

TEACHING STATEMENT

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1. INTRODUCTION

My approach to teaching mathematics reflects my more than ten years of university teaching experience of both service mathematics classes and advanced classes, both at Brandeis University and at Lesley University. And for five of these years, I have also been the coordinator for multiple sections of calculus classes taught by teaching fellows and me. On course evaluations, my students consistently rate my teaching as more than four out of five, which compares favorably with the other ratings in the Brandeis Department of Mathematics. In my annual reviews when I was a doctoral student, members of the faculty consistently gave me positive evaluations.

Below, I discuss my experience in course administration and my teaching philosophy. Then, I outline the classes I have taught at Brandeis and Lesley University.

2. MY APPROACH TO TEACHING

In this section, I relate my philosophy of teaching in the context of its practice.

My approach to teaching begins with seeing my students as individuals. So I make myself available and approachable to them by announcing at my first class my office hours office phone, and email address. During class, I extend to them courtesy and respect for their ideas by asking for their input on how to proceed with examples and exercises and incorporating their answers into my work, as appropriate. I give them every opportunity to succeed while upholding standards of understanding by providing multiple opportunities to use what they know on graded quizzes and exams with clear helpful feedback.

My teaching begins before class by preparing myself and my course materials for my students. Guided by the syllabus I created for the course and the related parts of the course texts, I prepare each class as a series of written notes where I include multiple and varied examples for each concept and list out the problems I expect my students to address in their assignments. I try to choose examples first for their usefulness in understanding the topic, and second as examples of how to work through the problems. I also seek to create a graded series of examples that show the possible difficulties in applying a method. Finally, I review each class's topics to catch any possible mistakes and identify places where my students might require extra help, either through recalling a useful fact that we need to apply, or through additional examples.

My teaching continues in class as I make an effort to learn every student's name, so that I may address them personally. If possible, I learn something about each student's reasons for taking my class and what goals they would like to achieve, and I try to relate what I'm teaching to the topics in which my students have expressed interest. I welcome questions by my students and first repeat them to help others listen in. In doing so, I am emphasizing the importance of questions in mathematics, both for the student who asked the question and also for others who are listening. If appropriate, I answer my student's question with an example and I invite the questioner to help me work it out. I also encourage my students to work together both during class and on assignments, although on the latter, I require that their solutions be written up individually.

My teaching finishes after class, when I remind my students that I am available to them and guide them to work they should do outside of class. I show I am available by lingering after the end of the class to answer immediate questions and by reminding them of my office hours and contact information. And when they do come to my office hour, I address their concerns directly and encourage them to work with me to arrive at their answers.

Over many years, I have experimented with new techniques to help my students succeed. For example, in teaching a small summer class, I allowed my students to resubmit corrected assignments for upgraded points. In doing so, I encouraged my students to review and improve their own work. For at least one of my students, this additional work produced a steady improvement in grades and resulted in a very good final exam.

Much of my approach to teaching comes from my experiences in working with classes of between twenty to forty students. While I would use different approaches in working with much larger classes, the basic principles remain the same. My students are individuals worthy of courtesy and respect and I will adapt my approach to teaching the subject matter so as to meet their needs.

3. COURSE COORDINATION

I have been the course coordinator for up to ten sections of undergraduate calculus classes since the fall of 2005. In this role, I choose the course topics, set the teaching goals for exams, and set the overall tone of the course for our students.

All calculus sections except mine are taught by graduate student teaching fellows who have been through Brandeis' teaching program. The sections have common assignments, teaching goals, and exams. The course grades of all sections are curved together¹, and then each student's letter grade for the semester is assigned by their instructor in consultation with me.

I create teaching notes out of which each teaching fellow creates their own class notes. I also choose the homework assignments, and make available self-quizzes and exam review sheets to help our students study the ideas more deeply. Exams are created by the instructors, and then I standardize the questions' language, and ensure that our students will have enough time to do their best work. After we've administered an exam, we grade it together using parallel grading with grading schemes I approve that are based on the written work we reasonably expect our students to show.

Finally, each semester, I exchange teaching ideas with Professor Susan Parker, the course coordinator for the calculus course opposite mine, differential when I coordinate integral, and vice-versa.

