

## TEACHING STATEMENT

XUNTAO HU

Over the past five years in graduate school, I have taught many different types of courses. Most semesters I teach two recitations in courses ranging from Precalculus to Multivariable Calculus. I have also been the lecturer for two Calculus II courses in summer 2015 and summer 2017. In the meantime I have been a teaching assistant for graduate courses such as Complex Analysis. Since my undergraduate years, I have organized and co-organized student seminars on various topics such as Abstract Algebra and Riemannian Geometry. Over the years I have observed and learned lots of teaching techniques and ideas, which in turn have influenced and shaped my own philosophy of teaching. I have the following fundamental tenets which I would like to elaborate on in this statement:

- *Mathematics should not be exclusive to “clever people”.*
- *Learning mathematics is extremely satisfying, but requires hard work. It is the teacher’s duty to guide the learner through the swamp, and lead them to the land of joy.*
- *A healthy student-teacher relationship is fundamental to learning mathematics successfully.*

The guiding principle in my teaching is that mathematics should be for everyone, in both the narrow and the broad sense. The narrow sense means that in the classroom, every student should be treated with respect and according to his/her abilities. In my classrooms, I always encourage students to ask questions publicly instead of privately. In this way everyone can benefit from the answer. I always exercise the greatest patience in clarifying the material. One of my recitation students wrote on the course evaluation website: “it was as if I never had to attend lecture classes because Xuntao reviewed a week’s worth of lessons in 53 minutes of class.”

The broad sense means that mathematics can and should be beneficial for everyone. My father majored in mathematics during college and taught mathematics for several years afterwards. He told me that mathematics changed his life, in the sense that he learned to think and act rationally. Through the years I keep rediscovering what he meant. Mathematics not only exercises my brain, it also gives me a better sense of aesthetics. Many mathematicians I have met have great taste in art, music and literature. I believe that these benefits should definitely not be restricted to mathematicians, and that is what I try to convey to every person around me, especially my students.

From my experience in teaching, I realize that the only way to make my students fall in love with mathematics is to let them experience the satisfaction after conquering a hard problem. When I am lecturing, I constantly ask the students questions about how to proceed to the next step. For instance, when I was doing examples on Integration by Parts, I always asked my students to choose the “ $u$ ” and “ $dv$ ” for me. Even if they chose incorrectly, I would still proceed with their choice and show them how it in fact complicated the integration. In this way the whole classroom learned about how to make a correct choice of the “ $u$ ” and “ $dv$ ” together. The message I try to convey to my students is that mathematics is developed by the process of trial and error, just as any other field that they will get into.

I always tell my students that mathematics is all about problem-solving. Any attempt to solve one problem all by oneself is better than copying down the solutions for one hundred problems. In the two summer courses I instructed, in the last thirty minutes of each lecture I would write a few problems on the board and ask my students to solve them on their own. When the students were working on the problems I walked around and helped them individually if I observed that they were stuck. Afterwards I would encourage the students to exhibit their work on the board. When students leave my class, I hope that their take-away is the ability to think logically, which will make them into good problem solvers in any field and in life.

Last but not least, I believe that in many circumstances, students tend to like one subject more if they like the person who teaches it. Therefore I aspire to become a better person first, a better teacher second. I constantly try to be as friendly and positive as I can with my students, so that they can learn mathematics from me in the most relaxed mood. One student once wrote this on the course evaluation website: “I really liked Xuntao, he knew what he was talking about and encouraged his students to be interactive. His positive energy was needed after a long day.”

Of course, my relationship with the students lies strictly within the realm of teacher-student relationship. I will not be partial to the students who come to my office hours more often, or ask more questions in class. I am also strict with the rules in my classroom. In particular, I have zero tolerance for dishonesty. In this way I ensure that all my students learn and compete on a fair level.

Above all these teaching philosophies is the belief I hold that the students we are teaching are no different than ourselves when we were students. The difference between me and them is often not in the quantity of mathematics knowledge, but in the amount of motivation and interest. Therefore it is my duty as an instructor to understand each individual’s capacities, and adapt the content and the approach around them. I am always willing to learn new teaching techniques and styles in order to give more people the ability to appreciate the majesty of mathematics.