

TEACHING STATEMENT

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I have enjoyed teaching Mathematics since my undergraduate days. As a youth I attended courses for high school students at the Technion. Over time my position in these courses shifted from participant to instructor. During my undergraduate studies that course was taught by me and one other student.

The course's aim was to introduce advanced high school students to concepts of higher Mathematics such as group theory, number theory, set theory, logic and analysis. It focused on problem solving techniques, partly but not exclusively with Math Olympiads in mind. Many of the course's participants went on to become mathematicians.

The Weizmann Institute, where I pursued my graduate studies, has no undergraduate program, and hence no teaching opportunities. However, during my studies there I have taught a similar program, oriented towards high school and grade school students. The skills I acquired teaching both courses have been useful when teaching undergraduate courses in recent years.

In recent years, I have taught a complex analysis course for two years at UBC, courses on stochastic processes and introductory probability at U. of Toronto, and an intense (15 lectures in 3 weeks) undergraduate course on Brownian motion as part of the PCMI summer school at Park City last summer. In the university courses, my duties were lecturing, planning the course timeline, writing homework assignments, quizzes and tests, and grading exams.

My goals in teaching are twofold. First, I must give students the knowledge and tools that they will need in order to identify and solve mathematical problems they will encounter in their respective fields of study. In addition, I strive to arouse their interest in Mathematics in general, and the course topic in particular.

With this in mind, I believe the foundation of good teaching is a clear presentation of the subject matter, which follows from careful preparation. The point of departure is the presentation of the course's material in textbooks and lecture notes. I supplement these with motivations and connections, and occasionally add points that I deem missing and necessary.

I always plan each lecture in advance, taking special care to select examples which demonstrate the material as well as lead naturally to subsequent topics. One more method I use is placing mathematical ideas in the historical context of their development. This is an effective means of broadening students' perspectives and keeping their interest.

Careful preparation must be balanced with flexibility in presentation. I actively promote class participation and strive for an atmosphere in which students ask questions and

raise ideas freely, which I find is the best way to engage their interest. One of the means to achieve this is asking a range of questions — from the simplest questions that most can answer, to deep questions designed to intrigue and encourage independent thinking. I will then encourage students to try and answer these questions before delving into the issue. In addition to engaging the class, students' ideas and questions often provide excellent leads for relevant discussion.

A key challenge in teaching is the diversity of the students' backgrounds. For example, my complex analysis classes at UBC had Math honours students as well as students majoring in Computer Science, various fields of Engineering, Biology and Economy. To the extent possible I try to make the material relevant to all by using examples that apply course techniques to concrete problems, and by relating the material to different disciplines. I would also sometimes pose questions which are just beyond the course's scope, and hint at the answer, rather than developing it, in order to intrigue the more advanced students.

One of the main difficulties students have is generalizing from the examples and arguments in class to the techniques and methods that they represent. This is where my previous experience comes in especially handy. I attempt to put emphasis on methods both in class and in discussions with students. In order to cultivate good problem solving abilities, I encourage students to find the similarities between problems and guide them in finding solutions themselves.

The PCMI summer school course stands out as I also planned the course, from the choice of topics to writing lecture notes (together with Marek Biskup who taught a parallel course). Our goal was to teach undergraduates some topics that are generally only covered in graduate courses. An expanded version of our combined lecture notes from these courses are due to be published as a textbook.

The undergraduate program involved roughly 50 students (out of over 300 participants in the summer school). My class at Park City had students with widely varying backgrounds, from those with minimal mathematical background, to some who were ready for graduate studies. Planning and teaching this course was a most enjoyable challenge. I believe the students were received good exposure to probability theory, and I look forward to seeing many them continue to graduate studies and beyond.