

PHYS3880 Spring 2019

ADV PHYSICS LAB (CI)

Course Description

Modern experimental physics techniques, with emphasis on student designed and implemented experimental projects. Prerequisite: PHYS 3870.

Fees

A \$40 fee per semester is charged for this class to help cover the expenses for expendable supplies and accessories. Please be aware that the equipment used in this lab was acquired over many years, at a cost well in excess of \$250,000; please treat it with appropriate care and respect.

Course Objectives

By the end of this course, you will be able to:

1. Design a physics experiment with a testable hypothesis.
2. Write a research proposal.
3. Carry out an experiment using proper project management principles.
4. Communicate the results professionally in both oral and written form.

Instructor

Don Rice SER 218B Don.Rice@aggiemail.usu.edu

Jonny Price SER 223 jonathanprice1@aggiemail.usu.edu

Office Hours: during lab time, MW 11:30-2:30, or by appointment (Friday 11:30-2:30 is a good time too)

Course Resources

1. J. R. Taylor, *An Introduction to Error Analysis*, 2nd ed. (Univ. Science Books, Mill Valley, CA, 1997). **REQUIRED**
2. R. Jensen, *Communicating Science*, 2nd ed. ([Rogue Publishing, 2016](#)).
REQUIRED
3. C. A. Mack, *How to Write a Good Scientific Paper* ([SPIE Digital Library, 2018](#)).
REQUIRED

Course materials, assignments, and notifications will be distributed via the Canvas system.

A bound Lab Notebook is required. All manually-recorded data, notes, calculations and scratch work must be kept in the notebook. You may also use a computer notebook program such as Onenote or Evernote to collect and organize computer data.

Course Requirements

Class will meet in SER 132 at 11:30 Monday and Wednesday for approximately an hour. Instructors will be available in SER 109, 132, and 138 or their offices until 2:30 on Monday and Wednesday to assist with assignments.

Students are expected to have taken and to be familiar with the content of **General Physics** (PHYS 2210 and 2220), **Introduction to Modern Physics** (PHYS 2710), **Introduction to Computer Methods in Physics** (PHYS 2500), and **Intermediate Lab** (Phys 3870).

Students will be expected to complete various short assignments on their own, as well as working in a team on research projects. A project proposal, project report, and oral project presentation will be required.

Course Schedule/Outline

Assignments will be made and submitted via the online Canvas system. The class assignments will have three sections.

1. Examine the experimental design of a laboratory experiment. Learn basic project management techniques.
2. Develop a proposal for an extended investigation. Research the literature and put together a convincing case that your proposed topic is practical and worthwhile.
3. Carry out an extended investigation of a physics topic, with a written and oral report.

All projects and experiments will be carried out in teams of 2-3 students. Partners may be changed during the semester.

Evaluation Methods and Criteria

The main class topics are graded as follows:

1. Experimental design and management: 30%
2. Proposal research and development: 20%
3. Extended investigation: 50%

Attendance and participation in the class meeting time will be a part of the grade for each activity. Late assignments will be penalized at a rate of **2% per day** up to a maximum determined by the instructor for each assignment.

Grade Scheme

The following grading standards will be used in this class:

Grade	Range
A	100 % to 93.0%
A-	< 93.0 % to 90.0%
B+	< 90.0 % to 87.0%
B	< 87.0 % to 83.0%

B-	< 83.0 % to 80.0%
C+	< 80.0 % to 77.0%
C	< 77.0 % to 73.0%
C-	< 73.0 % to 70.0%
D+	< 70.0 % to 67.0%
D	< 67.0 % to 60.0%
F	< 59.0 % to 0.0%

Attendance and Excused Absences Policy

Students are expected to attend the 11:30-12:30 segment of each class. This segment will be used for short lectures, problem-solving, and status reports. Attendance and participation is part of the course grade, so avoid scheduling other activities during this time.

