

TEACHING STATEMENT: LAWRENCE ROBERTS

Experience: I have taught both semesters of single variable calculus, multi-variable calculus, applied calculus, linear algebra, and differential equations. I have also taught all three semesters of calculus at an honors level, emphasizing concepts, definitions, and in-depth problem solving. At Michigan State University I taught an upper division undergraduate class on point set and metric topology, and a first year graduate class called geometric topology, dealing with low dimensional manifolds. My classes have ranged from 8 to 30 students. I have also been a graduate assistant to several 400 + student lecture sections in calculus and linear algebra. This entailed twice weekly discussion sessions, homework, and grading for approximately 80 students per semester. While at Berkeley, I also took two courses on teaching mathematics (both in the math department). These explored the perceived strengths of various methods suggested for teaching mathematics, such as small groups.

What I've tried: I generally find that a lecture with homework assigned and collected once a week and infrequent testing leads to poor student study habits and a consequent rapid loss of knowledge after leaving the class. In my time teaching as a post-doc I have tried to address this problem in several ways:

- (1) To facilitate course discussions, I have broken the class into small groups, added more problem solving to lectures, and directed the students to harder or more interesting topics for pre-class preparation in order to generate more questions.
- (2) I've expected my students to complete some work before coming to class.
- (3) I've encouraged feedback, both from my students to me, through soliciting anonymous comments, and from me to my students, through comments on graded papers.
- (4) I've structured the courses to add value to the homework, as most learning occurs outside of class, and nudged the students to do homework daily.
- (5) I've endeavored to use repetition – especially with regard to key concepts and themes – each time extending the ideas in a new direction.
- (6) I've strongly knitted the grading on tests to the course aims, but given more challenging problems on homework, when there is more time to solve problems.

What I'm now aiming for: From the experience I gained trying the previous items, I hope to improve on:

- (1) Structuring the course so that classes are mostly discussions of concepts/definitions/problems to provide a constant routine of feedback and guidance. Providing more work for students prior to class will help to direct class discussions.
- (2) Teaching students how to learn mathematics: both in understanding what is read and in problem solving technique. Conveying that mathematics is more a discipline than a body of knowledge.
- (3) Using the textbook more fully to facilitate the previous two items.
- (4) Finding a better means in the class of allowing confusion and using failure as a stepping stone to better understanding.
- (5) Finding better ways to persuade students to work at the class on a daily basis.