

# TEACHING STATEMENT

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In choosing a career in academia, I committed myself to excellence in teaching. Since I received my B.S. degree in 2002, I have been teaching as both a teaching assistant and an instructor. I have taught several undergraduate courses from College Algebra to Differential Equations. I have experienced a variety of classroom situations and I have developed several techniques that help me become an effective teacher.

**Preparation.** I always prepare lecture notes for my class regardless of whether I have taught the course before. I do re-use old lecture notes but remove or adjust materials that I found technical or difficult the last time I taught. When writing lecture notes, I make up new examples so that I will not bore my students with examples taken directly from the textbook. I also go through the exercises and carefully select questions with various levels of difficulty for the homework. I actually work out the questions to see how easy or difficult they are before choosing them.

I usually spend time reading the lecture notes before going to class. I rehearse in my mind how the lecture would go on the way going to school or walking to a classroom. I imagine in my head what examples I will present, what questions I will ask, and sometimes what joke I will tell my students. With such preparation, I feel confident and excited each time I walk into a class to begin a new lecture.

**Mathematics by Example.** In advanced courses, theorems and proofs receive more attention but an example that illustrates the idea is still important. In lower level courses, examples are much more important to students. Keeping this in mind, I use many examples, from a very simple to more complicated ones, to elucidate new concepts. I usually walk the students through a first few examples and let them do the others by their own before I explain the solutions on the board. My favorite example when introducing limits of functions is  $\lim_{x \rightarrow 0} \frac{2^x - 1}{x}$ . I make a table of values of the function  $f(x) = \frac{2^x - 1}{x}$  for values of  $x$  near 0 and convince the students that the values of  $f(x)$  get closer and closer to  $\ln(2) \approx 0.693147$ . You might wonder why I choose such a bizarre example instead of the familiar limit  $\lim_{x \rightarrow 2} x^2$  or the like, as done in most textbooks. In fact I used to give the latter example but I was always asked “If we plug  $x = 2$  into the function, we will get the same answer. So limits are just values of functions at the given value, aren't they?” The answer to this question is, of course, based on continuity, but in the first lecture about limits, how would we explain to the students in a satisfactory way? Even though the former example involves more computations with a calculator, I believe it is an interesting example to demonstrate the concept of limits, not only to students who have not seen limits before but also to those who have already had some knowledge about limits.

**Mathematics with Technology.** I like to incorporate technology into my lectures. I believe technology not only makes the lectures more exciting but also helps students understand mathematical ideas better. In Calculus 1, I use an animation to present the idea of approximating a tangent line by secant lines. This then motivates the definition of the derivatives. Another animation that I often use is to show the students that if water flows at a constant rate into a conical tank, then the water level rises very fast at the beginning but becomes slower and slower. I then explain this by using related rates. When teaching volumes of solids of revolution, I show my class animated pictures which illustrate how a solid can be approximated by slices or by cylindrical shells. All students agree that they understand the disk/washer method and the cylindrical method much better this way. Very recently I started using GeoGebra to create other calculus applets. I have made applets that illustrate how cycloids are formed and how polar curves are sketched in slow motion. Besides the demonstrations in class, I encourage students to explore similar examples on their own.

**Mid-course Evaluation.** An important factor for success in my teaching is to show the students that I care about them. Several weeks after the first day of classes, I ask their opinions of my teaching style with a short survey consisting of three questions: What is the best thing about my teaching? What is the worst? And what would you suggest to make the class more enjoyable? After receiving the students' suggestions, I maintain the good, improve the bad, and develop new strategies to make the lectures more effective. Students say that they appreciate my responses to their requests, which make them feel more comfortable working with me in class.

**Outside the Classroom.** I encourage students to come to my office for questions if they have not had a chance to ask in class. When answering a question, I do not give a solution right away. I first have the student explain how far he or she has tried before getting stuck. I then give a hint with an explanation why it should work and let the student complete the rest. There have been several instances where a student did not do well at the beginning of the semester but after meeting with me a few times the student regained his/her confidence and completed the course successfully.

In conclusion, I consider teaching an essential part of my academic career and I try my best to do an excellent job. My teaching evaluations have been consistently high but I know that I am just at the beginning of a long road. I continue learning new approaches and techniques to constantly improve my teaching skills.