

General Student Information for Physics 40B

Physics is fundamentally an experimental science. Theories developed by physicists are considered valid only when they are confirmed by experiment. The eight experiments that you will perform this quarter are designed to help you better understand the concepts taught in the lecture, to give you an experiential approach to topics that have been covered only theoretically in lecture, and also to provide hands-on experience that teaches how experiments are performed and how data are analyzed. This document describes the policies and procedures that will be observed during the quarter. Please read and understand it before beginning your laboratory course.

Instructor and Staff

The instructor is responsible for scheduling, the content of the lab course, setting policy, writing the laboratory skills assessment, and assignment of the letter grades.

Instructor in charge:

Dr. Michael Anderson (he, him his)

e-mail: michaelg.anderson@ucr.edu

office: Physics 3013

phone: (951) 827-5370

The laboratory staff is responsible for setting up the labs and maintaining the laboratory equipment.

Technical Staff Contact:

David Neff (he, him, his)

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Laboratory Schedule

There will be eight labs for Physics 40B. **Labs will begin on Tuesday, January 14, 2020, and end on Friday, March 6, 2020.** You will be given an assessment during your normally scheduled lab period in the tenth week of classes: Tuesday, March 10 through Friday, March 13. Refer to the chart below for the specific lab schedule:

Lab #	Topic	Tuesdays	Wednesdays	Thursdays	Fridays
1	Buoyancy	1/14/20	1/15/20	1/16/20	1/17/20
2	Simple Harmonic Oscillation	1/21/20	1/22/20	1/23/20	1/24/20
3	The Pendulum	1/28/20	1/29/20	1/30/20	1/31/20
4	Introduction to Waves	2/4/20	2/5/20	2/6/20	2/7/20
5	Resonance	2/11/20	2/12/20	2/13/20	2/14/20
6	Ideal Gas Law	2/18/20	2/19/20	2/20/20	2/21/20
7	Specific Heat of Solids	2/25/20	2/26/20	2/27/20	2/28/20
8	Heat Engines	3/3/20	3/4/20	3/5/20	3/6/20
	Lab Skills Assessments	3/10/20	3/11/20	3/12/20	3/13/20

iLearn

The lab manuals, your scores, and other information will be available on iLearn at ilearn.ucr.edu. If you have issues accessing your section's iLearn page, send an email to michaelg.anderson@ucr.edu.

Laboratory Attendance and Absence Protocol

You are required to attend the lab section in which you are enrolled. You will not be allowed to complete any labs by attending a different lab section than the one in which you are enrolled.

Laboratory attendance is mandatory, and you must arrive on time. All pre-lab assignments are due at the start of the lab period. Important information about each experiment is presented at the beginning of the session. Quizzes are then given during the first ten minutes and will not be repeated.

Makeup labs are not possible, but missed labs may be excused for illness or other exceptional circumstances. If you are unable to attend your regularly scheduled lab, you will need to file an "excused absence request form" (the form may be found on your iLearn page). The completed form and associated materials should be submitted well in advance of any lab that you plan to miss. If the absence is unplanned, such as in the case of an emergency medical issue, you must turn in the form and materials within 48 hours of the end of the scheduled class. With the completed form, you must submit the following via email to the instructor in charge:

- The **original** copy of any relevant documentation, such as a doctor's note.
- The pre-lab assignment that was due for the lab period that you missed.

Upon receipt of the above, the instructor in charge will make a determination as to the status of your request and will notify you via e-mail. If your request is accepted, then the scores for lab reports, quizzes, or other in-class, graded items will be set to the average from your other labs. A student with an excused absence should consult their TA and other classmates for the technical information from the excused lab and copy it into their notebook, as this material will be needed in the lab final exam.

Please note: Filing a request for an excused absence does *not* guarantee that it will be accepted. Excuses for medical appointments, funerals, accidents, and educational conferences are usually approved. It is extremely unlikely, however, that more than one excused absence would be granted in a given quarter, as any absence means that you miss critical information. In cases where a student misses more than two labs, the student will likely be advised to withdraw from the course or will receive an incomplete should that student's completed work be of passing quality.

Laboratory Conduct

Be Prepared: It is very important that you read the lab manual ahead of time and understand the physics involved in each experiment. The manuals will be available on iLearn at least one week prior to the class. You are responsible for bringing lab manuals, notebooks, pens, calculators, and other general supplies.

Pre-Lab Assignments: Each lab has a pre-lab assignment that must be completed before class and handed in to the TA when you arrive. Complete the pre-lab assignment in your lab notebook and turn in the copy.

Quizzes: Quizzes are intended to be a measure of the information you retain from the previous laboratory and how well prepared you are for the upcoming laboratory. Quizzes are given at the beginning of the class period, and you will not be allowed to take them after the first ten minutes lab or to make them up.

Start and Finish on Time: The labs are written so that you have enough time to complete the experiments and write a lab report during the meeting period. **If you are more than 30 minutes late you will not be allowed to perform the lab and will be marked absent.**

Clean-Up of Your Workstation: At the end of each lab, return any checked-out equipment and clean up your area. Report any malfunctioning equipment immediately to your TA.

Safety: Many aspects of laboratory work have some degree of hazard and potential for injury. Our labs are all designed to be safe, but you must obey all instructions regarding lab safety. Use common sense when handling equipment, and be careful around AC outlets, sharp corners, slippery floors, and other obvious hazards. You will be given specific instructions concerning safety for unusual experiments. Any personal protective equipment needed (*e.g.* lab coats, goggles, *etc.*) will be supplied for you.

