

Teaching Statement

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November 2007

Teaching involves imparting knowledge and inculcating critical thinking skills in students. Academic world offers this exciting opportunity to guide the students as they learn and discover new ideas.

My first experiences in teaching was as an undergraduate in IIT Delhi where I interacted with high school students participating in regional mathematical olympiads and gave lectures at the training camps. At Carnegie Mellon, being in an interdisciplinary program, I have had opportunities to teach in a variety of courses. I have been a teaching assistant for courses in Graph Theory, Network Algorithms, Probability, Statistics and Operations Research Implementations. In Fall 2007, I had an opportunity to design and co-teach a graduate course *Special Topics in Combinatorial Optimization*. This was a great learning experience for me as it involved almost all facets of teaching: designing the course curriculum, teaching classes, designing and grading assignments.

My background qualifies me to teach in variety of courses ranging from advanced courses in algorithms and optimization to basic courses in discrete structures, probability and introductory programming courses. My experience has confirmed to me that I enjoy teaching both the advanced courses close to my research as well the basic courses.

Although there is no replacement for experience, inspiring teachers at different stages of my life have had a considerable impact on my thinking about teaching. I will now highlight some aspects of teaching that I have learnt from my experiences and will shape my teaching career.

1. **Basic Concepts First.** The importance of students learning the basic material cannot be overestimated. At the beginning of the course, it is important to gauge the knowledge of the students and pace the course accordingly. As a teaching assistant for the course *Probability and Decision Making*, I found in interactive sessions with students that they had difficulties grasping basic concepts like conditional probability. Hence, I utilized the recitation sessions to discuss basic preliminaries before moving on to more involved material. For the course in subsequent semesters, we gave the students a list of problems to help gauge their understanding at the beginning of the course.
2. **Different Facets of Learning.** My experience as a student has led me to conclude that learning happens not only in the *aha* moments of great insights but also in slow percolation of ideas. A student needs to cogitate over the concepts discussed in the class. Assignments, quizzes, exams and projects act to aid this role outside the classroom and thus need to be designed with this goal in mind.
3. **Enthusiasm and Responsiveness.** My best teachers have been those who were enthusiastic about their teaching and responsive to students in and out of classroom. In my short teaching experience, I have tried to emulate their example and in the future plan to be particularly receptive to student suggestions. In the course "Special Topics in Combinatorial Optimization" I changed the class schedule based on responses from students. In the latter half of the course, I placed emphasis on the topics which the students were enjoying more and which, I believed, made them learn the concepts better.

4. **Motivation and Examples.** It is necessary for students to understand the relevance of the course in the big schema of things. Teacher should spend considerable effort making the students realize what they are going to learn in the course and why should they learn it. This helps structure the course in a way that makes the students participate in the class with more enthusiasm. For example, when teaching algorithms for matchings, introducing their applications in matching medical residents with hospitals and matching patients for kidney exchanges will make the students appreciate matching problems better.

Besides teaching courses, mentoring undergraduate and graduate students offers great opportunities to combine research and teaching very closely. I plan to interact actively with undergraduate and graduate students for research projects.