

Intermediate Laboratory

PHYS 3870

Fall 2020 Syllabus

Course Description

Modern experimental techniques, data and error analysis, experimental design, research, and communication skills are emphasized. Exercises complement upper-level theory courses. For Fall 2020, experiments have been individualized to reduce health risks from interpersonal contact.

Fees

A \$40 fee is charged to offset the cost of lab kits and expendable supplies.

Course Objectives

Particular emphasis is placed on: (1) experimental and analytical skills including experimental techniques, data acquisition, data analysis, and error analysis; (2) developing collaborative learning skills through online interactions; and (3) improving written and oral communication skills for technical applications.

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

1. Collect experimental data in a careful, professional manner.
2. Perform basic error analysis based on observational uncertainties.
3. Determine whether experimental and theoretical values are consistent, and explain causes of discrepancies.
4. Describe your work in a well-formatted technical document.

Instructors

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A weekly meeting of about 10 minutes will be scheduled with small groups of students to discuss questions.

Students may contact the instructors by e-mail or Canvas Inbox at any time. Zoom meetings may be scheduled if needed. In-person contact is discouraged this semester for health reasons.

Course Resources

The following texts are required:

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 Canvas.

Students are expected to have access to a suitable computer for Zoom conferences, Microsoft Office (recommended; free for students) or equivalent, and Python scientific software (Anaconda recommended).

Course Requirements

Each student will:

1. Attend lecture in person or online from 11:30 to 12:30 on Monday and Wednesday. Complete the quiz or survey for the lecture.

2. Spend the remaining 12:30 to 2:20 pm class time working on assignments in their own home location. Students are expected to dedicate at least four hours per week to class work.
3. Meet with the instructor in a small group for about 10 minutes each week to go over assignments and experiments.
4. Complete assignments and experiments on their own. We will **not** have lab partners for the Fall 2020 semester.

Evaluation Methods and Criteria

Grades will be based primarily on assignments (80%). Attendance, in person or online, will be assessed by quizzes and surveys (20%). There is no final examination.

Late assignments will be penalized at a rate of 2% per day. Assignments will not be accepted after one week unless extraordinary circumstances are involved.

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%

Course Schedule/Outline

Lectures will be given face-to-face in SER 244 from 11:30-12:30 on Monday and Wednesday at the start of the semester. After the main course material has been covered, lectures will be reduced to weekly meetings to introduce experiments. Lectures and meetings will become online-only before Thanksgiving.

A weekly assignment will be made, including questions about course materials, research questions, and experiments to carry out and analyze.

A final assignment will encourage students to reflect on the work done during the semester. It will be due on the last day of class.

There is no final examination.

COVID-19 Classroom Protocols

In order to continue to provide various forms of face-to-face instruction at USU, and to limit the spread of COVID-19 during the pandemic, students are asked to follow certain classroom protocols during the fall 2020 semester. These protocols are based on CDC, state, and local health department guidelines and requirements are in place not only for your safety but also the safety of the entire campus community.

- Face coverings are required in all classrooms and teaching laboratories. Students ***will not be permitted to remain in class without a face covering***, as per University Policy 20T.3. Students that do not adhere to the face

covering policy will be referred to the Office of Vice President for Student Affairs for a possible violation of the Student Code of Conduct.

- There may be individual medical circumstances that prevent some students from using face coverings. If you require this exemption, contact the Disability Resource Center prior to the start of classes to investigate alternative instruction. These circumstances will be rare, but if they do exist, we ask that everyone be respectful.
- Follow faculty instructions regarding social distancing and entering/exiting classrooms.
- Stay home when you are sick, however mild your symptoms.
- Wash your hands frequently with soap and water.

Attendance and Excused Absences Policy

Students are expected to attend the Monday and Wednesday lectures, and to complete a quiz or survey related to the lecture. Students who cannot attend due to health concerns should try to participate online. If illness or other unavoidable circumstances prevent online participation, the student should inform the instructor as soon as possible so that other arrangements can be made.

