Advice for Physics 111 Students
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Physics is definitely hard. The competition for grades with your peers makes it harder. Nevertheless, my message is this: You can do it, and you must do it.

Everything I say below may seem disappointingly obvious. There is no magic formula. The key is to actually do these things, instead of just agreeing with them in principle. That's what separates the more-successful students from the less-successful students.

First, let's talk about a sports analogy. Suppose you wanted to do the high jump well. That's the one where you run and then jump over the highest bar you can. You probably (correctly) believe that good training would allow you to do this better. Would going to the gym be enough? No. Would watching other people jump be enough? No. Practicing on your own? No. Doing all of your practicing on one day? No. Ok, you get the point. You would need to learn the right techniques, practice the actual jumping, get feedback, and work on your weaknesses.

Learning to do physics is really not any different, except for one thing: you may not yet believe that good training can help you. You might be under the mistaken impression that some people are good at physics, and some aren't, and that nothing will really change this. Just as in jumping, in a physics course different people have more or less experience and inclination. However, just as in jumping, everyone can do it if they train right and train well. You can do it. My job is similar to that of a coach. Your struggle is with the material and the competition from others, and my job is help you learn how to do your best. You must do it. Your job is to decide to do well and then do whatever it takes to carry that out, using my guidance.

Here are the basic principles for doing well.

1. **Solve physics problems.** This is what you are tested on, so practice it. Other kinds of studying are good, but there is nothing like practicing the actual skill. This will increase your speed and accuracy.

2. **Develop your problem-solving skills.** Use the good habits that I have stressed. Break down problems logically and make pictures to engage the pre-human part of your brain that knows what right physics looks like. Be organized. Watch your signs.
3. **Think in terms of principles, not problems.** Focus on the underlying ideas, so that you can solve many problems, and don't try to memorize particular problems. If you know the principles, then you won't be confused when I rearrange familiar problems.

4. **Honestly assess your progress.** Isolate your weaknesses and fix them. The way to do this is to follow the above three points until you have mastered the material. (Lather, rinse, repeat.) This will make you more prepared and less nervous on exams.

Many students do not fully appreciate a few things, and this hampers their progress.

1. **You have more ability to learn this than you think.** I have seen many hundreds of students successfully learn this despite their thinking at first that they couldn't.

2. **Doing physics is a skill, not only an ability.** Your pre-human brain already knows mechanics -- you need to learn to connect that knowledge to words and mathematics.

3. **The right kind of studying and the the right kind of problem solving help a lot.** If you aren't drawing pictures, organizing your information, and focusing on principles, then I guarantee that you will make more mistakes than you should.

4. **The person who writes the exams is the person who writes my lecture notes.** Focus on what I say is important -- you can be sure that it will appear on exams.

5. **Your studying will go faster and faster the more you do.** When you're learning, the problems go slowly. Once you get the principles, you can go much more quickly.

Here are some specific activities that other students have found helpful.

- Skimming the book and upcoming homework before lectures.
- Reading lecture notes that day and repeatedly during the week.
- Consistently studying daily instead of all just before homework is due.
- Redoing homework problems and focusing on principles.
- Solving the Multi-Concept Examples in the book.
- Doing Check-Your-Understanding in book (solutions at end).
- Redoing assigned Concept Questions.
- Doing Self-Assessment-Tests online.
- Redoing quiz/midterm problems and focusing on principles.
- Summarizing key principles from each chapter.

I want to help people to learn the material and do well. **You can email me questions that arise in your studying.** If you are specific and clear, I can answer quickly.