

University Physics II - Teaching Assistant Guide

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Chapter 1

Introduction

I'm Dr. John Stewart. I got my Ph.D. from Illinois in Crystalline Surface Dynamics in 1994. I've been working on turning education into a science ever since. This course is the result of that effort. I believe it is a completely characterized course that provides sufficient support for the students to learn the material presented in the course guide and lecture.

1.1 How is this class different?

It does the obvious things that common sense would tell you to try to improve a science course:

- Focus on the lab - Students get as much hands-on experience as I have equipment money. Students also get as much one-on-one help with difficult concepts and calculations as we have time for. For this to work you have to be prepared.
- Less lecture - I only lecture twice a week for an hour, so the students have to read the notes.
- Readings constructed for the class. If I want you to know it I put it in the course guide.
- Lots of homework. Physics is not something you can read and just do.
- Quizzes to get students to lecture and to lab.

1.2 Educational Philosophy

You learn by doing. You don't know anything that you haven't taught yourself. As much as possible we let the student explore and experiment, form their own ideas and challenge those ideas. The more the student investigates the better.

At the end of the lab you look through the student's work and correct those places where the investigation has gone awry.

1.3 This Class is a Blast

This class is fun and by and large the students are great. Enjoy yourself.

1.4 What Do You Get Out of This?

Teaching the introductory labs is the most difficult TA assignment you can draw and I intend to use all of the twenty hours a week a full time TA is expected to provide. In many cases I expect to use a little more, because the time you spend relearning the material is your time, not my time. In theory we all know this stuff perfectly. In practice there were one or two problems on the last qualifier that you could work using only the material from this class. So what do you get out of this?

- You never really know the material until you teach it.
- If you do well, the fact that you have taught and been successful at it will be prominent point on your resume.
- I will know you better than anyone else at this institution other than your eventual research advisor and if you deserve it, I write very fine letters of recommendation.
- Most importantly, you get to teach, and have the experience of helping other people to learn.

1.5 This Class Comes First

Graduate school can be an overwhelming experience. For you to survive it, you must get the assignments for this class done first. Don't put off grading, don't rush grading, and don't skimp on preparation. Anything you put off while teaching takes you twice as long. Anything you don't do well increases your workload. If you put off grading an assignment, the students will hound you. The longer you have an assignment, the more the possibility that you will lose one. If you lose one, you look until you find it. If you grade sloppily, you will have 130 students coming to ask you about it. If your preparation is incomplete, suddenly the students will start challenging you at every turn. If you get this class done first, it is a joy, you'll have a good time, and your students will like you. This is a good time to learn one of the basic skills of a successful scientist, good time management skills.

Chapter 2

The Students

Your students are mostly engineers, with a variety of biology, geology, chemistry, biochemistry, and math mixed in. Many of those taking a scientific degree are planning to go onto medical school or some other professional school. Some of your students wish to go into teaching and you having fun may encourage them. There will probably be 5 to 10 physics majors in the class and we will recruit about 5 new physics majors out of the class. Many of your students have out-of-school commitments or children which make it difficult to complete assignments, work, research. Many of your students will have signed up for more class hours than they can successfully complete. Almost all of your students work hard and are very talented. A few of your students will be at school to have a good time rather than to get an education.

2.1 Interacting with Students

Your students are mostly 19-21 year olds. If you act like their parents, you will get the same response their parents get.

- **Always Positive** You are here to help them learn this stuff. Don't criticize, show the student how the work can be better. All these students can learn this. The second you are negative with a student, you become their parents.
- **Don't Guess** If you don't know about some element of class policy, find out. Don't guess and have to go back and tell the class you were wrong. Never guess about physics. A delayed correct response is far better than an incorrect guess.
- **Everything is for the Student** We don't do anything in this class that doesn't have a specific educational value. If the student asks why something is done, you should be able to tell them what educational value it has.

- **Never Criticize Class or Co-workers** If you disagree about something done in the class or how I or a fellow TA is behaving, I want to hear about it, but your students shouldn't. The instant you criticize the class or a fellow TA you will lose your students and the class atmosphere will deteriorate.
- **Be Lenient the First Time** Emergencies happen. If the student misses an assignment because of an emergency, excuse it. A very few students will try to take advantage of this. Refer the second excuse to me.

