PHYS-3701
Intermediate laboratory-Electrons and Photons
Fall 2021, Call number: #2864

Instructor: Dr. Julie Roche (rochej@ohio.edu, 740-593-1982)
Office hours: Wed 9:00 to 5:00 pm[1]. To book an appointment in person in my office or over video-conferencing, use Bookings (this link)
Class time and location: Tu & Th, 2:00 to 3:50 pm, in Clippinger #043.
Class web site: Blackboard (this link)

All information in this syllabus are 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. If something in this syllabus makes it difficult for you to learn, let me know. 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 0f 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.

[1] If these do not work for you, email me to find a time that does work.

Schedule

You will work on seven different activities during this class: one module on "Data Reduction and Error Analysis for the Physical Sciences" and six experiments (noted lab 1, lab 2, ...). Table 1 gives the agenda of the class as well as the date on which assignments are due. Note that the first eight sessions are dedicated to the introduction and practice (the tutorial) of tools helpful for this class. The remainder of the semester is made up of six labs. One lab will last three sessions. During the lab, you are expected to perform the experiments as well as significantly start the analysis of your data. Typically, you should:

- plan the experiment during the first session,
- take data and start your online analysis during the second, and
- take additional data if needed, and complete your analysis during the third session. You may be able to start preparing your slides during that third session.

For each lab, you will be working in a group or by yourself. For each of you, Table 2-bottom assigns partners as well as topics to be studied on a specific day.

COVID-19

In this class, we will follow all the Health protocols and policies of Ohio University. Please refer to the "Be Safe Bobcats" website (this link) for more information. Moreover, as you will be working in pairs around "small" pieces of equipment, we will all wear masks at all times, even when the OHIO general policy does not require masks indoors by default.
If OHIO asks you to stay home because of COVID-19, do so. If you are sick: we wish you to feel better very soon. If you are asymptomatic: we hope you remain so. In both cases, you automatically receive a valid University excuse for absence from class. Let me know what is going on asap. Later on, when you are ready to get back to your studies, email to make up arrangements.

Attendance Policy

Attendance to all experimental sessions is required. I will not check attendance at the tutorial sessions. If you think you have enough data for one lab, take advantage of the remaining time to start preparing your presentation: 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[2] for your absence. Excused absences include illness, death in the immediate family, religious observance, jury duty, involvement in University-sponsored activities, and isolation or quarantine because of COVID-19. Again, if OHIO asks you to stay home because of COVID, do so. Let me know what is going on asap. Later on, when you are ready to get back to your studies, email to set up make arrangements.

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

If you miss a class without a university valid excuse, a make-up session will not be automatically arranged, and you will have to produce a report on the data you were able to obtain in the remaining time. **A student who misses four 80-minutes class meetings without university valid excuses fails the class immediately**.
Note that I will evaluate participation at each meeting (0: absent, 1: unsatisfactory, 2: satisfactory). Participation will account for 40% of your grade for a specific lab. For example, if an experiment is to be done in 3 sessions and you miss one, the best participation grade you can get on this lab is 66% which combined with a perfect presentation, perfect APQs, and perfect run plan gives you an 86.4% final grade.

Assignment

Remember that your instructor will gladly help you with any assignment before the official due date: come and talk.
All assignments are due on Blackboard. Good quality scans or photos of handwritten work are acceptable, but typed work is preferred.
You are asked to produce three different products for each lab: Answers to Preliminary Questions (APQ), a Run Plan, and a taped oral presentation. Collaboration between lab partners is expected at all class stages (before, during, and after the lab session), but each student needs to turn in their own work for all assignments. Two different students cannot submit the same file.
Late work policy: Work submission received more than a week after the deadline will not be graded and 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 asap to discuss an alternative schedule.

Lab presentation

At the end of each lab, you present your results in a short 7 minutes talk followed by about 5 minutes of questions. Prepare between 5 and 7 slides that motivate your experiment, present your measurement, show your results, and evaluate the significance of your results. The grading system used for the class is presented in section 1.3 of the lab manual. You need to upload your slides and recorded version of your presentation at least one hour before your scheduled meeting with the instructor[3]. These meetings will be scheduled with 15 minutes intervals on the dates listed on table 1. If you miss the actual session, you will need to reschedule it. Meetings that do not take place within a week [7 full days] of the initially scheduled time will not be graded and given a 0.
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.

