

## Teaching Statement – Rafe Jones

I have been teaching students in one form or another for most of my graduate school career. My experience has taught me particularly to value three things: student engagement both inside and outside class, in-class organization and flexibility, and development of students' ability to reason logically.

I feel that students are most likely to care about the course ideas and assignments, and thus to profit fully from the course, if they are fully engaged during class. One of the principal ways I engage them is to create a welcoming atmosphere. This encourages them both to answer my questions and ask their own, makes them more likely to approach me outside of class, and contributes greatly to their enjoyment of the course. I find this in turn makes them work harder. To achieve such an atmosphere, I bring enthusiasm and energy to my classes. I sprinkle my lectures with humor and relevant anecdotes, and I treat all questions with attention and respect. I also ask numerous questions of the students during class. The results of these efforts have been gratifying, as my students quickly come to respond fearlessly to my questions and to ask plenty of their own. My enthusiasm, humor, and attentiveness to questions have been frequently mentioned in student evaluations. Another benefit of having students feel free to express themselves during class is that I get a better sense for whether they're understanding my explanations, and can adjust my pace accordingly.

As much as I work to engage students fully during class, I believe that most significant learning in a course comes from students' exploring material and working through problems on their own. Thus I do everything possible to get them involved with the material outside of class. I tell students directly, on the syllabus and repeatedly in class throughout the semester, that the homework is a powerful learning tool and therefore of paramount importance. My grading system reflects this emphasis. I strongly encourage them to work on the homework in groups, though I require that each student write up the answers in his or her own words. I know from my student days that group work does much to get students talking and thinking about the problems and ideas. I also encourage students to come talk to me, and I make myself available to them (by appointment) even outside of scheduled office hours. These habits have made an impression on students; one in particular wrote on an evaluation that I was "very approachable and sensitive to student needs... clearly very interested in getting students involved."

I feel that student engagement is the most vital element of a successful course. However, I have come to recognize the importance of several other areas as well, particularly organization in the classroom. I always make sure to prepare each lecture carefully, and through my semesters I have learned to make good use of class time. I've learned to recognize what phrases and symbols really need to go on the board, and I draw many pictures, both to save time and appeal to more visual learners. I am careful to identify the goals of each class, which usually consist of no more than two or three main ideas. I always write these on the board before each class, and I make sure I have enough time to get to them. These practices have been generally successful: in the last course I taught, linear algebra, several student evaluations mentioned that class time was consistently well organized.

Finally, I put great emphasis on developing students' understanding of mathematical reasoning. When appropriate, I go out of my way to discuss proofs of theorems and explain mathematical arguments. For instance, I explained to my advanced placement calculus students the gist of Cantor's diagonalization to illustrate a superb logical argument. In class and particularly in office hours, I highlight the logical structure of solutions to problems, and I try to get students to write down complete arguments rather than just do the appropriate computation and leave it at that. If I can teach students how to construct a logical argument, they will be better able to fully understand the problems they are solving, and will also learn a skill valuable far beyond the mathematical world.

In future courses I would like to give an occasional writing assignment. I find that writing about math prods students to engage the material more conceptually, and leads to richer understanding of mathematical ideas and objects. For instance, I might assign a short essay on the historical development of a certain mathematical idea. I might also assign a short piece on how an important idea like differentiation can be used to describe various aspects of a specific everyday event.