TEACHING STATEMENT

SUNGHYUK PARK

As a mathematician, I view teaching as a natural extension of research: both are acts of inquiry, communication, and discovery. My goal as a teacher is not only to convey mathematical knowledge, but also to foster mathematical thinking and curiosity across all levels. Whether teaching a large calculus class for non-math majors or guiding advanced undergraduates and graduate students, I aim to create a classroom that is intellectually vibrant, inclusive, and collaborative.

My teaching spans a broad range of audiences and course types. At UT Austin, I taught Integral Calculus for Science (M408S), a coordinated course with over 100 students, most of whom were non-math majors. This experience taught me how to support students who are learning calculus primarily as a tool—emphasizing clarity, relevance to other fields, and active engagement. I adopted a flipped-classroom style, giving students time to work through problems collaboratively and present their ideas, which encouraged peer learning and built mathematical confidence.

At Harvard, I have taught both undergraduate and graduate-level courses. In Spring 2025, I taught Introductory Real Analysis (Math 112), a lower-level undergraduate course for math majors with around 60 students and six course assistants. This course focuses on writing rigorous proofs for the first time, and I emphasized the development of mathematical reasoning through a careful balance of intuition and technique. In my lectures and problem sets, I consistently included key examples to build students' intuition while highlighting the techniques needed to construct rigorous proofs. This dual emphasis helped students connect abstract definitions to concrete instances and develop fluency in formal mathematical reasoning.

In Spring 2024, I taught Quantum Topology (Math 264R), a graduate topics course that I fully designed and taught. This experience taught me how to structure a course from the ground up—selecting appropriate topics, determining pacing, and crafting coherent lecture sequences. I focused on presenting advanced material in an accessible way, balancing technical precision with motivating examples. Although the class size was small (about ten students), I taught the course through structured lectures while actively encouraging questions and discussion throughout. The process of designing and delivering this course deepened my understanding of how to support graduate students in engaging with new and challenging material.

Beyond the classroom, I actively mentor undergraduates in research. In Spring 2022, I supervised a visiting undergraduate student on a senior thesis project related to quantum invariants of knots—based on problems from my own research. More recently, in Summer 2025, I mentored two students through the Harvard Summer REU on a project in quantum algebra involving infinite Temperley–Lieb algebras, which has led to a joint paper currently in preparation. These experiences have reinforced my belief that, with appropriate guidance, undergraduates can make real contributions to research.

Across all teaching contexts, I aim to create learning environments that foster active engagement, accessibility, and meaningful feedback. In lectures and problem sessions, I structure

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opportunities for students to work collaboratively, explain ideas to peers, and engage in class-wide discussion. In office hours, I guide rather than instruct—posing targeted questions or suggesting related examples to help students take ownership of the problem-solving process. I view grading as an extension of teaching and take care to provide clear, instructive comments that help students learn from their mistakes. When teaching remotely during the pandemic, I adapted these practices by using collaborative online whiteboards to preserve interactivity in a virtual setting. Student feedback has consistently affirmed this approach.

Looking ahead, I am excited to contribute to a department that values both research and teaching. I am prepared to teach courses across the undergraduate and graduate curriculum and look forward to designing new courses that connect with my research in topology, geometry, and mathematical physics. Teaching is, for me, a lifelong craft, and I continually seek to refine my approach in dialogue with students and colleagues.

Selected anonymous student feedback

[1] "The instructor is very kind and encouraging. He is clearly very passionate about the course material. He is also available and willing to meet with students when requested. I really appreciated all the effort he put into the course."

–Math 112: Introductory Real Analysis student at Harvard, Spring 2025

[2] "Clear lecturer, lecture notes were amazing and super helpful."

–Math 112: Introductory Real Analysis student at Harvard, Spring 2025

[3] "Sunghyuk was awesome. During lectures, he would adapt or re–explain the concepts he was teaching based on class questions to ensure that everyone understood."

–Math 112: Introductory Real Analysis student at Harvard, Spring 2025

[4] "The instructor knew the material very well and answered all questions in detail"

–Math 264R: Quantum Topology student at Harvard, Spring 2024

[5] "The instructor prepared excellent lecture notes to accompany the material from lectures."

–Math 264R: Quantum Topology student at Harvard, Spring 2024

[6] "The instructor explained concepts very well."

–M408S: Integral Calculus for Science student at UT Austin, Fall 2022

[7] "I liked the problem sessions at the end of every lecture. It gave me a chance to try the new things we learned in class with the professor there to help if I got stuck"

–M408S: Integral Calculus for Science student at UT Austin, Fall 2022

[8] "Sunghyuk is great. He answers emails quickly and will have a long dialogue to help you if you don't understand something. Only a few people show up at his office hours, but he's super helpful! He's always prepared with a whiteboard and helps guide students to answers without outright showing us."

–Math 1a: Calculus of One Variable student at Caltech, Fall 2020

[9] "I mainly went to your office hours, and I liked how you did not reveal how to the problem and made me think on my own. I was frustrated at first, but they were very helpful when approaching the midterm and final exam. You were very clear at explaining the material. Good job!"

–Math 1a: Calculus of One Variable student at Caltech, Fall 2020

[10] "Great TA, very instructive feedback on HW."

–Math 121a: Combinatorial Analysis student at Caltech, Winter 2020