

# Teaching Philosophy

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## Teaching in General

During my ten years of teaching experience, I taught many different courses to students with a broad range of needs, knowledge, and cultural backgrounds. Several important general principles that I try to use in my teaching practice can be formulated as follows:

1. No matter how experienced a teacher is, every new class and every new student pose a challenge. For excellence in teaching, there is always room for improvement.
2. A teacher has to appeal to different learning styles, to offer a variety of instructional experiences, and to give every student the opportunity to participate fully and actively in the learning process.
3. Being a successful teacher depends on creating a learning environment that is open to the exploration of ideas. The teacher should establish relationships in which students feel respected as well as challenged. Students should be encouraged to stretch themselves a bit beyond their level of comfort and be given an opportunity to leave every class feeling that they have overcome a new challenge successfully.
4. Though student satisfaction is important for better learning, a solid teaching – especially in mathematics – should not become a popularity contest, or a show. A teacher is responsible to the society in general, and should resist the pressure of lowering academic standards in education.

## Teaching Mathematics

Most of the students often see mathematics as only a dry collection of definitions, theorems, and proofs that have to be memorized. Nevertheless, I try to use every possibility to expose students to the exciting world of mathematics. My main goal is to encourage students to become independent mathematical thinkers, capable of approaching, framing, and solving problems on their own. I make my classroom an engaging place where there is more discussion than lecture, and where students always feel free to contribute and ask questions. I believe that students' participation is crucial for learning mathematics.

In the past, I have found that nearly the same percentage of my class will meet my expectations no matter how high (within reason) I set them. Conversely, I have also found that no matter how low I set my expectations, the same percentage of students will fail to meet them. With these things in mind, I think a major part of my role as a teacher is to truly challenge my students and help them rise to the level of that challenge.

The first step in introducing a new mathematical concept is to help students see the “picture” behind that mathematical object. The teacher should try to give the student

a clue why that object is useful and interesting. I used this method very successfully throughout my years of teaching; the students became more comfortable with the concepts if these were initially described in lay terms.

Although visualisation is important as an initial step, it is crucial for students to understand that a simple illustration is not a proof. Mathematics is an exact and abstract science and demands a high level of rigor and precision. Therefore, I have emphasized the role of deductive reasoning in my classes. Proofs do not make mathematics more difficult; on the contrary, they represent the only path to understanding mathematics. A student who acquired a satisfying understanding is liberated from the frustrating process of trying to rely on memory to supply facts that he does not understand.

Finally, on a deeper level of learning, the student himself is able to ask meaningful questions about the validity or usefulness of certain results or concepts. This is the beginning of the mathematical discovery process.

### **Teaching Style and Methods**

I prepare my classes thoroughly, but I like to improvise whenever possible. I want to be interrupted during my lectures; and I give extra points for good questions and comments from students. I open each session with a brief reminder of the previous session's material and an outline of the day's topic, and I typically conclude with a summary of key points. There is a special session for review before every major test. Students are encouraged to learn from each other as their grades are not curved, thus, students are not competing with their classmates. In some classes, I give group projects and homework. When possible, I distribute solutions to homework problems, quizzes, and tests. To reduce students' anxiety about tests, I often give practice tests. As I do not consider memorization to be very important in math courses, all my tests are open book/notes. Assignments are an integral part of my courses. I spend time explaining them and solving similar problems in class for further discussion.

### **Teaching and Research**

I incorporate research activities into my regular teaching whenever possible. I have found that being active in mathematical research is important for my teaching. My research renews my personal love for mathematics which in turn inspires my teaching. By continuing my own mathematical learning, I model the behavior I am asking of my students and I am better able to recall my own experience of being a student. In particular, through my research, I am often reminded that even the simplest ideas may not appear so simple the first time they are considered.

Too often math majors, at the undergraduate level, see only established results, and get no real taste for the process of mathematical discovery. I consider myself fortunate to work in a field where the problems have a strong intuitive appeal and many of them can be understood by any undergraduate with a good mathematical background. It is one of my main professional goals to make my work comprehensible not only to a highly specialized elite but also to my students.