# Teaching Philosophy

## Introduction

My teaching philosophy is shaped by experiences as a teaching assistant, tutor, student, and team leader across a broad range of subjects and student backgrounds. As a student, I learned what I value most in a teacher; as a tutor, I learned to see through the eyes of the student; as a teaching assistant, I gained experience delivering lessons and communicating ideas clearly; as a team leader, I learned that effective teaching is a two-way exchange. These experiences have shaped my core teaching principles: knowledge, passion, clarity, adaptability, and application.

## Knowledge

It is reassuring to learn from a teacher who is not only knowledgeable but also able to communicate effectively. A teacher's foremost responsibility is to be an expert in their subject. This involves deep expertise—whether gained through academic study or professional experience—paired with thoughtful preparation and a commitment to continuous improvement.

I embody these principles as a lifelong learner. My pursuit of a Ph.D. stemmed from a passion for learning and a desire to solve challenging problems. In both research and industry, I consistently work to fill knowledge gaps, driven by both necessity and curiosity. I invest significant effort into crafting thoughtful explanations, often using visuals or multiple approaches to ensure ideas resonate with a wide range of learners. My goal is to create a classroom where students feel confident in the material and motivated to explore further.

## Passion

As a student, I was most inspired by instructors who showed genuine passion for what they taught. Two teaching faculty at my undergraduate university left a lasting impression through courses such as dynamics, thermodynamics, fluid mechanics, and heat transfer. The difference between their classroom energy and that of research-focused faculty was striking. Their enthusiasm made lectures engaging and transformed complex material into something exciting and accessible. Outside the classroom, they extended office hours, supported student design teams, and were deeply involved in the department's educational mission. Their passion was contagious and played a major role in my decision to pursue a Ph.D. Their example showed me that passion isn't just a helpful trait; it's a powerful tool for inspiring curiosity and commitment in students.

## Clarity

Even the most advanced ideas are ineffective if not communicated clearly. Throughout my academic and professional career, I have prioritized structured, accessible communication. During my Ph.D., I developed a complex wall model for large-eddy simulations with multiple layers of physics and mathematical formulation. A key challenge—and accomplishment—was explaining this model to others. I created animations to visualize how the equations behaved, used consistent color-coding for different model components, and was among the first authors to publish a *Journal of Fluid Mechanics* article with embedded Jupyter Notebook links for interactive figures and code. In industry, I face similar challenges when presenting complex results to audiences without a background in fluids - or even engineering. I use schematic

diagrams, visual consistency, and precise terminology to make technical content understandable. These experiences have reinforced my belief that clarity is not a byproduct of knowledge, but a deliberate and essential practice.

**Adaptability**

Adaptability lies at the heart of effective teaching—and for me, it is one of the most rewarding aspects of the profession. Every student learns differently, and I find genuine excitement in discovering what works best for each individual. As a tutor at Kansas State University's tutoring center, I often worked with up to 20 students at a time in a fast-paced environment that required constant shifts in teaching approach based on each student's background and learning style. Over multiple semesters, I supported a range of college-level subjects including dynamics, calculus III, and fluid mechanics. I've also tutored students from elementary through high school in math and physics, and served as a teaching assistant for both undergraduate and graduate fluid mechanics courses. In my current position as a Naval engineer, I often explain fluid dynamics to colleagues without technical backgrounds. These conversations have taught me how to break down complex topics into simple, relatable terms and adapt my explanations in real time. Across all these contexts, the process of identifying how a learner engages best—and helping a concept "click"—continues to drive my enthusiasm for teaching.

**Application**

Application is at the core of engineering education. Engineering is, by definition, the application of scientific principles to solve real-world problems - so it is vital that students see how classroom concepts translate into practice. I believe curriculum must go beyond theory to prepare students for practical challenges through hands-on experiences, design tasks, and assignments that mirror real engineering scenarios. Homework should reflect how engineers use technical knowledge to design systems, analyze performance, and solve problems.

With industry experience, I've seen how core concepts—like fluid mechanics—inform real decisions. I bring this perspective into the classroom by highlighting applications and designing assignments that simulate the kinds of tasks engineers actually perform. Grounding coursework in application helps students build both technical competence and the confidence to tackle open-ended problems.

**Conclusion**

In summary, my teaching philosophy is rooted in five core principles: knowledge, passion, clarity, adaptability, and application. These values guide how I prepare, communicate, and connect with students, and they shape the kind of learning environment I strive to create—one that is rigorous, engaging, and relevant. As I move forward in my academic career, I will continue to teach with these principles at the center, fostering both technical understanding and intellectual curiosity in every student I work with.