[3]If you can submit your work at the beginning of the previous evening that would help

Week	Date	In class activity	Assignment due on Blackboard
1	Aug 24	Introduction Presentation Tips	Know you syllabus Get to know you poll
	Aug 26	Intro to Error Analysis	Reading report on Chap 1
2	Aug 31	Python tutorial	Reading report on Chap 2
	Sep 2		Reading report on Chap 3
3	Sep 7		Reading report on Chap 4
	Sep 9		Reading report on Chap 6
4	Sep 14	Tutorial exercise	
	Sep 16		Presentation practice
5	Sep 21	Lab 1	APQ 12h before class meeting time Run plan end of class meeting
	Sep 23		Self-reflection on presentations skills
6	Sep 28		
	Sep 30	Feedback meeting	Presentation on Lab 1 12h before class meeting time
7	Oct 5	Lab 2	APQ 12h before lab beginning Run plan end of class meeting
	Oct 7		
8	Oct 12		
	Oct 14	Feedback meeting	Presentation on Lab 2 12h before class meeting time
9	Oct 19	Lab 3	APQ 12h before class meeting time Run plan end of class meeting
	Oct 21		
10	Oct 25		
	Oct 27	Lab 4	APQ 12h before class meeting time Run plan end of class meeting
11	Nov 2		
	Nov 4		
12	Nov 9	Lab 5	APQ 12h before class meeting time Run plan end of class meeting
	Nov 11	No class: Veteran's day	
13	Nov 16		Presentations on lab 3&4 12h before class meeting time
	Nov 18		
14	Nov 23	Lab 6	APQ 12h before class meeting time Run plan end of class meeting
	Nov 25	No class: Thanks Giving break	
15	Nov 30		Self-reflection on presentation skills due
	Dec 2		
Exam week	Dec 10	Presentations on Lab 5 & 6	

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

Experiment	Lab 1	Lab 2	Lab 3	Lab 4	Lab 5	Lab 6
A	1,10		5,7	4,6	3,8	2,9
B	2,9	1,8		5,10	4,6	3,7
C	3,8	2,7	1,6		5,9	4,10
D	4,7	3,6	2,10	1,9		5,8
E	5,6	4,10	3,9	2,8	1,7	
F		5,9	4,8	3,7	2,10	1,6

1: Sandro 2: Morgan 3: Sarah 4: Sam 5: Derek
6: Ernie 7: Everett 8: Drake 9: William 10: Cherie

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

Experiments you will perform					
Lab 1	Lab 2	Lab 3	Lab 4	Lab 5	Lab 6

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

Grading policy

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

25% : Preliminary exercises
- Presentation practice
- Two self-reflection on presentation skills
- 6 Reading Reports
- Error Analysis tutorial

25% : Work for lab 1 and for lab 2.
- Answer To Preliminary questions (for lab 1 and 2)
- Run Plan (for lab 1 and 2)
- Participation (for lab 1 and 2)
- Presentation (for lab 1 and 2)

50% : Work for labs 3, 4, 5 and 6
- Answer To Preliminary questions (for lab 3, 4, 5 and 6)
- Run Plan (for lab 3, 4, 5 and 6)
- Participation (for lab 3, 4, 5 and 6)
- Presentations (for lab 3 or 4 and for lab 5 or 6)

Grading scale :

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

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

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

Feedback

I would appreciate feedback from the students on how the class is going. Talk to me, send me an email, Specifically, I wrote the lab manual myself; please report typos, mistakes, unclear passages... You may gain up to 10% bonus points on your participation grade for a specific experiment.

Mandatory Reporting of Sexual Violence and Misconduct policy

We all share the responsibility to create a safe learning environment for all students and the campus as a whole. Except for confidential resources (listed here), all employees are required to report any instances of sexual harassment, sexual violence, and/or other forms of prohibited discrimination to the Office of University Equity and Civil Rights Compliance (ECRC). Suppose you share that you or another OHIO student has had any of these experiences (including in, but not limited to, class discussion, papers, office hours, or other scenarios). In that case, it is my responsibility to notify ECRC. Your safety and the safety of others are important to me. Therefore, I take my responsibility seriously to report. Additionally, the University requires that I do so (see Policy 03.004 (this link). In some instances, I may also report to the Ohio University Police Department (OUPD) and/or the Office of Community Standards and Student Responsibility.

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 for and 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).

==========

Changes to the syllabus

1.0: initial
1.1: created the matching between Students and Experiments.
1.2: general proof checking and typo hunting. No changes in substances.