

# ALEXIS HARDESTY

## TEACHING STATEMENT

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### TEACHING STYLE AND PEDAGOGICAL PRINCIPLES

In the classroom, my overall goal is to help students build appreciation for mathematics and build confidence in their mathematical skills. In particular, I strive for students to connect the course material to their academic goals, build connections with classmates, and tackle mathematical problem-solving.

### GAINING AND MAINTAINING STUDENT MOTIVATION

To best serve my students, it is essential to involve them in the learning process, achieved by gaining an understanding of where they came from and where they would like to go.

*For example, before instruction begins each semester, I survey my students to acquire a sense of their background knowledge as well as their academic goals.*

In my experience, tough mathematical concepts become more approachable when some level of familiarity is introduced, which I achieve by connecting to background material. These same concepts become more enjoyable when some level of importance is introduced, which I achieve by connecting to future career path.

### ENGAGED STUDENTS AS A CLASSROOM CULTURE

In addition to promoting engaged learning between student and teacher, I also encourage engagement between students. I learn all student names within the first few weeks of class and encourage students to become familiar with their peers as well, letting each student to know they are an essential part of the classroom experience.

*For example, in a face-to-face classroom, at the beginning of each class, I ask students to quickly check in with their neighbor to recall information from the previous class.*

These neighborly interactions establish a cooperative classroom culture, which allows students to feel more comfortable sharing their thought processes with each other. In a hybrid or online classroom, student engagement may look different than these neighborly interactions.

*For example, in an online synchronous differential calculus course, we regularly switched between lecture and completing interactive learning activities online. These activities allowed students to engage with the material in a more interactive capacity.*

### ACTIVE DISCOVERY AS A GATEWAY TO STUDENT RETENTION

Although time management throughout a semester is always a consideration, there are some practices that I choose to prioritize despite losing traditional lecture time, such as derivation of formulas and algorithms.

*For example, many students know that when dividing fractions, we flip the second fraction and multiply instead. However, few students know why this method works. When teaching a course on mathematics education, I had students engage in an activity to model how this method of dividing fractions is derived, providing an active learning experience.*

In my experience, providing active learning experiences increases student retention more than relying on memorization. Memorization, while a good tool, too often fails students for various reasons, whether that be a hectic exam week or chronic test anxiety.

### ADJUSTING TO THE NEEDS OF THE STUDENT

At the end of each semester, I reflect on the successes and failures of my teaching. I evaluate mid-semester and end-of-semester student feedback along with my own observations to adjust to the needs of the student in my next teaching endeavor. Adjusting to student feedback mid-semester lets students know that my classroom is one that values their experiences and opinions.

*For example, in a linear algebra course, in mid-semester feedback, a student mentioned a noticeable*

*difference between problems in class and on homework. To address this, I set aside class time for students to work through questions that highlight how a single concept is applied differently depending on the specific question. Although allocating in-class work time makes for a faster-paced lecture, the student is more equipped for a variety of possible questions, leading to increased confidence in their mathematical abilities.*

This example is just one of the changes I have made throughout my teaching career. Since I am always seeking to improve, I anticipate more changes to come.

## CLASSROOM TECHNIQUES AND ASSESSMENT STRATEGIES

### SYNCHRONOUS INSTRUCTION

When teaching synchronously, I have typically opted to use a “chalk talk” method of teaching over alternatives such as lecture slides. In my experience, this instructional method has many benefits, such as pacing the course and showing students the mathematical thinking process in real-time, accommodating students who may be slower to catch on to new concepts.

*For example, when explaining linear transformations of vector spaces in a linear algebra course, after giving the initial examples, students asked how this concept connected with the functions of real numbers studied in calculus. The chalk talk method allowed me to easily pause and write out examples, diverging from the content I had initially prepared.*

Despite my preference for the chalk talk, I am aware that this method puts a burden on students to record the written notes as well as the oral explanations of the content. Although I have previously provided a note-taking resource for students to ease this burden, I hesitate to utilize this strategy again, as it detracted from the flexibility of my instruction. Instead, I would opt for emphasizing the importance of oral explanation in real time, reminding students to include this in their notes, in addition to providing a written version of the notes after the lecture.

During one semester of online teaching, I applied a flipped classroom method where students watched pre-recorded lecture videos outside of class and completed practice problems and homework during class time, providing students additional time to digest the lecture material. My experience with this teaching method was high student opposition, with multiple students stating that this instructional method forced them to “teach themselves.” Although student opposition to this learning method is common, some of the opposition resulted from poor instructor utilization of the learning management system and failure to properly motivate student engagement. In my experience, a flipped classroom relies on student accountability to watch the lectures before class time and instructor responsibility to create space for students to ask questions during class time. Considering this reflection, I am open to applying a flipped classroom again with a more interactive usage of the learning management system and reliable routines to ensure students receive ample support during class time.

### ASYNCHRONOUS INSTRUCTION

In the pre-COVID era, online mathematics courses were traditionally taught using either pre-recorded lecture videos or self-paced slide show presentations. When faced with online asynchronous teaching in the midst of the COVID-19 pandemic, I opted for the former of these options, recording lecture videos explaining examples from the course textbook. Student response to this method was favorable overall, with student criticism noting that they wished the “videos were a bit more engaging” and they found this method of instruction “boring and long to watch the videos.” In light of this feedback, if I were to teach an online asynchronous course again, I would opt to shorten pre-recorded lecture videos and include more interactive learning activities to supplement the material rather than relying solely on video instruction.

## CURRICULUM DEVELOPMENT

### READING AND WRITING MATHEMATICAL ARGUMENTS USER EXPERIENCE

In the 2018-2019 academic year, I served as a research assistant for a curriculum development study for the Introduction to Proofs course at Texas Tech University. This study was a collaborative effort between the Department of Mathematics and Statistics, the Department of Classical and Modern Languages, and the Technical Communication and Rhetoric Program in the Department of English to improve mathematical literacy for students learning proof-writing for the first time. In this study, a control group of students was taught with the standard course curriculum and an experimental group was taught with an experimental course curriculum that included daily assessment and in-class activities. My role in the study was to grade and assess student performance on the experimental course curriculum. Through this experience, I gained valuable insight on teaching mathematical communication and creating interactive learning activities for proofs-based mathematics courses.

### SUPPLEMENTAL RESOURCES FOR UNDERGRADUATE COURSES

During most of my undergraduate career, I served as a supplemental instruction leader for Calculus II, Calculus III and Introduction to Proofs at Texas Tech University. Throughout this experience, I led semiweekly study sessions during which I would reteach difficult concepts and provide students with supplemental materials for each course.

In the 2022-2023 academic year, I am a research assistant creating materials for Calculus I, II, and III at Texas Tech University. In this role, I am creating supplemental resources that will be uploaded to the departmental website for all students to access. In addition, the website will include links to opportunities of interest for mathematics undergraduate students, such as research opportunities, internships, etc. We will distribute this website within lower-level courses, especially to students from groups historically excluded in STEM, to help students succeed and pursue professional opportunities. Although it is early in this experience, I have already expanded my thoughtfulness and creativity in the development of mathematical content.

## OUTREACH, ADVISING, AND MENTORING

### K-12 EDUCATION

Throughout my time as a graduate student, I have been actively involved in K-12 education in the local community. Since the 2020-2021 academic year, I have served as an instructor at a local private school teaching their senior mathematics courses. In addition, since the summer of 2021, I have taught a local summer program for middle and high school students learning college-level mathematics.

Through these experiences, I have consistently been reminded that the educational journey for students is sometimes a struggle, especially in mathematics courses. In my college-level classes, especially those with many first-year students, this has allowed me to establish a more realistic baseline of students' mathematical abilities and the vocabulary in which they have previously learned mathematics.

### LAURO CAVAZOS & OPHELIA POWELL-MALONE MENTORING PROGRAM

For the 2022-2023 academic year, I am mentoring a first-year undergraduate student. Through weekly interactions, I answer their questions about university life and provide support and accountability in their studies. This experience allows me to remain grounded in the expectations and struggles of adjusting to college life.