

## Learning at the University Level

*The following is taken from an article, "Teaching at the University Level" by Steven Zucker, Professor of Mathematics at Johns Hopkins University. It was published in **Notices of the American Math Society** Vol 43 No. 8 in August 1996.*

1. You are no longer in high school. The great majority of you, not having done so already, will have to discard high school notions of teaching and learning and replace them by university-level notions. That may be difficult, but it must happen sooner or later, so sooner is better. Our goal is more than just getting you to reproduce what was told to you in the classroom.
2. Expect to have material covered at two to three times the pace of high school. Above that, we aim for command of the material, especially the ability to apply what you have learned to new situations (when relevant).
3. Lecture time is at a premium, so it must be used efficiently. You cannot be "taught" everything in the classroom. **It is your responsibility to learn the material.** Most of this learning must take place outside the classroom. You should be willing to put in two hours outside the classroom for each hour of class.
4. The instructor's job is primarily to provide a framework, with some of the particulars, to guide you in doing your learning of the concepts and methods that comprise the material of the course. It is not to "program" you with isolated facts and problem types nor to monitor your progress.
5. You are expected to read the textbook for comprehension. It gives the detailed account of the material of the course. It also contains many examples of problems worked out, and these should be used to supplement those you see in the lecture. The textbook is not a novel, so the reading must often be slow-going and careful. However, there is the clear advantage that you can read it at your own pace. Use pencil and paper to work through the material and to fill in omitted steps.
6. As for *when* you engage the textbook, you have the following dichotomy:
  - a. [*recommended for most students*] Read for the first time the appropriate section(s) of the book *before* the material is presented in lecture. That is, come prepared for class. Then the faster-paced college-style lecture will make more sense.
  - b. If you haven't looked at the book beforehand, try to pick up what you can from the lecture (absorb the general idea and/or take thorough notes) and count on sorting it out later while studying from the book outside of class.
7. Exams will consist largely of fresh problems that fall within the material that is being tested.