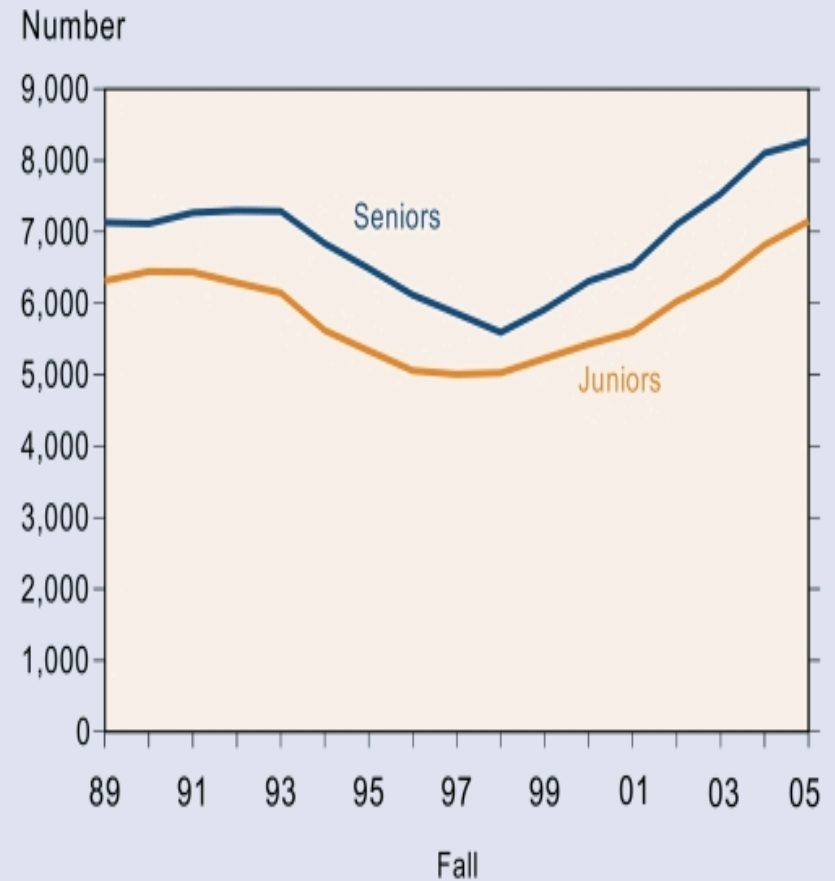


Welcome and Congratulations

- ❑ This is the largest class I have ever had at SMU. Let's work together to make it the best one.
- ❑ I congratulate you on making this wise decision to learn physics, especially Electricity and Magnetism, the knowledge that modernized the world.
 - The first unification theory that brought energy to the world.
 - The first force (interaction) we actually understand that provides scientific foundations to advances in chemistry, biology, material science, semiconductor industry and physics itself.
- ❑ More people realize the importance of physics.

Figure 5. Junior and senior level physics major enrollments, fall 1989 - fall 2005.



AIP Statistical Research Center, Enrollments and Degrees Report.

What is physics and why we shall study physics?

Physics is crucial to understanding the world around us, the world inside us, and the world beyond us. It is the most basic and fundamental science. Physics leads to great discoveries (power generators, computers, lasers, **world wide web, check www.cern.ch** for details) that change our lives. **Physicists invent, engineers improve.**

Physics encompasses the study of the universe from the largest galaxies to the smallest subatomic particles. It's the basis of all sciences: chemistry, oceanography, seismology, and astronomy.

A physics education equips a person to work in many different and interesting places—in industrial and government labs, on college campuses, and in the astronaut corps. In addition, many physics grads leave the lab behind and work at newspapers and magazines, in government, and even on Wall Street—places where their **problem-solving abilities and analytical skills are great assets.**

So—physics is interesting, important, and it can prepare you for great jobs in a wide variety of places. I am sure that's why you take this physics course.

The language used in physics is mathematics. Are you prepared? We will find out.

Rules:

Please check the course webpage for details:

http://www.physics.smu.edu/yejb/teaching/1304_2008s/1304.htm

Additional:

Homework assignments are to be turned in and picked up in class.

Students are responsible for keeping records for homework assignments and report missing/mistake in grades **within two weeks** from the time the grades are posted in the course page.

Students are encouraged to use the problem solving templates in quizzes, exams and homework assignments. Partial credits will not be given if these templates are not used.

What we will be discussing:

1. Electricity.
 - a) Electrostatics: charges, force, electric field, flux and potential.
 - b) Electrodynamics: current, resistance, capacitance, power and energy.
 - c) Direct current circuit analysis.
2. Magnetism and the unification with electricity.
 - a) Magnetic field and its relationship with electric current.
 - b) Electromagnetic induction.
 - c) Alternating current circuit analysis.
 - d) Electromagnetic wave.
3. Geometric optics.
 1. Reflection and refraction.
 2. Mirrors, Lenses and optical systems.

How we will learn:

1. Be proactive, not reactive. You have to learn by yourself, I cannot make you learn.
2. **Preview before class is highly recommended.** Come to the classroom with questions.
3. Participate in the classroom. Questions and debates are highly encouraged. Find the teacher's mistakes. Learn with the teacher, not from the teacher.
4. Pay attention to problem analysis and solving skills demonstrated by the teacher. Follow the templates when doing homework.
5. **Prompt review is important.** Understanding is more important than memorizing. Summarize what's discussed at the end of each topic and make connections to other topics by yourself.

Research opportunities

SMU provides undergraduate research opportunities

<http://faculty.smu.edu/ura/> (this page is a bit old, but the program exists) and here:

<http://www.physics.smu.edu/~kehoe/ugradResearch.html>

The research topics I have for this year are:

1. Circuit design and simulation with Cadence in the physics department.
(prefer EE major)
2. Monte Carlo studies (material, medical) using GEANT4.
(<http://geant4.web.cern.ch/geant4/>) (prefer math or physics major)
3. A taste of life in a research lab: help setting up state-of-art equipment in the opto-electronics lab.