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Mathematics is considered to be the mother of all sciences. It is really so because it is a brain-making subject and being thus, it makes me passionate about it and I consider this to be the driving force behind my enthusiasm for teaching the subject and regularly update my methods of teaching. I firmly believe that in order to understand math, you need to do math. As a graduate student, I am honored to have been an instructor of record, a lead teaching assistant for Calculus 2, and a grader for high-level undergraduate courses.

I have always been intrigued by the dynamical nature encountered while teaching ant class. There does not exist a generalised model to edify all student and expect an uniform accomplishments. I care deeply about the intellectual development and personal growth of my students. I have noticed that in general, students fear mathematics, and thus fail to see their potential to excel in the subject. In my opinion this fear deprives them from the nourishment this subject has to offer. My teaching techniques focuses on enhancing the students' analytical and computational skills rather than merely providing solutions. It is to my belief these adaptive skill sets will help them in resonating the ideas and apply them to the real world. The most important aspect I include in my lecture is encouraging students to ask questions. Often students feel embarrassed to ask questions thinking it will make them look ignorant. I believe I bring a welcoming nature from the introduction of any class for the students to feel comfortable in asking even the simplest of questions.

I feel really grateful to my department for offering and trusting me to be an instructor for Finite Math with Applications in a semester when the University had to change to various modes of teaching due to the pandemic. Teaching such large section classes in a synchronous way, when most of them are used to face to face lecture modes was an intimidating task. It was expected many students will not have proper resources, many will be encountering unforeseen difficulties and many might see unthinkable losses. It was really difficult to be compassionate and fair to all the students' simultaneously, when these are multi section courses taught by different instructors following the same schedule. One important thing I did differently to other instructors or professors when teaching online. I allowed my students to ask questions verbally whenever they have one so that – one they feel much more like an one on one interaction or like face to face lectures. Second, it allowed me to understand where the class as a whole might be unclear as there was no facial expressions to read on unlike face to face lectures. It goes without saying, I had to create a compartmentalized access of all materials so that a student can find one whenever needed be it lecture recording or notes. I always devoted an extra 15 - 30 minutes after class to answer questions after the official class hours.

As an instructor for Introduction to Mathematical Reasoning, the challenge I had to face was to teach non-mathematics students rudimentary math concepts. It was challenging for me to come up with ways to explain rudimentary mathematical concepts in a lucid way, as for mathematicians these are just alphabets. I had to keep in mind most of the students have not been in touch with mathematics for many years. Being an instructor for any course, I focus on foundations first as I prepare the students for the exams. To ensure this, I cover a diverse range of problems on each topic, no matter how trivial the problem might be. I always try to engage my students through my passion for the subject, prioritizing grasp of the fundamentals to ensure success on tests. My students report that I have successfully educated and inspired them. Discreetly I try to ensure the students beliefs that if they follow my day to day lecture they are bound to excel in the course. It provides them with a sense of security for their future.

As both instructor and teaching assistant, I have noticed that students are quick to grasp new concepts when I explain them, but struggle with the basic concepts and computations. Consequently,

I focus on teaching fundamental material in a clear, intuitive way. Moreover, sometimes I purposely make mistakes to ensure students are attentive and following the subtleties of the topic. This focus on foundations develops both analytical skills and computational proficiency. My students often say that the use of my techniques leads to consistent excellence. I believe it is important to communicate to the students that I care about their success, no matter if I am an instructor or a teaching assistant. The way that has works for me is addressing students by their name. I always know all in students name when I teach any class of around fifty to sixty strength. This ensures a personal touch and solidifies their belief in my teaching.

I anticipate, a slightly different approach is needed while teaching any labs. Each time I teach a calculus lab, my focus is on problem solving. I believe labs are designed for the purpose of problem solving. In general, the lecture section does not have enough time to cover a variety of problems along with teaching the concepts. My goal in labs is to first answer students' questions, which they encounter while solving homework and quizzes. I then move to different problems I consider tricky and important in order to clarify relevant concepts. For instance, I teach students how to take a given series and systematically apply tests for convergence. I focus heavily on written communication as well. It has been mentioned to me on numerous occasions mathematics is complete until written down. As a student I have struggled many a times on penning down a solution even though I was aware of the solution to the problem. Students must learn to coherently communicate technical thinking. This requires a series of efforts starting with me by providing diverse range of transparent examples, asking students idea of approaching a problem and then illustrating cogent solutions.

As a future teaching professor I would definitely bring my research for the undergraduate students. My research area is applied mathematics focusing on interdisciplinary sciences. I wish to develop undergraduate research projects for juniors and seniors with the questions I encountered while working on my research. It will be pivotal for me to inspire students in mathematical research direction. Most of the students will be obscure about a research direction even though if they possess the necessary qualities. It will be my responsibility to channel those ideas in a constructive research directions. I believe every student has the potential to excel in research with the proper motivation and maneuvering them to help them vision what truly inspires them. I would certainly try to incorporate interdisciplinary research either in my teaching or as research projects.

During my graduate school, I have worked on two research projects. One on computational geometry exploring the pursuit evasion problem in mobile sensor networks. Second is on computational dynamical systems which works to provide better glycemic management in intensive care unit patients. The former has an application in various mathematical and engineering problems. A few interesting undergraduate research problems could be - the effect of boundary geometry in detecting an intruder, an extensive study of various motion models and analyzing interesting statics, exploring the existence of phase transition - in mobile sensor networks. On a challenging side one can think of - describing asymptotics of time statistics under limiting conditions, coding up algorithms when each sensor possess variable sensing radius, developing cost functions for comparative motion model study. The latter has application not only in clinical research but human physiological systems in general. With the abundance of available ICU data one could try to build functions representing the data and drawing inferences. It is crucial to notice these data may be highly sparse in nature, thus making it difficult to mimic. Keeping in mind the growing use of machine learning will make students interested in data driven applications of such systems. Collaborating with undergraduate biology students and analyzing various other human physiological systems will definitely broaden the research scope.

As an instructor for any course I will make sure my classes are inclusive in nature. I would definitely encourage diverse range of students to enroll in my classes. I would work towards increasing minority and woman representation in my classes. This will have rippling effect on the society and the mathematical research community as a whole. It will be of my utmost importance to get students interested in STEM fields in general. I will be happily associate myself with any outreach community program the department has, or create one with institutional help, to increase scientific awareness and accessibility to all. Additionally, I will work towards procuring grants such offered by the National Science Foundation (NSF) under The Division of Undergraduate Education (DUE). This is will not only benefit my teaching in general, but also help in undergraduate research, increasing inclusion and diversity, etc. I shall also look forward in getting involved in various outreach programs to get children inst rested in STEM fields, particularly in mathematics. I believe we should start addressing problems of underrepresented at earlier stage when children really have more time to see what makes them really interested in STEM.

I try to bring the innate aesthetics of mathematics to my classes by solving various problems, showing students how to overcome challenges, demonstrating the use of mathematics in daily life, and referencing comments from television series such as The Big Bang Theory or movies. Through my teaching I try to ensure that students fall in love with mathematics. I want my students to experience inspiration, not feel like human calculators! I always wanted to be in academia, and through this process I hope to enhance my teaching abilities and motivate my students to disseminate their knowledge to future generations.