

# Rahul Singh

## *Teaching Statement*

Department of Mathematics  
Northeastern University  
Boston, MA 02115, USA

[rahul.sharpeye@gmail.com](mailto:rahul.sharpeye@gmail.com)  
[mathserver.neu.edu/~rahul](http://mathserver.neu.edu/~rahul)

I find mathematics to be a fascinating subject. It is powerful in its reach, beautiful in its intricacy, chastening in its rigor. If the primary purpose of a college education is learning to learn, then the study of mathematics is an extremely effective tool for this purpose. As a professional mathematician, I am cognizant of my responsibility, and grateful for the opportunity, to shape the futures of many generations of students.

I have been involved with teaching from the time I was an undergraduate student in India. In the summer of 2008, I taught a combinatorics class for high-school students preparing for their college entrance exams in India. In my final year as an undergraduate, I led recitations for an advanced algebra course. Upon entering graduate school, I first had the opportunity to teach a section of Calculus for Business. This was a learning experience for me, and I was very proud when my section aced the finals!

Later, I was recruited to run an experimental course introducing math major freshmen to MATLAB and RStudio, with a particular focus on using computers to attack mathematical problems. A parallel objective is to introduce the incoming students to various strands of mathematics that they are likely to encounter as part of their undergraduate education. Depending on the students' interests, we usually discuss modular arithmetic, differential equations, graph theory, and counting techniques, all of which are very amenable to computer exploration.

In the last two years, I have worked as a TA/Mentor in our flagship Applied Math Capstone course, taken by a majority of math majors at Northeastern. Over the years, I have also had the opportunity to work as a mentor and substitute lecturer with Bridge to Calculus, an intensive summer program for high-school juniors preparing to take AP Calculus in their senior year, organized by Northeastern University in collaboration with Boston Public Schools.

My guiding philosophy as an educator is that *every student should get the most they possibly can out of their education*. While it is unrealistic to expect that every student graduating a course has mastered the subject and discovered a new love, it is perfectly reasonable to insist that every graduating student achieve the stated learning goals, however modestly defined. At the same time, I believe in challenging high-performing students, pushing them to explore the cutting-edge of the curriculum, and to attempt problems that pose creative challenges. After all, the least important part of any course is the grade you obtain! As a personal rule of thumb, I find myself judging the success of any classroom at the 90th, 50th, and 10th percentiles.

Let me say a few things about my philosophy and style when teaching a course. Every lecture, is an interactive stage performance. As such, the instructor must always:

- Treat your audience with respect.
- Before you begin, plan precisely what you will write and what you will say.
- Be prepared for questions, ideally with examples and exercises that clarify the most common misconceptions.

To keep a room attentive and awake, I always follow these cardinal rules:

- Project your voice. Project your enthusiasm!
- Always face your audience when speaking.

Lecturing, of course, is only one part of teaching. An instructor has many other responsibilities, the most important being guiding students towards the resources that are available to them, and appropriate to their needs. At the start of the semester, an instructor must help students decide if they are in the right course. Invariably, some students are underplaced, while others need a little more more time in a lower level class. This is the time when all options are on the table, with little to lose. Further on in the course, it is important to keep an eye out for diminishing performances, usually through some finely calibrated quizzes and homework. Often, a well timed request that a particular student attend office hours or meet with the TA can make all the difference in the world. In my experience, international students, and students from minority backgrounds, often find a singular benefit in extra nudge or a well-timed request for a follow-up. Finally, some triage is often in order for certain students in the penultimate stages of a course, guided always by the principle that *every student should get the most out of a course that they possibly can*.

I always tell my students that the only way to do well in a math class is to solve lots of homework problems. For this reason, I usually set weekly quizzes and homework in most lecture courses. I prefer to keep the quizzes hard, and the grading (and, if necessary, curving) generous. This has the nice effect of teaching the students to persevere in stressful situations, without unfairly tarnishing their grade. Coupled with the promise of relatively easy midterms and finals, this is an effective way to spur students to work hard to the point where they are comfortable with the subject.

It is always a great pleasure to witness the moment when a student suddenly, irrevocably, understands a difficult piece of math that they were struggling with just moments before. I hope to witness many such moments as I continue teaching, and honing my craft as an educator.