

Course Description: The Physics 195, 196, 197 sequence is designed to give a foundation in calculus-based physics for engineering and science majors. Physics 195 deals primarily with the description of motion, Newton's Laws, energy, momentum, rotation, gravity, oscillatory motion, and thermodynamics.

Course Prerequisites: Mathematics 150 with a grade of 'C' or better, or equivalent.

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, Volume One, 6th Edition, Freeman/Worth Publishers

Scientific Calculator

Laboratory Packets – Downloaded from course website.

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Office Hours: See 'Contact Information' on website

Desired Course Outcomes: Successful students will gain proficiency in the understanding and application of concepts in the area of mechanics. This includes, but is not limited to projectile motion and energy transfer processes, including elastic and inelastic collisions, rotational and linear motion, gravitational effects and harmonic motion. Students will be able to differentiate between vector and scalar quantities and know how to mathematically manipulate each type. The concept of superposition of forces on or about the center of mass of an object or system will be applied to the solution of linear and rotational systems. Students will be expected to understand and apply the concepts of conservation of energy and momentum to analyze situations and predict the future state of a system.

Grading Scale

- ❖ A: 88 – 100% of possible points
- ❖ B: 75 – 87% of possible points
- ❖ C: 62 – 74% of possible points
- ❖ D: 50 – 61% 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 conceptual problems and calculation problems. There will be no make-up quizzes. You may bring a single 3" x 5" note card with you to each quiz.

²Unscheduled Quizzes

Unscheduled quizzes will be held at the beginning of a class period. They will consist of a single conceptual topic and one to two questions on such a topic. You will have five (5) minutes to answer if you are on time. 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. *Re-purposed paper with one side blank is available from the tutoring center if you wish to conserve resources.*
- ❖ Your work is neat, clear, logical and legible.
- ❖ Your final answer to the problem is placed in a box.
- ❖ Your answer has standard SI (mks) units.
- ❖ 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 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 excellent
- ❖ 6-10% error is acceptable
- ❖ 11-15% error is tolerable
- ❖ 16-20% error is substandard
- ❖ >20% error is unacceptably large

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.

⁵Cumulative Final Exam

The cumulative final exam will be composed of multiple choice conceptual questions. The conceptual questions require you to select the correct answer from a list of responses. Simple calculations may be required to answer some questions. There will also be a series of 'true or false' questions.

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.

Classroom Policy: 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 / Afternoon / 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. If *my* cell phone rings, I will remove one of your 'absences'. 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 if you have accumulated unexcused absences in excess of 12% of the total course meetings even after the withdrawal deadline of 10/30/09. If you do miss class, please make arrangements with a classmate to keep you informed on lecture topics. Absences for medical reasons will only be excused once proper documentation is presented. Students who remain enrolled beyond the published withdrawal deadline of 10/30/09 will receive an evaluative letter grade in this class.

Late Work Policy: No late work will be accepted for any reason except a verifiable medical excuse or verifiable family hardship. *You may always turn in work before it is due* by submitting the assignment to my mailbox in K-202. I will not accept laboratory reports or problem sets submitted by email unless prior arrangements have been made at least 48 hours in advance. You are always better off handing in an incomplete assignment for partial credit rather than earning a zero.

Academic Dishonesty Policy: Experience has shown that there are students willing to cheat. 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 by any means.

There is no excuse for cheating in this, or any other course. 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 generate the graph, and you attempt to pass off someone else's work as your own - 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 the points amongst all the participants. This reduced score cannot be removed from your point totals by any means.

This means it is not in your interest to share your results with people who are not willing to do their own work. 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.

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 or any other resource available to you. However much help you receive, I still expect you to perform your own calculations, draw your own graphs and write your own reports. The goal is for **you** to learn the material after all, isn't it?

Physics Phreebies

I understand that there are occasions in which by no direct fault of your own, you will be unable to complete or turn in a laboratory report or problem set. You may have a 'bad day' while taking an exam and not perform to your full potential. You may be unavoidably delayed en route to class and may miss an unscheduled quiz. I recognize that this may occur and so I will drop your lowest laboratory report, problem set, unscheduled and scheduled quiz scores.

However, I would encourage you to complete all assignments and to attend all quizzes regardless of this policy. Even if you do not perform to the best of your ability, each interaction with the material increases your understanding and provides another opportunity to learn.

Suggestions For Success

Success in physics will come about through two main avenues – Being brilliant and/or being consistent. There is no substitute for doing the work in this course aside from a complete grasp of the workings of the universe. Should you already possess such a grasp, I have many questions to ask you. In this case, you should be teaching the course instead of me.

Familiarity with the course material is imperative, but you should never confuse familiarity with true understanding. You must understand the definitions within the context of the course and how to apply them to the situation. It is great to be familiar with the central issue, but if you cannot solve problems then the recognition alone is meaningless. I may ask you to push yourself and attempt things that you may not believe you are capable of doing.

My reasons are selfish. Many of you are preparing to transfer to some sort of engineering degree and I want no part in bearing the responsibility for 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.

I can't tell you how much time to spend on the material in order for you to understand it. That responsibility ultimately falls to you, but I am here to help you with the process and I encourage you to take full advantage of me as a resource.

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.

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.

