Course Goals

The overriding goal of this course is to help you develop an intuitive understanding of the basic physical concepts and physical laws that govern the mechanical world. Since an intuitive understanding does not necessarily imply applicability, you will also develop skills to apply these somewhat abstract ideas to practical, problem-solving situations. By the end of the semester, you should be able to open the textbook to essentially any homework problem, be able to identify the underlying physical concepts involved, and outline a solution. And, of course, we will try to have some fun along the way.

Introductory Physics: Words (of Wisdom)

Here is a collection of tips and words of advice for succeeding in the course. The purpose of this course is threefold: to teach you (some of) the fundamental laws of our physical world; to teach you a powerful, stimulating, and rewarding way of thinking about problems and going about solving them; and to teach you some skills which you may find useful in your college and post-graduate careers. But whether you're just starting your second semester at Notre Dame, facing a long night of studying for an exam, reeling from your (perceived?) performance the morning after, or contemplating whether to become a physics major or perhaps even dropping the course, here are a few strategies and some things to keep in mind.

A. Use your resources! We have tried to provide as many opportunities to learn as possible.

1. READ THE BOOK. Lectures in this course will be very interactive, and you will be required to discuss physics concepts and ideas with those around you in the lecture hall. If you haven't read the material ahead of time, you will be unable to actively participate, and you may not absorb all that is said in class. Even better, read, then think about what you've read, perhaps even discussing it with other students (no, it's not disrespectful to bring up physics during a meal) or trying some exercises. The more you prepare outside of class, the more useful the lectures will be.

2. COME TO LECTURE. As you will soon see, the lectures will not be just a rehash of what is presented in the book. The lectures are a chance for you to see extra material that should reinforce what you have already read. A large part of the lectures will be an opportunity for you to test your understanding of the concepts we are studying "on-the-fly" - if you skip them, you will miss a great deal of the course.

3. Explore the CD-ROM that comes with the text. It's a new product, and has many useful insights, as well as interactive experiments that you can play with.

4. Next, think about the material. No, really think about it. Why does the ball accelerate downwards when it's climbing upwards? If you can't answer the questions you yourself come up with, how do you think you'll answer ours?

5. If you're stuck, try asking your professor in class or during office hours (no question can be unwarranted or wrong) or your section leader during section or even, if you dare, a fellow student. It's always been our experience that when any question is asked, at least a dozen other students have wanted to ask that very same one. This is no time to be shy, and it's a very good time to also try your hand at e-mail, the web, and the phone. Make an appointment to see the professor outside regular hours if you need more help or advice.

6. Aside from the resources provided by the Physics Department, the university runs the First Year Learning Resource Center which is designed to help students with various introductory courses through tutoring and collaborative learning programs. To sign up for either of these programs or for more information, contact the First Year of Studies. More information is also available via their web page `http://www.nd.edu/~fys/`.

7. **Finally, and perhaps most important, work problems!** You can never do too many, and if you do enough you will undoubtedly be richly rewarded at exam time. Remember: right now you have all the time you want and all the help you request, which is more than you'll have during the exams. The problems in the text have been carefully constructed and selected to fortify your understanding of the physical principles we've learned and to test your ability to apply them. The solutions to all of the problems in the book will be posted after each chapter's assignments are completed. You should be able to pick any problem in the book at random, read it, think about it, write down the steps required, then check your proposed solution against what is in the solution manual. This will allow you to rapidly check your understanding of the material. This is an incredibly useful study technique, and one you should master early.

B. Don't waste points which count towards the semester grade. At the end of the semester, it will probably be too late to regain those lost points.

1. Neglecting to turn in a homework set is costly when it comes time to add up your score for a final grade. There are no homework make-ups since solutions will be available. If the problems look a little strange, check that you're doing the right problems in the right chapter, and make sure your writing is humanly readable and perhaps even easy to follow. PUT YOUR NAME ON EACH ASSIGNMENT. Staple your pages to ensure the grader sees all the fruits of your labor. Remember that the homework assignments count as much as an exam and that doing them is the best way to study for the exams, so don't let them slide.

2. Oversleeping an exam (due to overstudying the night before) is at least as costly; invest in a battery of battery-operated alarms and easily-awakened roommates.

3. If you believe we've misgraded your assignment or exam, and it does happen occasionally, please come see your professor, remembering of course that after regrading your score could go up or down.

4. Lab grades are also a decisive part of your final grade, so keep them up.

C. Study wisely. Your time and energy are precious: the first is obviously limited, and the second (as we learn in this course) can appear in useful or less-useful forms. To use them wisely, you need to invest them before difficulties arise, and in the proper channels. The homework problems, the exam problems, indeed the whole course is structured around understanding and applying principles, not plugging into equations or memorization. Before every lecture, as you're reading the text and your notes, try to capture the gist of the material. Do that again after the lecture. What have you actually learned in that particular section or chapter? Then, look at a few examples or problems, without necessarily working them out in detail. Very often it helps to draw a diagram or a picture to visualize the system you are considering; on an exam, that also shows us what you are thinking, which could give you more partial credit. Do you see how to approach each problem, what is the physical system in simple terms, what is given and what is to be calculated, how to set up the math, and what should the solution look like? If you can do that well, you're well on your way to success in the course. If you can't, work at it by yourself or with friends or with your professor. You need to be able to do these, and eventually you need to do them correctly and at a reasonable pace. The time to acquire such an ability is throughout the semester, not the night before an exam, so allocate your time and intellectual energy accordingly. The rewards may well last long after the semester is over. Your grade certainly will.

D. And one last note: Remember to stop from time to time and take a deep breath. The purpose of this class is not to create a hurdle you must clear before continuing your education or to give you another grade on your transcript, but to teach you concepts and problem-solving skills which will help you in later intellectual pursuits. Treating the course in this spirit will make the time you invest both more pleasant and more profitable.