

Syllabus for Physics Laboratory, PHYS 381(W, O), Fall 2024

CRN: 74495, F01

Laboratory: TR 2:30-5:30 PM, REIC 135
Class: W 2:15-3:15 PM, REIC 138

Instructor: Ataur R. Chowdhury

Office: REIC 118

Office Hours: MTW 10:30-11:30 AM (REIC 118)

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Fax (907) 474-6130
Email archowdhury@alaska.edu

Prerequisites: COMM 131X or COMM 141X
ENGL 111X, and either 211X or 213X
PHYS 213X or demonstrated equivalent
PHYS 421 (Quantum Mechanics) concurrent enrollment is strongly recommended.

Textbook: A. C. Melissinos and J. Napolitano, 2nd Edition,
Academic Press, Inc., 2003,
J. R. Taylor, 2nd Edition, University Science
Books, Mill Valley, California.

Course Objectives

1. To gain experience in the methods of experimental physics through laboratory work.
2. To sharpen your skills of writing scientific reports.
3. To master the art of oral presentation of scientific reports.

Student Learning Outcomes:

1. develop an understanding of the experiment to be performed, including literature searches in the library;
2. select and set-up the necessary equipment;
3. perform the experiment and collect all necessary data;
4. analyze the data and complete an error analysis; and
5. prepare a detailed written report.

Credits: 3 credits: 6 hr. of lab and 1 hr. of lecture per week.

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Course Requirements, Policies and Evaluation

There will be an hour-long class every week on materials required for the course. It is highly recommended that every student attends the class. Homework will be assigned from time to time, and the students must turn them in by the date they are due. No late homework will be accepted. Collaboration with your fellow classmates on the assignment is highly encouraged, but you must work out your own solutions before you turn it in.

An integral part of this course is the laboratory work, and every student must attend two laboratory sessions every week. Credit is given for attending the laboratory, participating in meaningful discussion, and maintaining a clean and orderly work area. All laboratory work must be neatly recorded in a bound notebook, and have it signed before you leave the laboratory for the day. The notebook will be graded for clarity and completeness.

As per requirement of this course, you must turn in four complete laboratory reports following the guidelines described below, and make an oral presentation

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All laboratory work must be recorded in a bound laboratory notebook that is available for inspection throughout the semester. The notebook is used to create a detailed record of all aspects of your activities in the laboratory, including, but not limited to, clear diagrams of all experimental configurations, identification of all equipment and materials, records of all quantities measured in setting up an experiment, all data, with clear records of discarded data and the rationale for their deletion from the final data set, and the methods of error analysis. The contents of this notebook form the basis for each written report. Data collection can be a very lengthy process for some experiments, so it is then acceptable for the two individuals performing the experiment to share a single data set. Discuss this with the instructor. In general, it is a good idea to collect

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development of a mathematical derivation. At that rate, after the presentation of six or seven items you are behind schedule and searching for a conclusion.

Practice your presentation carefully and thoroughly as many times as it takes to feel comfortable with the material. Writing it out in outline form can be a great help, but I do not recommend writing it out in explicit detail and trying to read it. The reading of papers as a method of presentation is seldom seen today. A worthy objective of the first presentation is to put all the elements of a scientific talk together for the first time and to demonstrate to yourself just how long it takes to cover the material in a well-prepared talk. The second presentation at the end of the semester then builds on this experience. Speaking from my experience, it can take years to reach the point that you are not overly concerned about what you are about to do, while becoming too unconcerned can lead to a public demonstration that you are not working hard at it. I do not recommend the experience, though it is a great teacher. Outstanding presentations are not given casually—they only look like it.

The specific items upon which your oral presentation will be graded are as follows:

1. Statement of your objectives, clarity;
2. Presentation of an introduction that may include historical information and the importance of the particular experiment;
3. Presentation of the experimental method – mathematical development;
4. Presentation of the experimental method – instrumentation and other important materials;
5. Presentation of the observations, including the error analysis;
6. Description of difficulties in carrying out the experiment;
7. Clear statement of your results;
8. Responses to questions posed by the audience;
9. Use of visual aids; transparencies, chalk board, etc.;
10. Personal presentation, including speech (clarity and efficiency;) body language (facing audience vs. chalk board), eye contact (direct vs. looking anywhere else), animation vs. rigidity, interest in the problem (positive presentation vs. indifference, or worst, an apparent dislike of the whole affair).

Rules for Using the Lab's Computers:

1. The only people authorized to use the laboratory computers are faculty and staff of the physics department and students registered for PHYS 381.
2. No software is to be transported into or out of the computers.
3. Other student data files are also kept on the hard drive. It is recommended that you maintain personal backup copies, as the files are not password protected. Also, disks have been known to fail.
4. The software on the computers is highly specialized and except for EXCEL and KALIDAGRAPH, is probably useless outside the laboratory. You may wish to use the computers in the department's computer laboratory for routine data analysis.

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mandates related to COVID-19 by regularly checking this website:

Further, students are expected to adhere to the university's policies, practices, and mandates and are subject to disciplinary actions if they do not comply.

: UAF embraces and grows a culture of respect, diversity, inclusion, and caring. Students at this university are protected against sexual harassment and discrimination

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Initial Questionnaire

NAME: _____ Student # _____

Age (NRC requirement for use of radioactive sources) _____

Academic Major(s) _____

Physics courses completed:

Physics courses this semester:

Laboratory experience:

Experience with radioactive materials? YES NO Any training? YES NO If so, please explain: