



## **Quantum mechanics is the greatest intellectual accomplishment of the human race.**

Before quantum mechanics, humans understood motion, gravity, gases, and a little bit about electricity and magnetism.

With quantum, we understand the underlying behavior of everything you are likely to experience in your lifetime! The properties of all basic materials (why are metals shiny and usually silver? why is glass clear? why is rubber stretchy?), properties of light and other electromagnetic waves, how light interacts with matter,... Quantum mechanics is the basis for all modern technology.

**Physics is not a collection of facts but a way of thinking. No one can teach you physics. Only you can teach yourself to think.**

### **Guiding Principles of the Course**

1. People understand concepts better by seeing them in action and thinking about them than by hearing them explained.
2. We learn physics by working problems, not by reading about working problems. Understanding physics is a learned skill, like cooking or playing basketball. It takes time, effort, and practice.
3. People learn best by thinking about topics and discussing them with others.
4. Students learn most when they take the responsibility for what is learned.

In this course, many topics are counter-intuitive and contradict our existing ideas about how the Universe works. To overcome our misconceptions, we must confront them, figure out why our initial idea is wrong, and build a new understanding of the situation. This takes a lot of practice. Research has shown that students learn and retain the most when they make a sustained consistent effort each week, rather than cramming before exams.

To make your time and effort the most efficient, I suggest the following study procedure:

1. Read the chapter prior to lecture, so that you will know what it's about. I recommend skimming the chapter and writing down an outline of the headings to form a context for the lecture.
2. Listen carefully to the lecture and take notes.
3. Start working problems, going back through the chapter to clarify points as they come up. Instead of glancing over the example problems, **work** them without looking at the answers until you're really stuck. I also suggest you try to answer all "Conceptual Questions" at the end of the chapter. If you understand these, you probably understand the significant points of the chapter.
4. **Think!** Don't just try to fit the problems into an equation or sample problem, think through the question and the physics first.

## Homework

The homework is designed to give you practice in thinking about and doing physics, so that you gain a deeper understanding. I do encourage you to work together on homework problems—talking about physics and explaining your ideas is one of the best ways to learn!

However, you will learn the most if you attempt the problem on your own before asking for help. And, **the solutions you hand in must be entirely your own work. You may not directly copy words or equations.** A good practice is to re-write your solution without looking at your previous notes to be sure you understand each step yourself. When you obtain outside help, you must acknowledge it (“After integrating (as suggested by Hermione), I find...”).

When writing your homework solutions, **being able to explain what you have learned is an essential step in the learning process.** Thus, for all homework and exams, your thought process must be clear. **Neatness counts.** When working problems, your steps should be explained using short phrases. Any sketches or graphs should be clearly labeled. Use of *Mathematica* is normally acceptable, but only as a step in the problem solution. The solution still needs to be easily understandable with explanations of your work.

## Academic Integrity

**Cheating on a test, quiz, or homework is a serious breach of academic integrity and is grounds for an F for the entire course. Direct copying of homework is a violation of the Wooster Ethic.** Other violations of the Wooster Ethic include copying from any source without proper citation, going beyond what is allowed in a group project, fabricating excuses and lying in connection with your academic work. You will be held responsible for your actions. If you are unsure as to what is permissible, always ask!

## Curricular and Extra-curricular Conflicts

The College of Wooster is an academic institution and its fundamental purpose is to stimulate its students to reach the highest standard of intellectual achievement. As an academic institution with this purpose, the College expects students to give the highest priority to their academic responsibilities. When conflicts arise between academic commitments and complementary programs (including athletic, cultural, educational, and volunteer activities), students, faculty, staff, and administrators all share the responsibility of minimizing and resolving them. As a student you have the responsibility to inform me of potential conflicts as soon as you are aware of them, and to discuss and work with me to identify alternative ways to fulfill your academic commitments.

**If you know of any conflicts that will require you to miss class or lab, notify me immediately.**

## Accommodations for Learning Disabilities

Any student with a documented learning disability needing academic accommodations is requested to speak with me and with Pam Rose, Director of the Learning Center (ext. 2595), as early in the semester as possible. All discussions will remain confidential.