One of my most important roles as coordinator is to help out students who have run into some difficulty while taking the class. Fortunately, Brandeis has a system of academic advisers to help students and faculty work around private issues, such as a family or personal crisis, so that I may concentrate on helping my student on their academic side. When needed, I meet with a student to give them a sense of our expectations for the kind and amount of work I expect them to do outside of class, help them diagnose the sources of their difficulties with their course and devise ways to overcome them, and also to provide tips and strategies to prepare for exams and show themselves at their best. Towards the end of the semester, I am also called upon by students worried about their final grade, and then I provide them with a sense of what is possible for them to achieve, and the amount of effort that would be involved to reach those goals.

4. COURSES TAUGHT

I have been a teacher at Brandeis University for over eight years, and taught at Lesley University for one year. Table 1 describes the classes I have taught in this time. As faculty, I have taught differential or integral calculus almost every semester, in addition to one or more of the other classes. As a teaching fellow, I taught each semester one of pre-calculus, differential, or integral calculus; I also taught linear algebra for a summer session.

¹Here "curving" means to set the location of B- near the median, usually 80%, and adding in the other letters at natural locations.

Role	Course
Faculty 2004–Present	<p><u>Quantitative Reasoning.</u> <i>Instructor.</i> Logic and problem solving, dealing with data, modeling, and other real world applications.</p> <p><u>Introduction to Statistics.</u> <i>Instructor.</i> An introduction to the methods of statistics without calculus. Students participate in a semester-long statistical survey or study so they experience using what they learn.</p> <p><u>Differential Calculus.</u> <i>Coordinator and instructor.</i> An introduction to differential calculus of one variable, with an emphasis on techniques and applications. Also includes antidifferentiation.</p> <p><u>Integral Calculus.</u> <i>Coordinator and instructor.</i> An introduction to integral calculus of one variable with an emphasis on techniques and applications.</p> <p><u>Multivariable Calculus.</u> <i>Instructor.</i> An introduction to vector calculus with an emphasis on techniques and applications.</p> <p><u>Applied Linear Algebra.</u> <i>Instructor.</i> An introduction to matrices, determinants, linear equations, vector spaces, eigenvalues, quadratic forms, linear programming. The course emphasizes techniques and applications.</p> <p><u>Probability.</u> <i>Instructor.</i> An introduction to the mathematical fundamentals of probability. Sample spaces and probability measures, elementary combinatorial examples. Random variables, expectations, variance, characteristic, and distribution functions. Independence and correlation. Chebychev’s inequality and the weak law of large numbers. Central limit theorem. Markov and Poisson processes.</p> <p><u>Mathematical Statistics.</u> <i>Instructor.</i> An introduction to the mathematical basis for classical statistics. Probability distributions, estimators, hypothesis testing, data analysis. Theorems will be proved and applied to real data. Topics include maximum likelihood estimators, the information inequality, chi-square tests, and analysis of variance.</p> <p><u>Ordinary Differential Equations.</u> <i>Instructor.</i> A first course in ordinary differential equations. Study of graphical and numerical techniques, with a view to solving specific problems.</p> <p><u>Abstract Algebra.</u> <i>Instructor.</i> Theory of groups including infinite Abelian groups and rotation groups. Order of elements, subgroups, normal subgroups, and homomorphisms.</p> <p><u>Analysis I.</u> <i>Instructor.</i> Metric space topology, sequences, continuity, derivatives, and sequences of functions.</p> <p><u>Analysis II.</u> <i>Instructor.</i> Derivatives, and Riemann and Lebesgue integrals in multiple dimensions. Implicit and inverse function theorems. Change of variables.</p>
Teaching Fellow 2000–2004	<p><u>Pre-Calculus.</u> <i>Instructor.</i> A brief review of algebra followed by the study of functions. The emphasis is on exponential, logarithmic, and trigonometric functions.</p> <p><u>Problem Solving for Calculus.</u> <i>Instructor.</i> An experimental course intended to provide additional assistance to students taking Differential or Integral Calculus.</p> <p><u>Differential Calculus.</u> <i>Instructor.</i> As described above.</p> <p><u>Integral Calculus.</u> <i>Instructor.</i> As described above.</p>

TABLE 1. Courses Taught