

Course Description: Physics 197 is the third semester of a three a three semester calculus-based course designed for prospective scientists and engineers. Topics include the fundamental principles of physics of waves, the behavior of light, and an introduction to relativity, quantum physics and the atomic and nuclear properties of matter.

Course Prerequisites: Physics 195 with a grade of 'C' or better, or equivalent. Physics 196 and 197 may be taken concurrently only if Physics 195 was completed with a grade of "B" or better or with approval of the department.

Course Advisories: English 51 and 56, each with a grade of 'C' or better, or Assessment Skill Level W5 and R5.

Required Equipment:

Physics for Scientists and Engineers, 6th Edition (with Modern Physics), Freeman/Worth Publishers

Scientific Calculator

Laboratory Packets – Downloaded from course website.

Course Instructor: Claude Mona

Course Website: homework.sdmesa.edu/cmona/

Contact Email: cmona@sdccd.edu

Office Location: F215-D

Office Hours: See 'Contact Information' on website

Desired Course Outcomes: Upon successful completion of this course, students should have proficiency in the understanding and application of concepts in the area of wave based physics. This includes, but is not limited to wave motion and resonant processes including electromagnetic waves, the properties of light and interactions with matter including polarization, reflection and refraction, diffraction and interference. Additional areas of study include nuclear and atomic physics, including relativity. Investigation of energy propagation will include thermodynamic, acoustic, electromagnetic and mechanical arenas

Grading Scale

- ❖ A: 87 – 100% of possible points
- ❖ B: 73 – 86% of possible points
- ❖ C: 61 – 72% of possible points
- ❖ D: 50 – 60% of possible points
- ❖ F: <50% of possible points

Possible Points

- ❖ 45% Scheduled Quizzes¹
- ❖ 5% Unscheduled Quizzes²
- ❖ 20% Problem Sets³
- ❖ 15% Laboratory Reports⁴
- ❖ 10% Cumulative Final Examination⁵
- ❖ 5% Participation⁶

¹Scheduled Quizzes

There will be a total of 4 scheduled quizzes during the semester. They will consist of 3-4 conceptual problems and 3-4 calculation problems. There will be no make-up quizzes. You may bring a single handwritten note card with you to each quiz no larger than 3" x 5". I will confiscate unauthorized note cards, or cut them down to size as I see fit.

²Unscheduled Quizzes

Unscheduled quizzes will be held at the beginning of a class period. They will consist of questions about a single concept. You will have five (5) minutes to answer. There will be no make-up quizzes, and if you arrive more than five (5) minutes late to class, you will receive a score of zero for that unscheduled quiz.

³Problem Sets

In order to be graded, each problem set must be presented in the proper format. Problems or problem sets that do not follow the proper format will not be graded. A sample problem set solution in the correct format is available for viewing on the course website.

Problem Set Format

- ❖ Your name or initials, the problem set and the problem number are clearly visible in the upper right hand corner of *each* page.
- ❖ Each new problem number begins on a new sheet of paper, though multiple parts of the same problem (a, b, c, etc) can be on the same sheet.
- ❖ Your work is only on the front side of the paper.
- ❖ Your work is neat, clear, logical and legible. You must explain all assumptions.
- ❖ Your final answer to the problem is placed in a box.
- ❖ Your answer has standard SI units as appropriate.
- ❖ Your answer is presented using scientific notation when appropriate (any time there are leading zeros or a large number of digits involved).
- ❖ Your problem solutions are assembled in order.
- ❖ Your solutions are stapled together in the upper left corner.

Problem sets are available for download from the course website. They are due as indicated on each problem set. Problem sets are due within five (5) minutes of the start of the regularly scheduled class time, as displayed on the classroom clock. Problem sets that are late will not be accepted. You may always turn in assignments early, by leaving them in the 'instructor basket' in K202.

⁴Laboratory Experiment Reports

There are weekly laboratory experiments that you will perform with a group of other students. I will randomly assign you to a group, and will periodically change group compositions. The laboratory packet for each experiment is available for download on the course website. You may not attend any laboratory session other than the one for which you are registered. I will not accept a report for which you were not present. There are no make-up laboratory sessions.

The laboratory report is due the week following the data collection. Reports are due within five (5) minutes of the start of the regularly scheduled laboratory session, as displayed on the classroom clock. Laboratory reports that are late will not be accepted.

Report scores are based on the following criteria:

40%: Completeness:

- ❖ All sections completed
- ❖ All calculations displayed
- ❖ Graphs labeled in correct units
- ❖ Summary section completed

20%: Analysis of results and discussion of errors.

20%: Legibility, penmanship and spelling.

20%: Accuracy of results:

- ❖ <5% error is good
- ❖ 6-10% error is acceptable
- ❖ 11-15% error is tolerable
- ❖ 16-20% error is substandard
- ❖ >20% error is unacceptable

You must wear closed toe shoes to each laboratory session, or you will be asked to leave immediately. Please observe the same standards of behavior as you do in the classroom. Disruptive or dangerous behavior will result in your removal from the laboratory session, and perhaps the course.

I will begin each laboratory session with a brief description of the equipment, as well as any concerns or tips regarding the use of the equipment. If you arrive more than ten (10) minutes late to a laboratory session, you will not be permitted to participate and will earn a score of zero for the assignment.

⁵Cumulative Final Exam

The cumulative final exam will be heavily conceptual in scope, in the same format as the unscheduled quizzes and the conceptual section of the scheduled quizzes, with the addition of some simple calculations. It will be held during your final laboratory session of the semester.

⁶Class Participation

Class participation is based on the non-academic aspects of your involvement in the course. If you appear awake and alert in class, if you ask questions and listen to the answer, if you are taking notes and actively involved in your education, if you utilize office hours and email to get your questions answered then I assume you deserve full participation credit.

If you are frequently late to class, asleep, not paying attention, fooling with your cell phone or displaying other non-productive behavior, I will adjust your score accordingly.

Of course if I catch you cheating you can expect a zero for participation, only because I cannot give negative scores.

Classroom Conduct: I expect you to arrive on time to class, stay for the entire period and actively participate in your education. Should you arrive late, or need to leave early, do so in the least disruptive manner possible. I will signal the beginning of the class or laboratory session by saying 'Good Morning or Afternoon or Evening' as applicable. From that point onward, standard classroom behavior is expected. This means no extraneous conversation, and absolutely no cell phone noise. If your cell phone rings in class, I will mark you as absent for that day. Repeated disruptive behavior may result in your removal from the course.

Attendance Policy: I will take attendance at the beginning of each session and may drop you from the course at my discretion—even after the add/drop date— if you have accumulated unexcused absences in excess of 12% of the total course meetings. Absences for medical reasons will only be excused once proper documentation is presented. If you do miss class, please make arrangements with a classmate to keep you informed on lecture topics. If you are more than ten (10) minutes late you will be marked as tardy. Every three times you are tardy, I will treat it as an absence. It is the student's responsibility to drop classes they are no longer attending. If you remain enrolled in the course, you will receive an evaluative grade.

Late Work Policy: No late work will be accepted for any reason except a verifiable medical excuse or extreme family hardship. You may always turn in work before it is due by submitting the assignment to the 'instructor basket' in K-202. I will not accept laboratory reports or problem sets submitted by email unless prior arrangements have been made well in advance. You are always better off handing in an incomplete assignment for partial credit rather than earning a zero.

Academic Dishonesty: Experience has shown that there are students willing to cheat when possible, despite the absurdity of the situation. Academic dishonesty will be dealt with in the harshest manner possible. At minimum, you can expect to earn a score of zero for the assignment that cannot be removed from your point totals by any means. Cheating includes, but is not limited to the following actions:

- ❖ Bringing unauthorized notes into any exam
- ❖ Looking in the direction of another student's paper during an exam.
- ❖ Changing anything on a graded work in an attempt to gain additional points.
- ❖ **Plagiarism of ANY sort.**

Plagiarism is quite simple: If you did not take the data, or perform the calculation, or write the report, and you attempt to pass off someone else's work as your own expecting to obtain credit - you have plagiarized. Your intent is not relevant.

