I feel capable of teaching courses from the basic mathematics/statistics/operations research curriculum, both on undergraduate and graduate level. I can also design various applied probability courses, in particular, with applications to optimization, queuing theory and finance.

I have had three years of experience teaching undergraduate courses in the Department of Mathematical Sciences at Carnegie Mellon University. During that time, I taught Simulation and Continuous Time Finance. The Simulation course was new to the department, and I had to design it. As for the Finance, professor Steven Shreve has successfully taught the course on the graduate MBA level and I, with his book as a textbook, needed to adjust the level to undergraduate setting. I will teach these courses in the next academic year as well.

My main teaching statement can be put this way: I am fascinated with mathematics, especially applied probability, and try to transfer my excitement to students. This, I believe, will motivate learning, since no one can teach a person, who does not want to learn. To succeed, one has to be a good lecturer - hard working, creative and careful – because today’s students are smart and will not accept a fake.

I think it worth describing how my personal experience has influenced my teaching. My undergraduate Math degree is from Donetsk State University, Ukraine (former Ukrainian Republic of USSR), and I may as well be considered as a product of Soviet system of mathematical education. I have gotten a solid background, as well as a strong impression that the way we were taught things – lots of hard-core science without much intuition or examples – was not beneficial for the vast majority of my classmates. Students knew things, but did not understand them. They were simply not taught to do that.

In 1999 I immigrated to Israel, and in 2000 was accepted to the Technion, to program in Statistics. In Technion, Statistics belongs to the Department of Industrial Engineering and Management and there I got my first ever teaching assistantship job. We taught probability theory to Engineering and Computer Science students. In Hebrew. This was quite the opposite of what I had in Ukraine. The students needed intuition, examples and computer demonstrations, which I was happy to provide to them. At that time, I used to build my recitations in a lecture form, with a reasonable part devoted to theory. Together with other assistants, we even wrote and distributed our own lecture notes, in which we usually included main concepts, demonstrated on nice examples. From that time on I have adopted
this way of lecturing – before proving/explaining some theorem, start from an interesting, non-trivial example, compute it and get what you need to get. Surprise the students! Then introduce the theorem. Once they saw how it worked, they would be more interested in the theorem and its proof.

An important step in my teaching occurred in 2004, when I started to be a TA to professor Avishai Mandelbaum. The course was called Service Engineering, and was a mixture of stochastic processes and various practical applications. From that moment, each recitation had to be prepared as a self-contained lecture, on slides. Often I had to teach a theory, not covered on lectures. Moreover, Avishai usually sat in on my recitations, sometimes commenting or correcting me, making notes about my teaching, and discussed them with me afterwards. To succeed I had to reassess my preparation and teaching. It has been a good school for me after all, and I felt confident going to teach at Carnegie Mellon as a Postdoc.

It started smooth. The lecture, I thought, is much like a recitation, and worked on making perfect lectures. One day I suddenly realized that was not enough. In addition, I had to plan things, had to see the whole picture of where it goes to and what I want students to know. Especially, since I was designing a new course. Moreover, for many of students my lectures were the only source of material. That definitely required more responsibility, and took me some time to adapt. Now, after two years of teaching at Carnegie Mellon, I feel that my acclimation is successful and my passion to teaching has only grown.

Wise man once told me that in academy one should always thrive to have fun on both fronts, research and teaching, and I was lucky to see live examples of people combining them on a highest level possible. Avishai Mandelbaum, Steven Shreve, Kavita Ramanan, Robert Adler are just a few with whom I was lucky to teach, work or study. My own experience so far has also been successful: usually I have been able to incorporate research papers/ideas in my teaching, whether in regular courses, or during summer projects with undergraduate students. First of all, I am much more passionate when I speak of what I do and love; second, students are really excited to see that they can apply their knowledge to solve some modern research questions. Luckily, applied probability gives us so many interesting examples. On the other hand, one can often benefit from teaching as well: there are always challenges in explaining some hard concept, or answering some interesting question in class. Dealing with such challenges enriches the background and even motivates some research directions.
Detailed list of my courses:

  I have designed and taught this course at the Department of Math. Sciences. The course is intended for undergraduates from Math and Engineering departments. Usually taken in the framework of “BSc in Computational Finance” program. The topics include main algorithms of Monte Carlo; simulation of basic stochastic processes, in particular, Brownian motion and Poisson process; applications to financial engineering and queueing theory: derivatives pricing, performance analysis of queueing networks. As well as Markov Chain Monte Carlo methods: Metropolis-Hastings samplers, Gibbs sampling with applications to Ising model, simulated annealing, traveling salesman problem, etc.

  The course is given in the framework of “BSc in Computational Finance” program at the Department of Math. Sciences. The topics include introduction to measure-theoretic probability, stochastic processes, Brownian motion, martingales, stochastic integration and Ito's lemma. The theory is then applied to derivation of the Black-Scholes formula and risk-neutral pricing of various financial derivatives.

- **Project director (Summer 2008, 2009),** Carnegie Mellon.
  I have supervised students projects (three projects each year) in the framework of the Center for Nonlinear Analysis (CNA) Institute. The topics included applied probability, finance and simulation.

- **Teaching assistance (2000-2007),** Technion, Israel.
  For the period of 2000 – 2007 I served as a teaching assistant at the Faculty of Industrial Engineering and Management, Technion. In 2003 I won the Excellent Teaching Assistant Prize. Some of the courses I taught:

  - **Advanced Probability**, in different times with Haya Kaspi or Robert Adler.
  - **Stochastic Models**, with Avishai Mandelbaum or Leonid Mytnik.
  - **Stochastic Processes (graduate course)**, with Robert Adler.
  - **Service Engineering**, with Avishai Mandelbaum.
    
    Course website: http://iew3.technion.ac.il/serveng/