TEACHING STATEMENT

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Teaching philosophy

The teaching of mathematics has been one of the most rewarding and insightful experiences in my years as a graduate student. By teaching, I can share with students the knowledge and perspectives that many teachers helped me build throughout my life. At the same time, I can experience how different people learn and approach their challenges, getting a better understanding of the learning process. My time teaching at UIC has been successful, resulting in many positive evaluations and a Graduate Teaching Assistant Award.

During my education in Brazil, I attended humble, free public schools where there wasn't much encouragement to pursue higher education, and math was usually approached as a collection of tools you just needed to memorize, which was often uninteresting. That only changed when I took part in Mathematical Olympiads and their scientific programs. There, I had contact with stimulating and fun mathematics and started to understand the ideas behind solutions and how creative they can be. Thanks to that, my passion for mathematics could flourish, and I chose to pursue it as a career. For this reason, I comprehend the difference my teaching approach can make in a student's life, and I have the joy to share the opportunities I have had.

As a teacher, my goal is to transmit the math concepts my students will need in their professional lives but also to develop critical thinking, and share the beauty of mathematics. I understand students have different learning styles and backgrounds, so I seek to be flexible and create a welcoming environment where students can ask questions and make mistakes. I like to tell my students that math is like practicing a sport: they can't just watch, they need to actively do it. This process takes practice and resilience.

Teaching experience

I have been a teaching assistant (TA) at UIC since I started my Ph.D. in the Fall of 2019. Since then, I taught an ample variety of courses in different levels, from Intermediate Algebra (Math 090) to Calculus 3 (Math 210). I have both taught in discussion sessions as a TA and lectured classes as an instructor. I had experience teaching online, and I helped build online course content. By teaching two or three courses per term of around twenty to thirty students each, I have taught over 500 students in the last years.

During discussion sessions, the goal is to help students gain familiarity and practice with what they studied in the lectures. I usually start with a short review of the content and give an example of how it can be used to solve problems. Then, I have my students work in small groups, and I encourage them to collaborate on problems and ask each other questions. While they work, I walk around the class answering questions and checking if any group is stuck. When helping students, I do not simply give the answer but hints that will lead the students to get to the conclusion by themselves. I emphasize that math is not inflexible and rigid, but creative and open to new ideas and that most problems have different solutions.

In addition, I usually bring "challenge problems" with me in case time permits or some group finishes the worksheet earlier. Once, when I was teaching polynomials, I asked a group the question: "Is $sin(x)$ a polynomial function?". As other groups were finishing their exercises, they started to join the first group in the problem. They were then able to find the solution after I reminded them that the number of roots of a polynomial is at most its degree. This was a great way to engage students, compare different functions, and show how particular a polynomial function can be.

On the other hand, when my students are struggling with some content, I like to choose one exercise and solve it with them on the board. While solving, instead of just presenting the solution, I like to show where we want to get, and how the tools we learned can take us there, so the idea

behind the solution becomes more explicit and easier to follow. For example, when solving a system of linear equations, I remind my students that we can always solve a linear equation in a single variable. So our goal is to eliminate all but one variable from one of the equations. This way, the students know where we want to get before we start making operations with the equations.

I have also taught as an instructor of record for the courses Math 090 (Intermediate Algebra), Math 104 (Mathematical Reasoning), and Math 109 (College Algebra). During these opportunities, I lectured classes and independently wrote the syllabus, created lecture sheets and worksheets, and prepared quizzes and exams. When creating the course material, I strove to understand my students' needs and personalize it to their strengths and weaknesses.

As a Minority-Serving Institution, UIC is one of the nation's most diverse universities. Thus, my classes have all been incredibly diverse, composed of students with different backgrounds, nationalities, and interests. This has taught me to better listen to my students' needs and adapt to their learning styles. It has also taught me how students can face different obstacles when going through adversities. For instance, during the pandemic, when not all had access to the tools and space required to study online. I acknowledge their obstacles and work closely with my students to help them keep on track when falling behind, and to overcome their difficulties.

I also offer personalized help during my office hours. Every semester, I have students who constantly attend my office hours in addition to the classes. There, they feel more comfortable sharing their struggles and asking for advice. I often share with them my perspectives on how to learn math and suggest ways to better prepare for their exams. I was very happy when one of my Linear Algebra students, who started really behind but was putting in a lot of work, got good scores and passed the course.

At the graduate level, I prepared and taught an online course on Algebraic Surfaces in 2022 at the ICMC-USP Summer, in Brazil. In this course, I covered important content on surfaces, such as the Riemann-Roch Theorem, blow-ups, resolution of singularities, linear system of curves, and the 27 lines on smooth cubics. It was a good experience teaching math on a higher level, and I received excellent feedback from the participants.

Evaluations and feedback

Coordinators' and students' feedback is the best way I have to assess and improve my teaching. I always ask my students for their comments and suggestions, to which I give great value. In addition to that, UIC has an anonymous evaluation form that we obtain after the conclusion of the course. Here I show some excerpts that support the positive outcome in my classes:

- "Helped us to think about ways to solve problems instead of giving answers." - Math 121, Spring 2020
- "The way he explained problems to the class was really beneficial. He has a way of explaining which helps our fast-paced class understand the material." - Math 118, Fall 2020
- "This TA did an exceptional job at collaborating with students and walking them through the course material if there was any confusion/concern." - Math 104, Fall 2022
- "Very knowledgeable and explained concepts very well! Also very helpful. Great TA! Also appeared to enjoy his work, and the topics which help to create a positive teaching environment." - Math 210, Spring 2023
- "Office hours and discussion instructions and examples were clear and specialized for each student." - Math 210, Spring 2023

Teaching at UIC has been a great experience, which helped me grow as an instructor and reflect on the learning process. I deeply enjoyed the interaction with students and the opportunity to share knowledge with them. At the same time, realizing how different people learn has helped me get new viewpoints on my learning and my research approach. As I continue my career, I aspire to keep teaching and learning with my future students, improving how I present my ideas, and sharing with others the opportunities I am glad to have had.