Nonattendance Policy

Students May Be Dropped For Nonattendance

If a student does not attend a class during the first week of the term or by the second class meeting, whichever comes first, the instructor may submit a request to have the student dropped from the course. ***(This does not remove responsibility from the student to drop courses which he or she does not plan to attend.)*** This option is typically used for classes that are full and the instructor is trying to make a seat available for another student, but may be considered for other courses. Requests must be made during the first 20 percent of the course and will be considered on an individual student basis. Students who are dropped from courses will be notified by the Registrar's Office through their preferred e-mail account (see [2018-2019 General Catalog](#)).

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.

University Policies & Procedures

Academic Freedom and Professional Responsibilities

Academic freedom is the right to teach, study, discuss, investigate, discover, create, and publish freely. Academic freedom protects the rights of faculty members in teaching and of students in learning. Freedom in research is fundamental to the advancement of truth. Faculty members are entitled to full freedom in teaching, research, and creative activities, subject to the limitations imposed by professional responsibility. [Faculty Code Policy #403](#) further defines academic freedom and professional responsibilities.

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](#)

Sexual Harassment/Title IX

Utah State University is committed to creating and maintaining an environment free from acts of sexual misconduct and discrimination and to fostering respect and dignity for all members of the USU community. Title IX and [USU Policy 339](#) address sexual harassment in the workplace and academic setting.

The university responds promptly upon learning of any form of possible discrimination or sexual misconduct. Any individual may contact USU's [Office of Equity](#) for available options and resources or clarification. The university has established a complaint procedure to handle all types of discrimination complaints, including sexual harassment ([USU Policy 305](#)), and has designated the Office of Equity Director/Title IX Coordinator as the official responsible for receiving and investigating complaints of sexual harassment.

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.

Students with Disabilities

USU welcomes students with disabilities. If you have, or suspect you may have, a physical, mental health, or learning disability that may require accommodations in this course, please contact the [Disability Resource Center \(DRC\)](#) as early in the semester as possible (University Inn # 101, (435) 797-2444, drc@usu.edu). All disability related accommodations must be approved by the DRC. Once approved, the DRC will coordinate with faculty to provide accommodations.

Diversity Statement

Regardless of intent, careless or ill-informed remarks can be offensive and hurtful to others and detract from the learning climate. If you feel uncomfortable in a classroom due to offensive language or actions by an instructor or student(s) regarding ethnicity, gender, or sexual orientation, contact:

- Division of Student Affairs: <https://studentaffairs.usu.edu>, (435) 797-1712, studentservices@usu.edu, TSC 220
- Student Legal Services:
<https://ususa.usu.edu/student-association/student-advocacy/legal-services>, (435) 797-2912, TSC 326,
- Access and Diversity: <http://accesscenter.usu.edu>, (435) 797-1728, access@usu.edu; TSC 315
- Multicultural Programs: <http://accesscenter.usu.edu/multiculture>, (435) 797-1728, TSC 315
- LGBTQA Programs: <http://accesscenter.usu.edu/lgbtqa>, (435) 797-1728, TSC 3145
- Provost's Office Diversity Resources: <https://www.usu.edu/provost/diversity>, (435) 797-8176

You can learn about your student rights by visiting:

The Code of Policies and Procedures for Students at Utah State University:
<https://studentconduct.usu.edu/studentcode>

Grievance Process

Students who feel they have been unfairly treated may file a grievance through the channels and procedures described in the Student Code: [Article VII](#)

Full details for USU Academic Policies and Procedures can be found at:

- [Student Conduct](#)
- [Student Code](#)
- [Academic Integrity](#)
- [USU Selected Academic Policies and Procedures](#)
- [USU Academic Policies and Procedures](#)
- [Academic Freedom and Professional Responsibility Policy](#)

Emergency Procedures

In the case of a drill or real emergency, classes will be notified to evacuate the building by the sound of the fire/emergency alarm system or by a building representative. In the event of a disaster that may interfere with either notification, evacuate as the situation dictates (i.e., in an earthquake when shaking ceases or immediately when a fire is discovered). Turn off computers and take any personal items with you. Elevators should not be used; instead, use the closest stairs.