# Teaching Statement

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I owe my understanding of computers and the world overall to all the wonderful teachers in my life. I feel excited to lead the next generation of students towards thinking analytically, advancing technology, and benefiting society. I enjoy teaching operating systems, compilers, and software engineering to both undergraduate and graduate students and also enjoy teaching elementary algorithms and programming courses to undergraduate students. My passion for teaching is broader than just one field, and thus much of this statement is about teaching in general.

My first formal exposure into teaching began as the programming club coordinator at IIT Kanpur. I presented several lectures on Basics of Programming (BoP) over the course of one year that complemented the formal university curriculum to encourage students with little prior programming background to get early hands-on experience. I also assisted these lectures by hosting several programming competitions throughout the year. Seeing 150+ freshmen students attending lectures, participating in competitions and overall getting excited about programming, even when it didn't directly contribute to their GPA, was overwhelming and immensely rewarding. Over a dozen students chose to stay on the campus instead of going home to pursue 8 ambitious summer projects under my mentorship.

I have been grateful to gain further mentorship experience over the course of many years after this first teaching experience. I mentored half a dozen electronics and robotics projects as my hostel's science and technology secretary, mentored my team on building robotics software as the software lead in Boeing-IITK project, mentored junior graduate students in my research lab at Purdue, and most recently am mentoring engineers as the CTO of Mobile Enerlytics. I have developed my teaching philosophy from the years of learning, teaching and mentoring experiences.

My teaching philosophy centers on ***making a long-term impact on students instead of focusing on just the course materials presented in the timescale of one course***. From my past mentoring experiences, I find my teaching is successful when I achieve three important goals with my students.

**Teach how to think and how to learn effectively.** Due to our human society's large knowledge base and its rapid advancements, I believe any university curriculum is bound to be incomplete positioning each of us as a lifelong student. Universities can best prepare their students for successful careers by distilling passion for learning in general and helping them to think and learn effectively. From my mentorship experiences, I found that a storytelling approach works the best for achieving these goals. A good course story builds concepts on top of one another instead of presenting a list of disconnected concepts. Before teaching new concepts, I always like to pause and encourage thinking about why a new concept is required and why the concepts learned so far are insufficient or suboptimal. I then brainstorm with students on different possibilities on how the identified gaps can be filled.

**Empower students to challenge the status quo.** I want my students to lead technological advancements and benefit society. I believe this is best achieved by additionally presenting historical context around the invention and adoption of the concepts presented in the course story. Concepts presented in a matter of factly manner tend to either trivialize them or put their inventors on a superhuman status. In my learning experience, I found a lot of inspiration can often be derived from the human journey of the inventors and have empowered me to believe in myself in challenging and advancing the status quo.

I believe in further assisting graduate students in advancing the status quo by keeping a flexible curriculum. Graduate students are often already working on research problems when they join a course and are looking to understand how they can advance the status quo in their research areas by applying course concepts. I perform initial surveys of their research areas and what they expect to learn from a course and tailor the course to their learning requirements.

**Commit core concepts into students' long-term memory.** Finally, I aim to commit the core concepts of the course into students' long-term memory through true understanding and active learning.

There're a few strategies I have found effective to commit concepts into long-term memory:

- I encourage students to deeply understand the concepts which is much more effective to commit to long-term memory compared to cramming. I am strictly against students just memorizing every small detail of the subject, do well in exams, and then forget everything about the course. Deep understanding is absolutely necessary because real-world problems hardly ever follow the exact formulation like an exercise in the course book and require conceptual understanding to be able to solve them. Thus, my ***frequent exams and quizzes*** are designed to test students' understanding of the concepts and do not just ask them to spill facts.
- Intuitions stick the best when students keep concepts in their working memory for a long time with deep concentration. This is achieved the best by providing students ***hands-on-experience*** in solving challenging but rewarding problems. I put a lot of creativity to make sure that the assignments are focused on core concepts requiring substantial thinking and concentration, and upon solving the problems, provide a joyful and rewarding experience.
- Active learning is known to be more effective in increasing retention than just passively listening to course lectures. I design course curriculum to always have a ***collaborative course project*** component. When students explain what they've learned to their peers fading memories are strengthened significantly increasing retention.

To conclude, I view teaching students as a true privilege. It gives me a deep sense of purpose in life. I cherish many of my wonderful teachers starting from my parents all the way to graduate school teachers and feel excited about the opportunity to make a similar life-long impact on students through my own teaching.