Laboratory Notebooks

You are responsible for maintaining a comprehensive laboratory notebook for this course. The objective is to have a record of the experiment to which you or others can refer at a later date. A lab notebook is a working document that should contain a detailed and complete record of all the work performed and accurately reflect what actually occurred in the lab experiments. The writing quality of the presentation in the notebook is less important than making sure that the information in the notebook is complete, descriptive, and precise. Explanations such as “the results are recorded in my lab partner’s book” are not acceptable justifications for incomplete work.

The “Student Lab Notebook for the Physical Sciences” by Hayden-McNeil (ISBN 978-1-930882-70-6) is the required style of notebook and can be found in the textbook section of the UCR bookstore. It has a carbonless copy for each page so that every entry is automatically recorded on a second sheet. A used notebook of this style is acceptable if there are at least 40 blank pages. In this case, all pages used for work other than Physics labs must be removed.

You must print your first name, last name, and SID on page one of the notebook and on all of the submitted pages. **While you are encouraged to record as much information as possible about the experiment, please try to keep the number of pages for each lab report to eight or fewer.**

In general, lab manuals provide prompts for all the information that is absolutely necessary for your lab reports. Use the following criteria to prepare lab reports that will be most useful for your future reference:

- **Purpose:** This is a general introduction at the beginning of the report that states the lab objectives. It is useful for organizing your thoughts when you refer to your notebook later.
- **Description of Apparatus and Procedure:** Write down what measurements you will take and how you will take them, in case you are asked to replicate the experimental procedure at a later date. Labeled diagrams are always an effective way of documenting an experimental set-up.
- **Data Collection:** **All graphs, tables, or diagrams generated by the computer must be attached to the lab notebook pages and to the copies that you turn in.**
- **Overall Look:** Your lab notebook must be well-organized. It is a “working” notebook, so crossed-out words and sections are acceptable (nobody’s perfect...). Your work needs to be understandable by a third party, however, so your handwriting must be legible, the organization clear, and the overall look professional.

At the end of each session, remove the carbon copies of the notebook pages for that day’s work, attach any printed data (*eg.* graphs and tables) to the copies *and* the originals in your notebook with glue, tape, or staples, and turn in the stapled copy to the TA. Your report will be reviewed by your TA and handed back at the start of the following week’s lab with a numerical score and written feedback.

The written comments will address issues such as: Are the descriptions of the experiment and the data set complete? Are the data accurate and precise? Are the calculations and error analysis complete and correct? Are your descriptions, explanations, and analysis thoughtful and informed by your experiment?

You are strongly encouraged to review the TA's comments and correct any deficiencies on your original notebook pages. Correcting your notebook will help you with the lab skills assessment.

The numerical grade will be between '0' and '3'. A '3' will be given if the notebook is complete and accurate with enough information to write a comprehensive paper on the experiment, a '2' will be given if there are some significant errors, a '1' will be given if information is missing or incorrect, and '0' will be given if minimal effort was put in. You will not be evaluated on the presentation, having complete sentences, nor your syntax, provided that the grader can easily parse the information you recorded. Labeled diagrams are often an effective way of documenting any experiment or description. In many instances where you are asked to think about and describe hypothetical situations, you will be typically scored more on your thoughtfulness and your scientific analysis rather than on your explicit correctness.

Lab Skills Assessment

You will be given a lab skills assessment during your normally scheduled lab period in the tenth week of classes (March 10 – March 13). The purpose of this assessment is twofold: 1) It is intended to judge the extent of your learning throughout the lab course, and 2) the assessment is needed to compare grades across different lab sections that have been graded according to standards established by different TAs. Details about the assessment will be posted on your iLearn page no later than February 19.

The assessment is a sixty-minute multiple-choice test with questions on the experiments that you performed during the quarter. You may be asked questions about each lab along five descriptive categories: conceptual, calculation, experiment perturbation, graphical analysis, and uncertainty analysis.

The only aids you are allowed to bring to the assessment are your lab notebook(s) and a calculator. The more complete and comprehensive your notebook is, the more useful it will be during the assessment. The notebook(s) must contain only pages written in your own handwriting, except for the graphs and tables of data that you printed out during the experiments and attached to the notebook pages. You will not be allowed to bring the lab manuals, any books, any photocopied material, another person's notebook, or even the notebook pages you turned in with the TA's comments.

Grading Policy

Your score for the lab component of this class will be based on your lab reports, pre-lab assignments, quizzes, and the skills assessment. It is your responsibility to verify that all scores have been correctly entered into iLearn. If error(s) are found, contact your TA and/or the course instructor immediately.

The total score for the lab component will be calculated with the following weights and note that your lowest lab score (pre-lab + quiz + report) will be dropped from your final grade at the end of the term.

Lab Reports (0-3 points for each lab):	30%
In-Class Quizzes (0-2 points for each lab):	20%
Pre-Lab Assignments (0-1 points for each lab):	10%
Lab Skills Assessment:	40%

The raw scores, determined from a normalization of the total score for the lab reports, quizzes, and pre-labs within your section in combination with your lab skills assessment score, will be modestly curved and forwarded to the faculty in charge of the lecture component of this course. Contact the instructor with any questions concerning your letter grade.