

# TEACHING STATEMENT

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Mastery of undergraduate mathematics requires deep comprehension, analytical thought, and logical, deductive reasoning. Over the past four years, during which I've taught both elementary and advanced courses in calculus, differential equations, and matrix algebra, I've developed a unique teaching philosophy and set of practices that have allowed me to facilitate this mastery among my students. In addition to the role that my own experience has played in developing the practices described below, these ideas have of course been informed by feedback from students and professors, as well as my own observations of other professors and teaching assistants.

To begin, it's important that I convey an understanding of a course's basic concepts, formulas, and theorems to my students. This understanding should not consist simply of the ability to apply this set of knowledge and skills to textbook exercises, but should also enable students to tackle problems they encounter outside the context of pure mathematics. Helping students develop this broader competency requires me to see that they develop the habits of mathematical thinking, as well as that they gain an appreciation for the discipline. This leads me to emphasize a coherent understanding of the mathematical logic that underlies new ideas, as well as to encourage both creativity and caution by exposing students to diverse ways to approach a problem, while helping them see the pitfalls of ineffective approaches that at first appear promising.

When introducing a new idea, it's important to avoid confusion; this calls for a slow, careful approach, in which I explain details and then offer examples that are relatively free of concepts other than the theorem or definition being illustrated. After this initial exposition, I seek to offer additional insight by comparing and contrasting the idea under discussion with other concepts; my goal here is to help students place the new idea into their existing conceptual frameworks. An important part of achieving this clarity and cohesion is regularly seeking feedback from my students. I do this through informal channels (asking, "Does this make sense?" "Are you happy with this?") as well as formal ones (encouraging them to leave detailed comments in their course evaluations).

Of course, a reality of mathematics teaching is that because we're constantly building upon concepts from previous courses, a common source of student confusion is an incomplete understanding of these earlier ideas. Time consuming though it may be, the only truly effective way to address such difficulties is to return to the original ideas. When the majority of the class is struggling, lecture may be an appropriate place to conduct such a review; when just a few students are confused, setting up an appointment outside of class is more appropriate.

Besides presenting material with clarity and precision, it's important to foster independent, critical and analytical thought among my students. In discussion sessions, I accomplish this by requiring students to play an active role

in problem solving. I generally ask the class for ideas about how to start, call on students to supply intermediate steps, and question them about why certain methods won't work. When the class is stumped on an especially difficult problem, I sometimes offer hints, but nevertheless work hard to ensure that students' role in arriving at the solution is an active one. These hints often consist of reminding students of similar but easier problems encountered previously, and trying to elicit exactly what makes the problem at hand more difficult. We then work to isolate and address just the hard part. This teaches students to simplify complicated problems, and helps them ultimately see such problems as accessible.

Classroom technique is important, but students cannot learn mathematics without practicing outside of class; thus, in addition to assigning homework, I supply my students with carefully chosen practice problems and encourage them to complete them. Recognizing (and indeed, hoping) that these exercises will generate student questions, I strongly recommend that students talk with me outside of class; to make this easier for students, I provide a large number of office hours, and am always willing to make appointments outside these times. Mentoring and communicating with students helps me discover both their strengths and areas in need of improvement, thereby allowing me to obtain a clearer picture of each of my students, and enabling me to tailor my teaching accordingly.

Over the past four years, the principles above have led me to develop a number of different instructional practices. However, no classroom practice can replace positive, respectful relationships between a teacher and students. Consequently, I seek to be friendly and considerate, as well as to demonstrate a strong sense of responsibility and concern for my students' academic performance and overall well-being. Being enthusiastic and knowledgeable makes the experience of teaching mathematics a pleasant and enjoyable one for both students and for me. Being committed to teaching, making myself available as much as possible for students to consult, and simply smiling in class to make the atmosphere more comfortable, and thus, more conducive to student learning and more likely to generate future student interest in the discipline.

For more information, please check my webpage for teaching:  
<http://www.math.wustl.edu/~minbaili/teaching.html>