Teaching Statement

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I consider teaching a crucial and fulfilling academic duty. While there are many reasons why teaching is important, the most compelling one is that it is one of the most effective ways to pass on our knowledge, thus ensuring that our field grows and prospers. I enjoy teaching for two reasons. First, there is almost nothing more rewarding than seeing someone's eyes light up as they comprehend a new concept. And second, in the process of teaching a difficult concept to others, we tend to gain a deeper understanding. During my undergraduate and graduate study, I made it a point to seek out teaching opportunities in order to gain experiences and sharpen my skills for an academic career. Furthermore, I have extensive lecturing experiences outside of the classroom due to the talks I have given at various occasions, such as conferences, workshops, seminars, and invited talks. I feel confident that I am well prepared and ready to take full responsibility in teaching courses and advising students.

Teaching Philosophy

It is my firm belief that a university education ought to teach a student how to think not what to think. Therefore, students should not be bound to textbooks, but rather they should be encouraged to create new knowledge, methodologies, and algorithms in order to solve problems that do not yet exist. A teacher needs to be infectiously enthusiastic. Both learning and teaching should be a joyful process, and the instructor's emotion is likely to be reflected by the class. Teaching is an art as well as science. I believe effective teaching should be well-grounded in the science of learning. To that effect, I will adopt principles from *Backward Design* to design my courses. This is a three-step process. First, identifying the desired results and learning goals for the students. Second, designing transparent assessment activities that will provide acceptable levels of evidence that support the desired results. This requires designing the quizzes, tests, and other activities with a well-defined and transparent grading rubric, as well as providing detailed, useful feedback and explicitly linking them with the course learning goals. Finally, designing learning events that encourage active learning and active student engagement and participation. To achieve this, a teacher needs to design interactive lectures, while taking into account the background and interests of the students. Additionally, given the current swing in online teaching, I feel that the course curriculum should be designed in a manner that allows easy transition to either synchronous or asynchronous online teaching.

Teaching and Advising Experience

As an undergraduate student at Heritage Institute of Technology, Kolkata, I was an active member of the ACM Student Chapter, where I also held official positions. The CS curriculum lacked a Python programming course and students who were interested in exploring careers in data science and machine learning were forced to learn it on their own. In my junior year, I saw an opportunity to start offering courses and giving talks on Python programming and topics in data science. Through the chapter, I founded a Python Hobby Group and started offering workshops on Python programming to students, mostly to freshmen and sophomores. For a lot of the attendees, it was their first programming course, so I had to carefully design the content to tailor to their needs. These workshops were well received by the students and the department asked me to continue offering them for the next academic year. In addition to this, I delivered talks on topics in data science like decision trees, support vector machines, and graph clustering. I also organized biweekly seminars given by other students and faculty. During my tenure as an undergraduate research assistant at the Social Networks

Analysis research group, I got to mentor and collaborate with younger undergraduate students. I delivered talks on various topics in graph mining like random graph models, community detection, and node centrality measures. For my exceptional services to the department, I was awarded the *Class of 2017 Best Student Award for Academic Excellence*.

As a graduate student at Notre Dame, I was fortunate to have been funded by a grant from the NSF. This generally precluded me from working as a teaching assistant. I was a teaching assistant for two semesters of the *Theory of Computing* course. This course was a course for junior computer science students. My responsibilities included holding office hours and grading assignments, projects, and exams. I also designed a tutorial on drawing state machines with the TikZ library to help students with their homework [1]. This tutorial is still being used in the current offerings of the course. I've received *Exceptional* (the highest grade) in my TA evaluations in sections including grade performance measure, dependability, written and oral communications, motivation and attitude, and overall performance.

I have taken a credit-bearing, full-semester long graduate-level course titled *Pedagogy and Practice in the College Classroom* offered by the Kaneb Center for Teaching & Learning at the University of Notre Dame. The course is designed for students to prepare students to teach successfully in the college classroom. I believe this has led me to reshape my teaching philosophy and incorporate ideas from this course, especially *Backward Design*. Additionally, I have obtained a solid foundation of pedagogical knowledge, which I believe has given me increased expertise and confidence in my teaching abilities. I will be the instructor of record of the course on *Discrete Math* in Spring 2021 where I look forward to incorporating my teaching philosophy into practice. Finally, as a senior member of the Weninger Lab, I have been fortunate to mentor, collaborate, and work with both undergraduate and graduate students. All of these collaborations have led to significant progress in various projects, resulting in the publication of various research papers.

Teaching Preference

Due to my academic training in computer science teaching and research experiences, I am able and willing to teach courses from a broad range of areas. For entry-level undergraduate courses, I would like to teach *Introduction to Programming*, *Data Structures and Algorithms*, and *Discrete Math*. For senior-level undergraduate courses, I would like to teach *Automata and Formal Language Theory / Theory of Computing*, *Graph Theory*, *Data Science*, and *Information Retrieval*, or a hybrid/combination of these courses as requested. For graduate-level courses, I prefer to design and teach courses that are related to my research area, e.g., *Learning and Mining Large-Scale Social and Information Networks*. This course would be an interdisciplinary course that integrates materials from computer science, physics, social science, and economics, together with a large number of real-world applications, such as web-based information networks, biological networks, social media, government data, and so on. I would also like to organize seminars that discuss cutting-edge research results related to data mining and information networks. In all, I am looking forward to teaching and advising students in my future academic career, and helping them realize their dreams.

[1] `https://www3.nd.edu/~cpennycu/2019-2020/Spring/CSE34151/assets/tikz_tutorial.pdf`