



Georgia Institute of Technology

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December 1, 2022

TEACHING STATEMENT

This year marks my 18th year of teaching college level mathematics, and my 7th year of teaching at Tech, where I have specialized teaching the first-year math classes. Since teaching at Tech I have taught 3,352 students, and since Fall 2017 I have taught 1,767 students, or approximately 11% of all current undergrads. Including the students who took a course I coordinated, that ratio goes up to 19.5% and that number will continue to increase until saturation occurs after ten consecutive semesters of course coordination, in Spring 2024.

DESIGNING A LEVEL OF TEACHING

My primary goal in teaching incoming students is to prepare them for the demands of their upper level classes. I challenge the students to gain a deep understanding of the course material in order to be able to synthesize concepts, to integrate the ideas from class into their other studies, and not be content to simply memorize the definitions or mechanically learn the concepts. The challenge is to find a perfect balance of content level, pace for the course, and the ideal blend of theoretical versus practical knowledge.

The lectures were the best aspect. In most of my previous math courses in high school, there had always been an emphasis on mechanical math rather than conceptual. It was beyond evident Professor Sal wanted us to really understand the conceptual aspects of linear algebra. His lectures delved into immense detail on concepts, and he made them seem like elementary concepts, even though they, in retrospect, probably were not that simple.

– CIOS Response, Math 1553, Fall 2016

CURRICULUM DEVELOPMENT

I structure the courses I teach, typically Math 1552 Calculus II/Math 1553 Intro Linear Algebra/Math 1554 Linear Algebra, initially testing mechanical rather than conceptual knowledge, and finishing with assessments that test mastery at synthesizing concepts from the entire course. Lectures are always full of examples, contain few if any formal proofs, and the students always have a slew of additional practice problems for exams and quizzes in order for them to be able to practice

the concepts. Students successfully completing the course have a working knowledge of the course material, and are able to understand and convey the big picture, and use this understanding to aid in solving problems.

When designing a course curriculum with these goals in mind, assessments are used to accomplish various needs. Weekly quizzes are used to provide feedback to the students and to keep them on track with consistent study habits, and open-ended Exploration assignments for the Linear Algebra classes to help students obtain a deeper understanding of the course material. Exams assess mastery of the course material and provide a challenge to the students in order to encourage them to work to the best of their abilities and learn how to study effectively. I routinely employ technology in the classroom whenever possible such as the GeoGebra graphing tools or MATLAB Exploration Lab assignments, in order to help convey a difficult concept or to connect several concepts in the most impactful way possible. The course curriculum is designed to extract the greatest potential from each student, incentivize good study habits, and provide plenty of practice materials throughout the semester so that each student understands the expectations of the course and has the necessary resources to succeed.

COLLECTING FEEDBACK

Every semester I try to learn the names of all my students. The students really appreciate it, and it helps create a positive learning environment where the student feels comfortable and secure in the knowledge that I care about them personally. Learning names also aids in collecting feedback in order to teach as effectively as possible. Feedback can be obtained using technology such as Turning Point or a Piazza poll, or by calling on a particular student by their name, or asking students to raise their hand if they got up to a certain point of a problem.

Sal is a very good teacher. He is definitely challenging, but he teaches in such a way that you can handle such challenging topics without panic. He's very passionate about what he's teaching which creates a great environment to learn. He also takes the time to learn all of his students' names. You can tell he really cares about his students' success.
– CIOS Response, Math 2602, Spring 2015

COURSE COORDINATION

A primary responsibility in my role as an Academic Professional is to act as course coordinator for one of the service courses, typically either Math 1552 Calculus II, or Math 1554 Linear Algebra. The course coordinator aims to maintain a certain level of *uniformity* to the various sections of a course in order to provide a consistent experience for the students who take these service courses, as well as provide assistance to the instructors of the other sections who are typically new research faculty or incoming postdocs. These new faculty often teach a coordinated course as their first teaching experience at Tech. The coordinator assists the other instructors in several ways; we provide a sample syllabus, coordinate the writing and grading of exams, and help to manage TAs and advise the other instructors on various problems that the students have as they come up. In my courses, I often completely take on the responsibility of quizzes, with the Head TA, in order to take some work off the other instructors.

TECHNOLOGY IN THE CLASSROOM AND ONLINE LEARNING

These days students expect many avenues to accessing course material. Even after returning to fully in-person classes, I always stream and record my lectures and office hours on MS Teams, Bluejeans, or Zoom depending on the course. Students often tell me that they find it useful to have the lectures recorded so that they can watch them when reviewing for the exams. Also, for most classes I will use an iPad and OneNote to sync the lecture notes automatically in real time so that students do not need to copy what is being written during lecture.

I also try to integrate technology in the classroom whenever possible using, e.g., GeoGebra, Desmos, or MATLAB. The adage *a picture is worth a thousand words* is true also in mathematics, and it is wonderful when the students collectively gasp in that lightbulb moment, having just understood something complex after seeing a demonstration during lecture.

Technology can also be part of the curriculum. Students in Math 1554 Linear Algebra are asked to write MATLAB code in order to explore several concepts more deeply, especially for the topics which require tedious calculations such as Google PageRank, Markov chains, and the singular value decomposition. Many times each semester a student will tell me that they thought the MATLAB exploration assignment was extremely helpful in gaining a deep insight into a particular topic.

We also use Piazza in all of my courses, in order to give students additional help outside the usual working hours. Students in my classes always can get help very quickly and often cite my lightning fast responses as an advantage when taking my classes.

TEACHING MENTORSHIP

I help orient several new faculty in my role as course coordinator or as a follow-up to the *Teaching w/ Technology* workshop which has four sessions per year, and have provided assistance to current faculty due to my knowledge of the various technology teaching tools that are employed in SoM each semester including Gradescope, Canvas, and Piazza. This was especially true during the COVID-19 pandemic when many faculty were relying on some of these tools for the first time, and I was an active participant on the SoM Continuity Forum in Piazza throughout the pandemic.

I have mentored more than a dozen postdocs and grad students. I share my experience and provide any insight I can to help prepare them for their first teaching experience at Tech, or to provide advice for specific issues that they are facing. Postdocs and grad students often seek me out to get advice with regards to teaching informally, but I am also the formal teaching advisor for several graduate students including David Harper and Christina Giannitsi, as well as the former postdoc Larisa Serdukova. I assisted in writing syllabi, helped determine the proper scope and difficulty of exams, and in the case of Larisa Serdukova I attended her lectures once a semester and provided feedback on teaching.

I have also mentored countless undergraduate students who show up to my office, who are often experiencing stress or anxiety from being pushed to their intellectual limit. I welcome them, listen to them, and share my experiences as a former student, provide encouragement and some perspective. Tech is often a difficult place, especially for the first-year students who comprise my classrooms, and there are many ways that the students can sometimes struggle that do not always have to do with the right way to study. I listen to them and give them my time and an empathetic ear, I try to understand their struggle and see from their perspective, and I provide any insight that I can to help them.

OTHER SERVICE

Many students find me approachable and friendly, and as such, I end up writing many letters of recommendation every semester for former students. I also hold the *Teaching w/ Technology Workshops* for new faculty, postdocs, and grad students during orientation week every semester, which utilizes my knowledge of the technological tools employed in SoM and provides sample assignments, sandbox Canvas courses, and links to additional resources for later reference.