2.2 Common Sense

Don't date your students, have a beer with them, etc. Leave that until the class is done if you must. Don't close the door on a student of the opposite sex. If a student is being a problem, bring it to me. You are always the good guy. I'm the bad guy if need be.

Chapter 3

How the Class Works

- **Two Lectures a Week** I give two 50 minute lectures each week on Monday and Wednesday.
- **Lecture Quizzes Each Lecture** The students are given a lecture quiz at the beginning and end of each lecture to ensure attendance. If they score any points on the quiz they receive one drop point. If the quiz is perfect they receive 1.5 drop points. The drops count toward the test. Each lecture quiz is worth three points.
- **Two Activities Each Week** The students do two activities each week starting the first week. Each activity is worth four points. They get the points if you sign off on the activity. This eliminates you having to grade activities. In case of an emergency, the student may come to another laboratory. The TA who supervises the alternate lab must communicate the grade to the student's real TA and they enter it. You are responsible for your own activity and lab report gradebooks. The student may not do this routinely unless they arrange with me. The labs are very full. As with anything, be flexible the first time. If the student skips the lab they have four points subtracted from their grade. Two activities are dropped.
- **Lab Reports** The students do four lab reports worth 20 points each. The lab instructor grades their own lab reports.
- **Lab Quizzes** To get the students to your lab on time and to check that they have some knowledge of the homework, a quiz is given at the beginning of each lab.
- **Homework** The students turn in homework every lecture period and grade it in lab. You are responsible, in turns, for checking the grading and entering the homework into the gradebook. The students do not turn in the homework due immediately before the exam and there is no homework due the Monday after the exam. Each homework point scored

adds one point to the student drops on the exam. Monday homework is worth 10 points toward the class, Wednesday homework is worth 5.

- **Scaled Grading** Assignments are graded out of the natural number of points needed to correctly evaluate the assignment. The student score is then scaled to the number of points the assignment is worth. For example, a Wednesday homework might be graded out of 35 points but is only worth 5 points.
- **Exams** There are four hourly exams worth 150 points and 250 points for the final. The final is comprehensive. The hourly exams are sort of comprehensive, with 5-10 percent from previous tests.
- **Earning Drops** No exam drops are provided. The students earn one drop point for each point they score on the homework, one drop point for each lecture quiz they score something on, and 1.5 points for each perfect lecture quiz.
- **Grades Posted On-Line** The student's grade is posted online at the course site under an alias.

Chapter 4

Your Responsibilities

4.1 Tasks

- **Teach Lab** You teach four labs a week. You may not cancel them. If for some reason you cannot make it, you must arrange a substitute. Collect student names who have completed the lab and enter them in the gradebook immediately.
- **Prep Lab** You must work the activity by our Friday lab meeting. The activity is set up the week before in the prep room.
- **Read Course Notes and/or Attend Lecture** The course notes are online, the reading assignments are at the top of the homework. I need one TA to attend lecture to help collect homework.
- **Prep Homework** You will take homework questions in lab, so you have to know it. Work the homework by our Friday lab meeting, we will check it together.
- **Grade Labs** You have four lab reports to grade.
- **Grade and Proctor Exams** There are four exams, I need two proctors per exam. We key the exam at the Friday lab meeting after the exam. Grades will be entered by Monday morning.
- **Grade and Enter Homework** There are 21 homework assignments collected, all are entered. We will check the grading on 14.
- **When are Things Due** All grading and grade entry is due by 8:00am the Monday after the assignment is collected. If you can't make this deadline, you must make arrangements with me. Papers will be returned promptly in this class.

4.2 How to Grade

Grading is about communication and instruction, it is not about punishment and reward.

- **Clear Communication** When points are taken away, the number of points taken must be clearly indicated. There must be an understandable message to the student as to why the points were taken.
- **Write Clearly** Anything the student can't read is useless as education and will cause your fellow TAs to have to guess what you meant.
- **Education** When possible your grading should show the student what they did wrong. When not possible, ask the student to see the key.
- **IBC** Incorrect but consistent. When a student misses a part, they lose only points for that part, not all the parts that might depend on the incorrect part.
- **Must be Fair at End of the Day** After all is said and done, the grade you give should reflect the quality of the work.