TEACHING STATEMENT OF ALEXANDER YONG

I have taught mathematics to students at various levels and in a number of different contexts. I have been an instructor or teaching assistant for twenty five classes and nineteen distinct courses during my postdoctoral, graduate and undergraduate career. This includes courses of calculus, linear algebra, abstract algebra, real analysis, complex analysis and combinatorics. I have taught at both the (lower and upper division) undergraduate and graduate levels. I also lectured for two years at the University of Michigan's King-Chavez-Parks program for disadvantaged youths from inner-city Detroit.

Most recently (Fall 2007), at the University of Minnesota, I am teaching two courses. First, I am coordinating and teaching a large course on "linear algebra and differential equations". This course consists of 130 students. I am responsible for their lectures, as well as organizing exams and assignments with the four teaching assistants who prepare the discussion sections. Second, I am teaching an enumerative combinatorics course geared towards high school teachers. This class consists of a dozen students, and I am responsible for setting their exams and assignments.

In Spring 2006 at Minnesota, I taught a graduate combinatorics course on "symmetric functions and Schubert polynomials" (a part of my research expertise). This class consisted of a dozen participants: graduate students, postdocs and undergraduates. For this course, I prepared course notes that I posted online. I discussed standard material, as well as new ideas geared towards open problems and further research (which some of the participants are actively working on).

At UC Berkeley, I taught two courses in Fall 2004: real analysis and combinatorics. Both were upper division undergraduate courses. The real analysis course consisted of 20 students, which included mathematics, computer science and engineering majors, as well as highly-motivated high school students. The combinatorics course was an advanced upper division undergraduate course, which consisted of 12 students, including mathematics majors and graduate students from engineering. In each case, I lectured for one and a half hours, twice a week. I was responsible for making assignments and exams, as well as supervising graders. I also maintain a webpage for my classes, containing daily lecture summaries, assignments and their solutions.[1]

In previous terms at Berkeley, I have taught complex analysis and combinatorics (Spring 2004) and abstract algebra (Fall 2003). The analysis class was a larger class, consisting of 50 students. In the algebra class, since it is considered the first "proof course" for many of the students, I wrote "how to" articles on problem solving (based on office hour discussions). Students told me that these articles have helped to improve their solution discovery and writing processes. This is consistent with the increasing quality of both their assignment solutions and in-class questions.

As a graduate student at the University of Michigan, I led sections of Precalculus, Calculus I and Calculus II courses. This entailed lecture sessions of one and a half hours three

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[1] www.math.umn.edu/~ayong/teaching.html

times a week to classes of 25-30 students, grading weekly assignments and quizzes, office hour consultations and assigning final grades. The course structure allowed for a number of different pedagogical techniques, including traditional lecturing, problem-solving sessions, homework review periods, cooperative-learning, and calculator experimentation.

In addition to concentrating on thorough preparation and clear presentation of the course material, I also aim to teach students how to think mathematically. For example, when a student is stuck on a problem, I often ask if they first can think of any examples or special cases to understand. When I present a solution to a homework question, instead of reproducing the "textbook" solution, I might pose simpler problems that would allow them to naturally discover the answer. As time progresses, I find that students begin to use this method independently in order to understand ideas and to ask more effective questions. Consequently, students feel empowered: they may not solve a problem right away, but they know that they have a general technique to make progress.

In conclusion, teaching has been an enjoyable and fulfilling part of my mathematical life, and I look forward to sharing my knowledge and experience for years to come.

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