1 Introduction

This teaching philosophy is a reflection of my ten years of teaching experience. During these ten years, I have taught courses ranging from basic courses for the university entrance to fourth-year undergrad courses to students with different backgrounds.

"*Some of the stuff was too basic*", "*Few topics were too hard to grasp*", "*I am feeling like I wasted my time by enrolling in this course as the topics were not related*". " *We were just looking at long equations*" are the feedback reviews that I received after teaching my first course at the National University of Sciences and Technology (NUST), Pakistan. The course was about advanced calculus. The contents included differential equations and an introduction to mathematical modeling. It was 2009, I had just started my teaching career, was enthusiastic, and had been very eager for the course to start. Students enrolled up to the full capacity, almost 200 students from different backgrounds, including mathematics, engineering, computer science, and some from biological science. I worked hard, prepared for each class, used extended office hours, would respond to student's emails promptly, used a mix of technology and traditional teaching styles. But still got bad reviews. After investigating the problem deeply, I realized that the problem was neither with course contents nor my efforts. The problem was how I presented the contents. I was unable to satisfy some students in the class. For example, while explaining the basic SIR model, I would either tend too much towards biology or too much towards math, which would make class boring either for mathematicians or biologists. Thus, in every class one group (students with majors in biology, mathematics, engineering, or computer science) would feel left out. As I was patient, I worked hard to overcome this issue. It took me years to develop the skills to deliver a mathematics lecture to students from different backgrounds.

Now, as an experienced teacher in mathematics (10 years of teaching experience), I believe that developing content for a course is a relatively easy job but the delivery of those topics in a classroom setting is a skill that comes with time. Basic mathematics courses like Calculus, Differential equations, Numerical analysis are prerequisites for many disciplines and in these courses, we could expect students from many different backgrounds. Similarly, different quantitative biology courses are also attended by students from various backgrounds. This makes teaching these courses much harder. As an experienced teacher I have developed skills to be a successful teacher in teaching these courses.

2 Teaching Characteristics

I make efforts to pay attention to everyone in the class. I believe that everyone is intelligent, and that if they are in class, they are willing to learn. They must be given an equal opportunity to study it. For those students who are slipping behind, I would discuss the issue they are experiencing in class and come up with remedies. In my teaching career, I have worked with many of these types of pupils and have advised them to either view a video on the topics they were struggling with or I will assign a homework assignment that was suited to their needs. This technique has worked for me. I constantly relate new ideas to prior ones that pupils are already familiar with.

Before exposing students to hard math, I always provide them with examples where these ideas are used and how beneficial they are. I believe if I can convince students that whatever math they are going to learn in this limited time slot is having some useful application and they need it to excel in their career, students make their minds willing to grasp the idea. It is just like making the students hungry and then provides them with some nice food. While

presenting an abstract mathematical concept, I usually provide students with an analogy from day to day life to make it easy for them to grasp the idea.

I never go to class unprepared. While preparing for a lecture I always keep in mind the audience and prepare according to them. For example, if I am presenting an infectious disease mathematical model I would go to class with a good enough preparation for infectious diseases as well. I believe that mathematics should be taught with a proper mix of teaching technologies and old-school teaching techniques, like using a whiteboard or blackboard.

3 An Example

In the winter term of 2021, I was teaching MATH/ECO 3900 in the Department of Mathematics and Statistics at Dalhousie University, Halifax, Nova Scotia, Canada. The course MATH/ECO 3900 - Financial Mathematics, had students enrolled from the Mathematics, Statistics, Actuarial Sciences, Physics, Economics, Chemistry, and Biology departments. This course was about derivative security pricing. I needed to mix financial theory with mathematics and present examples from the stock market to keep all pupils engaged in the curriculum. Derivative securities models result in Partial Differential Equations (Black-Scholes and Merton PDE). Because explicit equations for PDE solutions are not always available, learning numerical methods is necessary when working with Partial Differential Equations. The course lacked a computational component, so I decided to add one and let students use any programming language they knew for this. Students initially resisted learning new ideas as they were unwilling to leave their comfort zone.

I decided to provide additional office hours to assist those students. MATLAB was the best selection for the computational purpose as MATLAB is freely available to Dalhousie University students, and it is simple to use. We began with the fundamentals of MATLAB instruction and students were given simple assignments. When I requested the students to write a MATLAB code to apply their mathematical skills to the stock market data in the midterm (take-home) test. The outcome was amazing. The majority were able to create a MATLAB algorithm and properly apply it to the stock market data. The course was entirely elective. If I hadn't provided them extra support in MATLAB, they could have dropped out of the programme. An instructor must convince pupils that learning a new skill is necessary and must extend full support.

4 Teaching Experience

- Instructor, *Financial Mathematics, MATH 3900 / ECON 3900*, Department of Mathematics and Statistics, Dalhousie University, Halifax, NS, Canada – Winter 2021
- Teaching Assistant, *Differential Equations, Probability for Life Sciences*, Department of Applied Mathematics, Western University, London, ON, Canada– 2019
- Teaching Assistant, *Calculus with Analysis for Statistics*, Department of Applied Mathematics, Western University, London, ON, Canada – 2018
- Instructor, *Calculus 2*, School of Applied Science and Technology, Fanshawe College, London, ON, Canada – 2018
- Instructor, *Business Mathematics*, Lawrence Kinlin School of Business, Fanshawe College, London, ON, Canada – 2017
- Teaching Assistant, *Applied Mathematics for Engineers*, Department of Applied Mathematics, Western University, London, ON, Canada – 2015, 2016 & 2017

- Teaching Assistant, *Introduction to Differential Equations*, Department of Mathematics & Statistics, McMaster University, Hamilton, On, Canada – 2015
- Teaching Assistant, *Engineering Mathematics*, Department of Mathematics & Statistics, McMaster University, Hamilton, On, Canada – 2014
- Teaching Assistant, *Linear Algebra*, Department of Mathematics & Statistics, McMaster University, Hamilton, On, Canada – 2014
- Teaching Assistant, *Linear Algebra*, Department of Mathematics & Statistics, McMaster University, Hamilton, On, Canada – 2013
- Instructor, *Differential Equations & Transforms*, NUST Institute of Civil Engineering, NUST, Islamabad, Pakistan – 2013
- Instructor, *Numerical Methods*, NUST Institute of Civil Engineering, NUST, Islamabad, Pakistan – 2012
- Instructor, *Calculus and Analytical Geometry*, NUST Institute of Civil Engineering, NUST, Islamabad, Pakistan – 2012
- Instructor, *Probability & Statistics*, NUST Institute of Civil Engineering, NUST, Islamabad, Pakistan – 2011
- Instructor, *Calculus and Analytical Geometry*, NUST Institute of Civil Engineering, NUST, Islamabad, Pakistan – 2011
- Instructor, *Calculus and Analytical Geometry*, NUST Institute of Civil Engineering, NUST, Islamabad, Pakistan – 2010
- Instructor, *Numerical Methods*, NUST Institute of Civil Engineering, NUST, Islamabad, Pakistan – 2009