Teaching statement of Benedek Valkó

My first experience with teaching came during my high school years. I started leading a math club jointly with a friend of mine for younger kids who were interested in mathematics. It was a weekly 90-minute session of challenging math problems, lasting for a period of about four school years. (In the end I was already in college and the students were in high school.) We collected problems which required clear thinking and bright ideas rather then the knowledge of regular class material. It was a quite demanding and also very rewarding task. Although it was obviously very different from the teaching duties I would later have at the university, my current teaching style is partly based on some fundamental observations I had picked up during those years:

- It is imperative to have a connection with the respective *individuals*.
- The most effective way to introduce a new concept or idea is through *solving problems*.
- A *relaxed atmosphere* helps a lot, but a *solid structure* is also important.
- Getting to the solution of a problem on one's own (even with the help of clues and hints) is much more instructive than simply hearing the solution.

I started having formal teaching assignments during my undergraduate years. Twice I led a one-semester discussion section in number theory for first year Mathematics majors. In the Hungarian educational system each lecture course is accompanied by a discussion section and the students usually get a grade for the latter, too. As a leader of discussion sections I had full responsibility for the grading in my groups.

My real initiation to teaching came during my PhD years and that is when I became an experienced teacher. During that period I had one or two assignments every semester (10 overall), mostly for first and second year Mathematics majors for classes of 20-30 students.

Twice I led discussion sections for a *Probability* course. I was in charge of correcting homework, grading and also extended the existing course material. I gave a one-semester computer lab on the use of the software *Mathematica*. I developed the material for the course (examples, problems) which I made available to the students on my web-page. The course provided an introduction to basic features of the software, but also highlighted how it can help to solve 'real' math problems. Besides weekly homework assignments and two mid-term exams, the students were required to complete a significant semester project. I led discussion sections for a one-semester *Introductory Calculus* course for engineering students. I have also regularly participated in the overseeing and grading of exams for several different undergraduate mathematical courses.

The assignment I liked the most (and I am the most proud of) was a two-semester course called *Problem Solving Seminar* which I led several times. (Twice the full course and twice the first semester.) It is a mandatory course for first year Mathematics majors and it is intended to provide the students with some experience in the basic techniques of problem solving through exercises in combinatorics, calculus and linear algebra. It was introduced the same year I started my PhD and I was put in charge of creating the syllabus and the course material. I prepared 8-10 problems for every seminar jointly with a fellow PhD student who also assisted me in the classroom. When we had the chance we were building on previously solved problems, making 'threads' relating to some important concepts. We also put emphasis on the interplay between different areas of mathematics, treating problems which could be solved using ideas from fields seemingly unrelated to the one in question. In a substantial part of the class, students were expected to work on the problems privately or in small groups. During that time we were walking around listening to ideas, giving feedback to the students. This way it was possible to treat each student according to her/his abilities. We could assign extra problems to those who finished with everything and could also provide hints to those who got stuck with one or the other. Regular weekly homework was also a significant part of the course (as for each of the courses I have taught), students received their grades based on those and two mid-term exams. Although the course was quite demanding, those students who were willing to make an effort generally enjoyed it and definitely profited from it.

In addition to classwork, I am also (jointly) supervising the research activity of a fourth year Mathematics major. He has just completed a research project in probability for which he received First Prize at the university's Scientific Student Conference (a national scientific competition for undergraduate students) and a place in the national final.

I am fully aware of the fact that the educational system in North America is different from the one in my home country. I am looking forward to the challenges and I am well prepared to make the necessary adjustments in my teaching style. I feel confident that the fundamentals I have learned during my years of teaching give me solid background to successfully tackle any educational assignment I might be trusted with.