

TEACHING STATEMENT

JEREMY MARZUOLA

1. INTRODUCTION

Teaching and mentoring have fortunately been a major part of my graduate career. Since the spring of 2003, I have taught several times, many for a program that specializes in college freshman with possibly a weaker background in mathematics. These experiences have helped to prepared me for a successful career teaching at the university level.

2. EXPERIENCE

My first experience teaching came as a Graduate Student Instructor in Calculus 1B at the University of California, Berkeley. Having not taught before, I took a great amount of time to prepare each day of section. This, combined with the fact that I was fortunate to have many interested and hard-working students, led to the success of my students and very good student evaluations. As a result, I was asked to teach for the Professional Development Program. This program is specifically designed to fit the needs of students who have an interest in mathematics and science, but may have had a weaker mathematical background. The discussion section meets five hours per week instead of the usual three and the directors ask that the materials all be developed uniquely for each class. Plus, we are given an undergraduate assistant who we must manage and include in the course. This provided me the chance to gauge how my own course materials worked with the students, collaborate on the production of course materials with fellow PDP instructors, and work with a grader. I wound up teaching for this program three semesters. Twice again for Calculus 1B and once for Calculus 1A. In my fourth year, I was hired to be a TA for graduate functional analysis. This course was taught by Marina Ratner and involved holding office hours and grading. Through this, I gained valuable experience in working with advanced students and learned a good deal about grading demanding problem sets for such a core graduate course.

Twice in my graduate career, I have been able to mentor advanced undergraduate students. To begin, through an undergraduate research program, I helped my advisor, Daniel Tataru, guide a student through the beginning studies of nonlinear dispersive equations. Through this, I taught the student about the Fourier transform, fundamental solutions, oscillatory integrals, and stationary phase. This student has since graduated, but went on to apply to graduate school. In my fourth year, an undergraduate student came from

Columbia to work on extending a result that I obtained the previous year with a collaborator of mine, Maciej Zworski. I was able to teach him about finite element methods, numerical analysis, Strichartz estimates, and programming. This project should result in a publication that studies scattering for solitons of nonlinear Schrödinger equations across two delta functions. Finally, I have also done some organizing of general interest lectures for some of the graduate students about useful and interesting ideas in new areas of analysis. These lectures were always well-received and complimented both by the faculty and my fellow students.

3. TEACHING PHILOSOPHY

Throughout my experiences, my teaching style has changed in various ways, but my philosophy has always been the same. I believe that an enthusiasm for mathematics should be fostered through interaction and communication. I try to make myself available to my students via office hours or e-mails and like to give them challenging, but interesting problems. This became especially important during one of my semesters teaching calculus with PDP. The professor decided to make ϵ - δ proofs a major part of the course. As this is a somewhat complicated subject for people just beginning to study analysis in detail, my students initially did not feel comfortable with the material. So, with the exam coming up, I set up a Saturday session for them to come in and work several examples with me. Much to my surprise, that Saturday afternoon all but two people in my class showed up and spent over two hours learning about continuity. Consequently, my students went into the exam incredibly prepared and were able to understand continuity at a surprising level for such a young class.

Beyond availability, in the lower division courses I always try to include examples from physics or engineering with which the students can identify. While teaching Calculus I found that my students always had a very hard time understanding sequences and series, as it is one of the first times they have dealt with abstract mathematical concepts. As a result, after the first few lectures have left them slightly confused, I like to actually give a brief lecture that explains how these lead us to power series which gives us a way to have reasonable polynomial approximations to smooth functions. Since they understand polynomials as inherently simple functions that are easy to manipulate, it makes sense to them that this would be a worthwhile development. Though this really gives them a preview of what is to come, having an idea of the usefulness of the method really gives them some sense of comfort and insight into the material.

Finally, though it is a recent development, I have found that continuing to maintain a course web-page is incredibly useful for the students and for me personally. It gives them immediate access to the course materials and any important course announcements, while allowing me to have a permanent record for previous problem sets and notes. Plus, the students have the syllabus and other information immediately available to consult. As

students continue to become more technically proficient, this seems to be a very important part of running a course that I plan on continuing.

4. EVIDENCE OF EFFECTIVENESS

Throughout my experiences teaching, I have always received exemplary evaluations. My averages over the five sections are close to a 6.1/7.0 for my performance and 6.0/7.0 for the section administration. My students have made comments saying that I am "well-prepared", "articulate," "willing to answer any questions," "organized," "enthusiastic," and a "very good lecturer." However, most important to me is that students from my section have consistently performed above the average in classes I am teaching. Being selected as a PDP instructor after one semester was also quite an honor. These positions are filled after the GSI director in the department suggests some of the top instructors and they are interviewed by the program directors. To have been suggested and chosen after just one semester meant that I had made a positive impact in my first semester on my students.

5. FUTURE PLANS

As I continue to grow, I look forward to teaching various subjects such as partial differential equations, complex analysis and Fourier analysis. I have always found that everytime I teach, I learn the subject matter more deeply through interaction with the material and the students. The use of interesting examples and technology will always be an integral part of my classroom strategy, but I also hope to grow as a lecturer and administrator by learning from my colleagues. Mentoring students is incredibly gratifying and I would like to do so at the undergraduate and graduate level.

MATHEMATICS DEPARTMENT, UNIVERSITY OF CALIFORNIA, EVANS HALL, BERKELEY, CA 94720,
USA