this class (round-robin), making up sessions is quite tricky.

However, make-up sessions will be arranged without any penalty if you present a university-valid excuse[1] for your absence. Excused absences include illness, death in the immediate family, religious observance, jury duty, and involvement in University-sponsored activities.

A student who misses four 80-minute class meetings without university-valid excuses fails the class immediately.

Policy on reasonable religious accommodations

In addition to participation/attendance/absence policies already listed, students may be absent for up to three (3) days each academic semester, without penalty, to take time off for reasons of faith or religious or spiritual belief system or to participate in organized activities conducted under the auspices of a religious denomination, church, or other religious or spiritual organization. Students are required to notify the instructor/me in writing of specific dates requested for alternative accommodations no later than fourteen (14) days after the first day of instruction. These requests will remain confidential. For more information about this policy, students/you may contact the Director and Title IX Coordinator, Equity and Civil Rights Compliance, Lindley Hall, 006, 740-593-9140, Equity@ohio.edu.

Late work policy

Initial work submissions received more than a week after the deadline will not be graded and will receive a zero. Remember that the deadlines below are abolished if you have a university-valid excuse for not fulfilling them. In this case, contact your instructor as soon as possible to discuss an alternative schedule.

Academic dishonesty and plagiarism

The Ohio University Student Code of Conduct (this link) prohibits all forms of academic dishonesty. These include cheating, plagiarism, forgery, furnishing false information to the University, and alteration or misuse of University documents, records, or identification. Suppose a student engages in course-related academic dishonesty. In that case, the student's grade on the work in question or the overall grade course may be lowered by the instructor[2]. For this course, it primarily means no fudging with the data or copying your presentation from someone else. Data are to be taken with partners, but you should prepare lab presentations individually.

Disability accommodation

Any student who feels s/he may need accommodation based on the impact of a disability should contact me privately to discuss your specific needs and provide written documentation from Student Accessibility Services. If you are not yet registered as a student with

[1] OHIO undergraduate catalog (this link), search for "Excused Absence"

[2] Read more at The Office of Community Standards and Student Responsibility" web page (this link)

a disability, please contact Student Accessibility Services at 740-593-2620 or visit their website (this link).

Inclusivity

Physics and Astronomy are best done in an inclusive environment. The students, staff, and faculty of the Department of Physics and Astronomy are committed to professional interactions, respecting and considering the rich and diverse backgrounds of all its members. We expect each member of our Department to encourage and support a culture of equity and the inclusion of all social identities in all activities in which we participate and uphold all Ohio University diversity policies. For more information about our culture of inclusion and how to report issues and concerns, consult the Inclusion and Equity website of the Physics and Astronomy Department (this link).

Feedback

I would appreciate feedback from the students on how the class is going. Talk to me, send me an email, or drop an anonymous note in my mailbox. I wrote the lab manual myself; please report typos, mistakes, and unclear passages. You may gain up to 25% bonus points on your participation grade for the class meeting the closest to your mention.

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Changes to the syllabus

1.0: initial
1.1: 09/09/24: Added contact info for TA. Updated Table 2 with new student-experiment assignment.
1.2: 09/27/24: Added the Canvas link to the syllabus