

STATEMENT OF TEACHING PHILOSOPHY

Murugiah Muraleetharan (Muralee)

As a student, I was lucky enough to have several exceptional mathematics teachers, including my father who guided and taught me mathematics up to High School. Without these mentors, I would almost certainly not be a mathematician today. In my own teaching, I try to convey the same passion and clarity to my students. My greatest strengths as a teacher are a strong geometric intuition, empathy with students, and an ability to think on my feet and see to the bottom of students' questions. My teaching continues to evolve and improve as I learn more about the ways that students think and how to communicate effectively with them.

I believe the first key factor in successful teaching is to motivate students. Nevertheless, it is particularly hard with mathematics because sometimes it is highly abstract and difficult to relate to their actual lives. One way to motivate students is to bring some tangible and fun problems. To teach math effectively also requires creating an environment that engages the student's mind and challenges them to be an active learner. I accomplish this by creating a nonjudgemental environment in which students feel comfortable sharing their ideas. I also frequently call on students (by name) to answer questions. This serves three purposes: (1) keeps student engaged in the class, (2) provides me with feedback on their level of understanding, and (3) broadens class discussions from which new ideas frequently arise. Giving weekly quizzes is another tool I use to gauge the student's understanding of both the material and my presentations. To provide extra help to my students, I hold regular office hours and review sessions before exams. To communicate with students outside of the class, I use the web-based program Blackboard. I also post course information and homework assignments on the Blackboard. I always start and end the class on time, and return homework and exams by the following class. I try hard to present the material clearly and run the course in student friendly manner, which then motivates the students to put the necessary effort into learning the material.

I use my geometric intuition to give models for analytical and algebraic subject matter. For a simple example, the $\epsilon - \delta$ definition for limit and continuity of a function at a point can be explained by drawing an image of a continuous function and images of different types of non continuous functions at that point to explain how limit or continuity fails at that point. The other simple example is when we try to solve a system of equations, I always draw what each equation represents and how the solution of the system is related to the picture. Also, a well chosen example can provide insight into a problem that would take a great deal of verbal explanation to convey. I always choose examples and homework assignments that greatly increase students' understanding of the subject matter.

Technology also provides many tools to explore mathematical ideas and build conceptual understanding. The use of interactive, dynamical mathematical software (Maple, Mathematica, MATLAB, etc.) helps students understand new ideas and relationships between different aspects of an abstract object, for example, the relationship between a formula defining a function, and the graph of the function. Recently, I have been using web based homework assignment - WebAssign for calculus classes. When the students

enter their answers online and WebAssign automatically grades the assignment and gives student instant feedback on their performance.

Most often what students need is someone to listen sympathetically and push gently from time to time. Many math majors are also interested in subjects outside of math, so it helps that I am familiar with many related fields, such as computer science, physics, financial mathematics, and statistics. By taking math courses, student learn how to think analytically and rigorously. Student should understand from math class that how to construct cogent and logical arguments. Deductive reasoning should form the basis for any form of intellectual inquiry and to me comprises mathematics' most crucial and elegant legacy. Mathematics does not stop in the classroom, and it is extremely important to encourage students who want to learn beyond the curriculum.

I think well on my feet, and can quickly understand where student questions and comments come from. I thus adapt a more informal and discussion-oriented style of teaching. Students' questions often lead me in an unexpected and positive direction. Teaching is an active profession. Consequently, I find it important to remain professionally active by participating in seminars and conferences, and maintaining an active research agenda.

I have had a wide range of teaching experience in pure mathematics and applied mathematics (which overlaps with physics). I have taught elementary business calculus, engineering calculus, rigorous calculus (introductory analysis), Differential Equations, Linear Algebra, Discrete Mathematics, Optimization, Fluid & Classical Mechanics, and Functional Analysis. The class size ranges from small recitation sections of 10 students to lecture classes of 135 students. My teaching has been always well received by my students, and I have the ability to explain difficult concepts to others. I am happy to fill whatever needs the department has. If I get a chance, I would love to teach courses that use my strengths in geometry, topology, and analysis.