

TEACHING STATEMENT

ASSAF BAR-NATAN

I am a flexible teacher who prioritizes community, in-class collaboration, and student experience in my classrooms. I have a wide range of teaching experiences, from large application based calculus and linear algebra courses, to smaller specialized classes, and on a wide range of topics from Python to partial differential equations to complex analysis. In each of my courses, I tailor classes, problem sets, and discussion to the needs of my students, the department, and the mathematical material.

Philosophy Summary. Mathematical knowledge comes from community, which I believe can be built by giving students dedicated time to discuss problems, and assigning group homework. Students make friends, exchange ideas, and learn together. As a student writes in the course feedback, “Assaf created a great learning environment in lecture by providing time for group discussions on how to approach math problems, what we find difficult/easy, etc.”

By fulfilling the social needs of my students, I strive to build collaborations that elevate weaker students and teach all students that math is a collaborative endeavor. I recognize that for many students, math is a barrier to their university success. By focusing on building community, learning through participating, and creating safe spaces to learn, I allow students to overcome these barriers.

Enacting my philosophy requires planning and goal-oriented class design. To plan a class, I use the lesson planner that I wrote and designed with the 2019 Calculus Community of Practice at the University of Toronto. I organize my learning objectives for the class material, and build a class plan that is directly related to the goals at hand. When writing problem sets, I make sure that the questions are directly influenced by the target goals, and reinforce the definitions and main ideas from the class.

A Classroom Story. In a review class, I wrote a list of calculus concepts on the board, and told the students to fill in the rest. All class, students were up at the board, drawing arrows, connecting ideas to each other, and presenting their contributions to the class. The result: a study tool created by 160 students working together. A student later said that this was “one of the most fun math classes she’s ever had and loves that it’s so different and a lot more interactive as compared to any high school or other university classes.” This class was the culmination of a semester of focusing on building a classroom community that can answer students’ needs.

Flexibility and Adaptability. To me, flexibility is a necessary component to meeting the needs of my students: “He made sure everyone was able to follow in class and tailored each lecture depending on where we needed help with the most.” My teaching strategies adapt to the situation. Worksheets for small classes, online demonstrations for large. Lectures only work well when combined with frequent in-class polling. Slides for large classes, blackboard for small. To match medium to context, I envision the class from the perspective of its participants, and change myself accordingly. This flexibility lets me create the same level of learning regardless of the class, classroom, and context.

To build a community in a large service course, such as those I taught in Toronto, I use group work and in-class discussions. In a smaller more specialized class, such as my classes at the Canada/USA Mathcamp, I use challenging problems and extra office-hours to bring students together over the material.

In my current teaching at Brandeis, I use a mix of tools, from collaborative components in assignments, to group-work on the board. In surveys, students are consistently surprised at the sheer amount they are learning compared to traditional lecture-only based classes.

Curriculum Design. At Brandeis, I was tasked with creating a new axiomatic linear algebra course from scratch for math majors. I designed a course with my philosophy in mind – pre-class readings, in-class group-work and lecture hybrid, and post-class individual and group assignments. I structure problem sets around course material, and write mid-terms to target important definitions and theorems in the course.

My role as a teacher extends to mentorship of TAs. I was a Lead Writing TA (LWTA) in the Toronto math department; an appointment that carried with it a role of leadership and curriculum development. I developed, wrote, co-ordinated, and ran training sessions on: giving effective feedback, facilitating group work, active-learning, dealing with challenging situations in tutorials, working with technology and teaching online.

As LWTA, I redesigned tutorials for a first-year linear algebra course. With community building in mind, I worked with the course co-ordinator, to create a sequence of ten-minute tutorials for small tutorial groups that was centered around paired group presentations and peer feedback. I wrote content, rubrics, and delivery instructions. Using the LWTA role to create communities in the tutorials allowed students to have dedicated speaking time in a course of 2400 – a rare opportunity for classes of that size.

Final Words. Teaching is hard because learning is messy. There's no formula for an empowering class, and there's no equation for a successful course. Instead, I work together with my students to meet their needs for collegiality and compassion. Thus, I consistently create and run impactful courses that, by virtue of training students, expand and enrich our mathematical community.