Teaching statement for Venkata Sai Narayana Bavisetty

TEACHING PHILOSOPHY

My teaching philosophy grew out of my reflections on my experiences both as a student learning math and as a teacher of mathematics, and its main principle is that active student engagement is indispensable for learning mathematics. I capture students' attention by telling stories, intentionally apply a variety of lecturing techniques, actively engage my students, acknowledge diversity in the classroom, and strive to foster an inclusive environment where everyone can succeed.

I pique the interest of my students by telling mathematical stories complemented with technology and crafts. When I present a new concept, I introduce the main characters and give a quick summary of the plot. One of my favorite stories to tell is the story of calculus, starting from the invention of calculus to understand motion, followed by the development of the $\epsilon - \delta$ definition of a limit to understand Fourier series, and culminating in understanding the geometry/topology of surfaces using Stokes theorem. More concretely, to motivate the complicated $\epsilon - \delta$ definition of a limit, I explain how the study of continuous everywhere but differentiable nowhere functions gave rise to this definition and emphasize that these definitions took a long time to crystallize. I supplement these stories by including animations, mathematical games (chess on a torus) and paper crafts (making a paper octahedron) to aid the visualizing and understanding of complex mathematical objects.

I intentionally use lecturing techniques to communicate mathematics successfully in the classroom. I start with easy but powerful examples which illustrate the concept without overwhelming the students with technical details. I anticipate the difficulties the students might have and make sure to have a lot of examples ranging from easy to hard to explain the difficult parts. For instance, when introducing Riemann integration, I use the examples of constant functions (easy), linear functions (medium), and quadratic functions (hard). After explaining something new, I give a small pause to scan the room in order to see if the students understood the material and to simultaneously give students some time to absorb the material and ask any questions they might have. I use multiple checkpoints, where I get feedback by asking them to raise their hands/thumbs up (these physical gestures also keep them alert), so that I can fine tune my explanations accordingly.

I encourage my students to become self-learners by actively engaging them with the material. So when a student gets stuck, I ask probing questions like "What do you think is the next step?" (allows them to focus on the next step rather than being overwhelmed by trying to come up with full solution), "What property of the derivative do you think we need?" (allows them to connect theoretical knowledge with the practical problems), "Explain your idea to your group and see what others think" (encourages collaborative problem solving). During the review sessions, I assign activities like "come up with some non-identities which look true" (makes it easy to remember which identities are true and which are not). I make sure that the students think collectively, communicate, and share ideas. To ensure that the students are comfortable discussing with each other, I include icebreaker activities such as "Would you rather" and "Name game". I incorporate technologies which promote collaborative problem solving such as Kahoot and Teacher Desmos.

I recognize that students in my classroom have different backgrounds, experiences, identities and expectations, and as a teacher I build a welcoming community for everyone. In order to know my audience, I hand out a "getting to know you" survey asking students questions about their mathematical background, concerns about the class and their expectations. During the first section, I clearly explain what they can expect from the course and what they are expected to do. Early on in the semester, I ask my students to fill out an anonymous early feedback form with questions like "What do you want me to start/stop/keep doing?". As the course progresses, I identify students who are struggling with the course and tailor my support accordingly. For instance, I have previously arranged meetings with first generation college students outside of regular office hours to guide them on how to study for a university course and provide them with relevant resources. I encourage students with low self-confidence to solve extra credit

assignments, to not only develop a better understanding of the key concepts but also to boost their confidence. I hold review sessions and practice exams to familiarize students who are taking a university class for the first time with what to expect in the exams.

I find teaching an extremely satisfying and rewarding experience, especially when I see my former students doing incredibly well in subsequent classes and life in general. As a teacher, I actively engage with my students to build a community of critical thinkers and to make the process of learning math a memorable experience.

TEACHING EXPERIENCE

For the past five years, I have taught the calculus sequence as a Teaching Assistant in the Active Learning format (students learn through collaboration) and I have been ranked as excellent by students for seven semesters. My duties included proctoring exams and creating fair and consistent rubrics for grading. I have been a Merit TA for the Merit Program for Emerging Scholars. This program targets students who are members of traditionally underrepresented groups in mathematics and science. As a Merit TA, I designed additional learning material which typically consists of conceptual worksheets, review Kahoot sessions, or vistas into upcoming material. I have also written/conducted several mock exams for Merit students. For the Summer Illinois Math camp, I designed a week-long topology course each for middle school and high school students. I developed an original curriculum including lecture notes, worksheets, and activities to motivate and simplify abstract concepts like homology for the students.

Before joining University of Illinois, I was also a teaching assistant at the Indian Institute of Technology Bombay, where I taught complex analysis and differential equations and was a Head TA for the differential equations course. Besides the regular TA responsibilities, I organized and coordinated all TA hours and work schedules, and assisted TAs experiencing difficulties while performing their duties.

MENTORING EXPERIENCE

I have been a mentor for the Illinois Geometry Lab, co-leading together with my advisor, a three-semester undergraduate research project titled "Modular forms and homotopy of Q(2)". The main goal of the project was to simplify certain algebraic computations of homotopy groups of a spectrum, named Q(2), using a complex theoretic viewpoint. The students utilized the computer software MAGMA to carry out these calculations. To prepare the students for the project, I gave several expository lectures on background material such as homological algebra, elliptic curves and chromatic homotopy theory. I met with the students regularly and discussed ideas they had, examples they worked out, and other issues that came up in their readings. At the end of each semester, I aided the students in creating a poster, building a presentation, and improving their mathematical communication skills. Seeing the students mature in their mathematical thinking to prove new and exciting results was a very proud moment for me. Being a mentor and discussing graduate level math with enthusiastic undergraduate students was a very fulfilling experience and motivated me further in my research. I plan to continue such projects throughout my mathematical journey.