The first time I encounter identical mathematical, grammatical or graphical errors in the work of multiple students I will take the lowest score amongst the identifiable group members and divide those points amongst all the offenders. This score cannot be removed from your point total by any means.

If I encounter this phenomenon a second time, I will treat it as a plagiarism case and will seek the appropriate sanctions for *everyone* involved. That means a score of zero for the assignment that cannot be removed from your point totals by any means.

Therefore, it is not in your best interests to share your results with people who are not willing to do their own work. This does *not* mean that you cannot work with other students*, nor does it mean you cannot seek help from the tutorial center, the student solutions manual, websites, or any other resource available to you.

However much help you receive, I still expect *you* to **perform your own calculations, create your own graphs and write your own reports.** The goal is for *you* to learn the material. Transcribing someone else's work does not increase your understanding!

**Please note that 'working with others' does not mean that one person solves the problem and everyone else copies the solution.*

Physics Phreebies

I understand that unexpected events can interfere with the completion of tasks, and that you may be late to class or lab through no real fault of your own. I will drop your lowest laboratory report, problem set, unscheduled quiz, and scheduled quiz scores when computing your final grade.

Suggestions For Success

Success in physics will come about through two main avenues – being brilliant or being consistent. There is no substitute for doing the work in this course. You should never confuse familiarity with understanding. It is great to recognize the central issue, but if you cannot solve problems then the recognition alone is meaningless. I will be asking you to push yourself and do things that you might not think you are capable of doing.

My reasons are simple. Most of you are preparing to transfer to some sort of engineering degree and I want no part in passing someone who is not suited to the discipline. While an incompetent doctor can kill one patient at a time, an incompetent engineer has the potential to kill thousands.

Should you not wish to invest the amount of time required in order for you to fully understand the material, I offer you the following alternative.

Whenever called upon to demonstrate physics knowledge, you should repeat the following:

“Protect me from knowing what I don't need to know. Protect me from even knowing that there are things to know that I don't know. Protect me from knowing that I decided not to know about the things I decided not to know about. Amen.”

–Douglas Adams: Mostly Harmless.

Of course, you also need to include this other prayer:

“Lord, Lord, Lord. Protect me from the consequences of the above prayer.”

–Douglas Adams: Mostly Harmless.

A test of your powers of observation

☺→This is your first unscheduled quiz←☺

Answer the following questions with the words ‘True’ or ‘False’ and turn in the answers on a 3”x 5” card (or equivalent piece of paper) within five (5) minutes of the start of the next classroom meeting.

- 1) T/F • If you are more than 10 minutes late you will be marked as tardy.
- 2) T/F • You must wear closed toe shoes in the lab.
- 3) T/F • You can resubmit problem sets if they are not formatted correctly.
- 4) T/F • You can use a 8.5 x 11” sheet of paper with notes on an exam.
- 5) T/F • Plagiarism is OK, as long as you really tried to learn the material.

The purpose of the study of physics is to test our understanding of the universe. We see if we can solve problems involving the concepts of physics. If we make a prediction and experiment verifies it, then we have understood some aspect of our reality. As a result, much of the emphasis in the study of physics involves problem-solving techniques.

You will not perform well in any physics course if you are not able to solve problems. Solving problems is largely a matter of practice and the more problems you attempt, the better you will understand the applications of the conceptual material.

There are things that you can do to make the process of problem solving as simple and efficient as possible. These approaches also make it more likely that you will be able to find a solution when you encounter a new type of problem, *such as on an exam*. What follows does require commitment and time, but this investment into your education will yield rich rewards.

The general strategy in any problem-solving course has two components: Reading to Solve Problems and the Act of Solving Problems. These two components complement each other, but must be executed in a particular sequence.

