

# Teaching Statement

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In my view, it is the combination of teaching and research that makes an academic career far more exciting than any other career choices. An absence of either of these two would make the overall experience monotonous. I believe a successful academic career is about a good balance between teaching and research.

I am absolutely comfortable in teaching any undergraduate computer science and engineering courses. However, if I am given a choice, I would choose subjects that relate to my research interest, such as the **Computer Networks, Operating Systems, and Machine Learning**, as these are the subjects on which I can impart advanced knowledge to my students. At both the undergraduate and graduate levels, I am interested in designing new courses that address recent advancements in **Embedded Sensing Systems, Mobile Computing, Ubiquitous Computing, and Cyber-Physical Systems**.

## Teaching Philosophy

- As a teacher, I will be **interactive** and **easy to approach**. In my class, I will pause to ask questions, and make my students ask me questions. I believe a carefully posed question cuts down the learning time by half, as it eliminates a great majority of confusions. I will encourage discussions, reward those who lead the discussion, and help the shy ones to come out of their comfort zones.
- Lecturing the course materials to the class is just not enough. A good teacher should **stress the core concepts** of a subject, make students interested to know more, and **teach how to learn**. Compared to traditional lecture-styled teaching, I believe this is more effective in the long run, as in future, when a student needs to learn something new, he will be able to relate it to the basics and will be able to self-teach the concept.
- **Project based learning** is undoubtedly better than just learning theories from the books. Doing a project brings together several concepts and unveils several practical issues. It helps a student understand – *‘that’s why it was written in italics in the book’*. Project-based hands-on learning experience boosts a student’s confidence and creates an ownership of his work – which are important for his own career.
- **Being innovative** is highly important in a classroom. Especially in introductory Computer Science courses where students from many backgrounds come to the class, innovative ideas such as – explaining concepts with visual aids and simulations, relating course materials to real-world problems, using computer games as a means for teaching, programming LEGO robots, etc. are keys to keep students engaged in classes and attract more students to the field of Computer Science.

## Teaching Experience as a Faculty

I have the rare experience of working as a full-time teaching faculty even before going to grad school. From November 2006 to July 2008, I served as a **lecturer in the department of Computer Science and Engineering** in Bangladesh University of Engineering and Technology (BUET), which is the nation’s largest and most prestigious engineering university. Each year the department produces 120 world-class computer engineers and the majority of whom are now studying in top US schools or working in big tech companies in the US. I feel proud that I was once a part of this great institution.

My appointment as a lecturer was based on my outstanding undergraduate academic profile and such offers are made only on rare occasions. My duties included lecturing undergraduate classes, conducting their lab classes, supervising projects, setting exam papers, grading, and participating in the faculty meetings of the board of undergraduate studies. During my one and a half-year teaching career, I delivered a total of **over 150 lectures** (on **Data Communication** and **Digital Electronics**), conducted **over 350 lab classes**, and supervised **over 100 projects** – which involved a total of **over 500 undergraduate students**. I enjoyed every moment of it.

During my teaching at BUET, I brought several changes to the courses and lab exercises. I felt the need for a change in the C/C++ programming course where the students had been doing the same old set of DOS based projects for decades using the

Turbo C compiler. To give them the real taste of graphical programming, I **created a graphics library** using OpenGL and provided some easy-to-use wrapper functions which even a first year undergrad could learn quickly. Since then, that graphics library is still being used in undergraduate C/C++ programming courses.

I made changes to the Algorithms and Artificial Intelligence lab courses too. Traditionally, the students used to implement an algorithm from the book using a programming language of their choice as their lab assignments. To add a flavor of problem solving, instead of letting the students just code an algorithm, I started to give them a problem to solve using an algorithm that was taught in the class. This created a competitive environment in the lab classes and students started to come to the class with the right mind-set that – as an engineering student, their job is to **think and solve problems**, rather than just implementing pseudo-codes in various languages.

Being in a faculty of the nation's leading public university, as a part of my duty, I was often sent to teach at the Military Institute of Science and Technology (MIST), Dhaka, Bangladesh, which is the leading technical institute for training military personnel in Bangladesh. There, as a **visiting lecturer in the department of Computer Science and Engineering**, I taught **Machine Learning** and **VLSI** courses in two semesters and delivered **over 120 lectures** involving **over 100 students**. This was totally a different experience for me as the student body was totally different from any other institute and my goal of teaching was to train engineers who were in active duty in the national intelligence corps.

### Teaching and Advising Experience in Grad School

I was a teaching assistant in my very first semester (Fall 2008) at UVA. As the head TA in two courses (**Software Development in Java** and **Computer Architecture**), I conducted about **50 lab classes** involving more than **130 students**. I also delivered a lecture on **the architecture of a smartphone** in an undergraduate **Computer Architecture** class as a guest lecturer.

My teaching experience in UVA was much different than my previous teaching experiences. I have found students at UVA more interactive, responsive, and interested to know more. During class lectures, I often brought up examples from my own research, which made several undergrad students interested in research. Some of those students later became an essential part of our research group.

As the largest and the most active research group of the department, we frequently get to meet interested undergrads and first-year graduate students who want to work with us. I, being the most senior student of my advisor, have had the chance to advise a number of them. During the last couple of years, for example, I have **advised three undergraduate students** – who helped with developing some parts of my research projects and in this process they got to know how research is done, what the state-of-the-art is, and how a good research paper is written.

Advising new graduate students who start working with my advisor is a bit different than advising undergrads. Advising grads is more like helping them understand the technical details of the research tools and systems that we have built as well as letting them know of the *bloopers*, i.e. what we tried but did not work – so that they are quickly on board. Other than this, I also have regularly participated in the **new international grad student mentorship program**, in which, I mentored new international graduate students by helping them settle down in the new environment, choosing courses, and answering questions regarding grad-school and grad-life.