1. Teaching Philosophy
Chad A.S. Mullikin

The first class I taught at the University of Georgia was differential calculus. In it I had a student named Andrew who I noticed from the first day was very outspoken and bright. On several occasions he took advantage of my offer to help students outside of class, and we began to have a more personal dialogue. We discussed our interests, and the topic of my thesis arose. When I told him my thesis involves knot theory he seemed amused and asked what it was good for. Andrew was a pre-med student, so I was easily able to describe applications in genetics dealing with knotting of DNA. He then became more interested, and I am pleased to say that he has since changed his major to mathematics. He still periodically picks my brain about courses to take.

Another student of mine, Ryan, was a member of my discrete mathematics class. He was an exceptional student who was always hungry for more challenging problems. He would come by my office to discuss some of these problems, and the conversations typically flowed into questions of more general mathematics. I am delighted to note that his enthusiasm led him to join a research group studying knot theory, led by my advisor. The experiences I shared with Ryan and Andrew illustrate the benefits beyond the scope of the course that occur during office hours. I find this time very important and encourage students to utilize it. I am pleased to say that this trend has continued in my new position at Spring Hill College, and I typically have four or five students in my office before class discussing different facets of mathematics. My office hours also allow me to explain topics covered in class in several different ways until we find a description that is best suited for a particular student's understanding.

In all of my teaching experiences I try emphatically to relay to my students that the material that they are learning is not expected to come easily and that I understand this. Before I walk into the classroom each day I try to think of some material that I am trying to learn myself, thereby reminding myself of what it must be like to face the frustration of learning difficult material. I find that empathizing with my students allows me to better predict problem areas that will require more lengthy explanations while at the same time helps to prevent the students' morale from declining.

Keeping students interested in the material for a course can also be challenging. As a graduate student I was especially aware of this challenge because I taught the courses that were required of most of the students; interest in the subject is not a prerequisite. I found that it was helpful to directly involve students in the classroom without singling them out in an obvious way. At the beginning of each semester I ask the students to provide contact information as well as some information about themselves which I can later use to prepare examples directly relating to the students' interests. For example, several of the students in my discrete mathematics class were interested in cryptography. So, this became a perfect medium to discuss the factoring of large integers. I showed them how long it would take to try to factor a 128-bit integer by trial and error using a modern computer (several times the estimated age of the universe), and then led them into more intelligent and sophisticated methods from number theory.

I quickly learned that it is absolutely crucial to assign homework on a regular basis to help reinforce material covered in class. I assign weekly homework that includes several typical problems from the course book as well as a few more challenging problems of my own design. I heartily encourage people to work together on the difficult problems, and I suggest almost daily that they are welcome to come talk with me. By writing my own problems I am better able to gauge how effectively my lecturing gets across the ideas that are intended. I also make it a point to show students how they can generalize their work to obtain results to "impress their friends." In actuality, it allows me to reinforce the ideas I have been teaching as well as boosting the morale of the students. For example, a problem I assign while teaching discrete mathematics is the following: How many different five card hands can be dealt to four people playing cards? Once students have answered this question, I ask them to prove it and point out that an identical combinatorial proof also proves the identity

$$\prod_{j=1}^{n} \binom{m - \sum_{i=0}^{j-1} k_i}{k_j} = \binom{m}{\sum_{i=1}^{n} k_i} \left[\prod_{j=1}^{n} \binom{\sum_{i=j}^{n} k_i}{k_j} \right]$$

where $k_i > 0$ for each $i = 1, \ldots, n$, and $\sum_{i=1}^{n} k_i \leq m$. I find that once students realize that they can understand the above equation, it empowers them and taps their curiosity.

2. Teaching Experience
Chad A.S. Mullikin

During Fall semester at Spring Hill College I was responsible for two sections of precalculus, one section of differential calculus, and one section of multivariable calculus. I understand that I quickly obtained a reputation for challenging students as well as making the subject interesting to them. This was reflected in my evaluations as well as in the fact that all of my classes this semester have more students than is typical.

While at the University of Georgia I was an instructor for several different courses. I have taught introductory calculus in which we covered the usual topics of limits, continuity, the derivative, and applications. For first and second semester calculus there is an additional one hour lab consisting of using the Maple software package to reinforce topics covered in the classroom, which I have taught several times. I have also twice taught discrete mathematics, which is designed to prepare computer science students for the unyielding logic of programming. In the discrete mathematics class, I introduce the idea of mathematical proofs to force the students to think about problems more critically. These proofs cover topics such as set theory and combinatorics, where I find that the students can begin to appreciate the benefit of devising clever arguments instead of performing brute force computations. Finally, I was given the honor of teaching a seminar to graduate students where the primary focus was on developing teaching skills. This seminar is typically taught by a graduate student that the department and University believe is an exceptional teacher. To this end I have been awarded the Outstanding Graduate Teaching Assistant award both by the department (2005) and the University (2004).

While working towards my masters degree at the Georgia Institute of Technology, I taught two courses, led recitation sections for numerous other classes, and spent a semester developing code to be used as a tool by students learning linear algebra. First, I taught standard second semester calculus involving integration, sequences and series, and some differential equations. The second course was calculus intended for computer science students in which we spent the majority of our time developing linear algebra and matrix analysis skills which were used to solve more applied systems of differential equations. I led recitation sections for first and second semester calculus which covered the standard topics in differential and integral calculus, respectively. I was also asked by a professor to cover his senior level linear algebra class for a week. I worked as a tutor with the Office of Minority Educational Development's Challenge program, under Dr. Mona Meddin, where the goal was to prepare minority students for their first year at Georgia Tech. This involved both a Summer program as well as daily tutoring services once the school year had begun. Finally, I accepted the department's request to introduce incoming graduate students to the program and discuss their responsibilities as well as give them some advice on teaching.

I am excited to begin an academic career where I will be able to meet more students and teach more advanced classes. It is one of the most rewarding experiences of my lifetime to see comprehension move across a student's face. I am anxious to be able to follow students' progress through their mathematical beginnings as well as encouraging new students to further their understanding of mathematics.