Students should inform the instructor of illness or other unavoidable circumstances as soon as practical to be marked as an excused absence.

Assumption of Risk

All classes, programs, and extracurricular activities within the University involve some risk, and certain ones involve travel. The University provides opportunities to participate in these programs on a voluntary basis. Therefore, students should not participate in them if they do not care to assume the risks. Students can ask the respective program leaders/sponsors about the possible risks a program may generate, and if students are not willing to assume the risks, they should not select that program. By voluntarily participating in classes, programs, and extracurricular activities, a student does so at his or her own risk. General information about University Risk Management policies, insurance coverage, vehicle use policies, and risk management forms can be found at: <http://www.usu.edu/riskmgmt/>

Library Services

All USU students attending classes in Logan, at our Regional Campuses, or online can access all databases, e-journals, and e-books regardless of location. Additionally, the library will mail printed books to students, at no charge to them. Students can also borrow books from any Utah academic library. Take advantage of all library services and learn more at libguides.usu.edu/rc.

Classroom Civility.

Utah State University supports the principle of freedom of expression for both faculty and students. The University respects the rights of faculty to teach and students to learn. Maintenance of these rights requires classroom conditions that do not impede the learning process. Disruptive classroom behavior will not be tolerated. An individual engaging in such behavior may be subject to disciplinary action. Read [Student Code Article V Section V-3](#) for more information.

Academic Integrity – "The Honor System"

Each student has the right and duty to pursue his or her academic experience free of dishonesty. To enhance the learning environment at Utah State University and to develop student academic integrity, each student agrees to the following Honor Pledge:

"I pledge, on my honor, to conduct myself with the foremost level of academic integrity."

A student who lives by the Honor Pledge is a student who does more than not cheat, falsify, or plagiarize. A student who lives by the Honor Pledge:

- Espouses academic integrity as an underlying and essential principle of the Utah State University community;
- Understands that each act of academic dishonesty devalues every degree that is awarded by this institution; and
- Is a welcomed and valued member of Utah State University.

Academic Dishonesty

The instructor of this course will take appropriate actions in response to Academic Dishonesty, as defined the University's Student Code. Acts of academic dishonesty include but are not limited to:

- **Cheating:** using, attempting to use, or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity. Unauthorized assistance includes:
 - Working in a group when the instructor has designated that the quiz, test, examination, or any other academic exercise or activity be done "individually;"
 - Depending on the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments;
 - Substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work;
 - Acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission;
 - Continuing to write after time has been called on a quiz, test, examination, or any other academic exercise or activity;
 - Submitting substantially the same work for credit in more than one class, except with prior approval of the instructor; or engaging in any form of research fraud.
- **Falsification:** altering or fabricating any information or citation in an academic exercise or activity.
- **Plagiarism:** representing, by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes using materials prepared by another person or by an agency engaged in the sale of term papers or other academic materials.

For additional information go to: [ARTICLE VI. University Regulations Regarding Academic Integrity](#)

Withdrawal Policy and "I" Grade Policy

Students are required to complete all courses for which they are registered by the end of the semester. In some cases, a student may be unable to complete all of the coursework because of extenuating circumstances, but not due to poor performance or to retain financial aid. The term 'extenuating' circumstances includes: (1) incapacitating illness which prevents a student from attending classes for a minimum period of two weeks, (2) a death in the immediate family, (3) financial responsibilities requiring a student to alter a work schedule to secure employment, (4) change in work schedule as required by an employer, or (5) other emergencies deemed appropriate by the instructor. See [Adding and Dropping Classes](#) for more information.

Sexual Harassment

Sexual harassment is defined by the Affirmative Action/Equal Employment Opportunity Commission as any "unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature." If you feel you are a victim of sexual harassment, you may talk to or file a complaint with the Affirmative Action/Equal Employment Opportunity Office located in Old Main, Room 161, or call the AA/EEO Office at (435) 797-1266.