STATEMENT OF TEACHING PHILOSOPHY

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Like any other skill, developing mathematical thinking requires sustained effort and productive practice. My goal as an educator is to meet students where they are and provide them the appropriate scaffolding to move from novice to master of the course material. My courses utilize a structured workflow of (1) Self-study, (2) Lecture, (3) Collaborative Worksheets, and (4) Problem Sets to move students from concrete examples and intuitive reasoning to precision and abstraction. Each of these steps incorporate active pedagogy to encourage student engagement. Additionally, I adopt interventions recommended by social justice research to create an equitable and inclusive classroom.

New material is first introduced to students through self-study, which takes the form of a reading assignment and an associated Canvas quiz. These quizzes contain short computational problems and, on occasion, include an exploratory question to set up the topic of a lecture. For example, when presenting induction in my Introduction to Proof course, students make a conjecture about the parity of the 105th Fibonacci number and provide an informal explanation for their answer. In lecture I formalize their intuitive explanation so it can serve as an anchor when presenting the general proof strategy.

My lectures prepare students for investigation of more in-depth questions on their collaborative worksheets. Students are engaged throughout the lecture: for instance, when demonstrating a related rates problem in Calculus I, I pause when we need to compute a derivative and have students guide me through the process. Also, after I present an example or proof, students indicate their level of understanding with their thumbs (up for “good”, side for “meh”, down for “no”.)

Students are assigned to collaborative groups for the term, which helps them establish a working relationship to take on more in-depth problems. On a Calculus III worksheet, for example, students work through the proof that \( \sin(x) \) is equal to its Taylor series. With the support of their peers and my individualized assistance, students can fully engage with this lengthy proof at their own pace and style.

Finally, students are ready to tackle problem sets. To encourage students to attend office hours, I give an “Assignment 0” at the beginning of each term. This assignment includes preferred names and gender pronouns and must be turned in during my
office hours. In addition to providing a first step to inclusivity, this provides an opportunity to break the ice, which lowers the barrier to attending office hours in the future.

Beyond the structure I give to students, I also apply structure to myself to manage implicit bias. For example, I grade based on predetermined rubrics and use a blind grading process. These interventions are made transparent to students to hold me accountable. Currently, I co-organize an antiracism learning seminar where we read research and meet on a biweekly basis to discuss how to implement the findings in the mathematics classroom.

Through these methods, students are put in a strong position to leave my classroom with a more developed capacity for mathematical thinking and an appreciation of the core material.