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### Teaching Philosophy

- Creating proper strategies and teaching methods which help students achieve the best that they are capable of achieving.
- Create the best atmosphere possible for students to enjoy learning and achieve what they are best capable of achieving.
- Creating and establishing programs that will both attract students to mathematics and help students advance their knowledge of mathematics.
- **Teaching Experience:** I have been a professor of Mathematics since September 1983. And now I am a professor of computer sciences. I am able to teach course in many areas of mathematics and computer sciences.

My teaching style is a result of many years of pedagogical experience (26) at Harvard University, SUNY Potsdam, Clarkson University, Cornell University, and Binghamton University, The University of Texas at Tyler. I also was part of a mathematics education delegation to China (Sept. 22-Oct.7, 2000), where we visited many faculty members and classrooms in many universities, high schools, and elementary schools.

I have taught mathematics, computer sciences, and Physics courses at the graduate, upper undergraduate, lower undergraduate levels. I have also taught mathematics courses for non-mathematics majors.

Courses I have taught include Abstract Algebra, Topology, Linear Algebra, Advanced Calculus, Number Theory, Set Theory and Logic,

Concepts of Geometry, Analysis of Algorithm, C-programing, Quantum Computation, Mathematical Statistics, Probability and Statistics, Multivariate Calculus(regular and honors section), Calculus I II, Pre Calculus, and Elements of Mathematics. During Spring 2003 I taught courses in Nuclear Physics and Electrodynamics at Clarkson University.

I have conducted independent studies and directed seminars (above my normal teaching load) at the Master's level at SUNY Potsdam and Clarkson University in many different areas of mathematics. This includes Representation Theory, Lie Algebra, Category Theory, Number Theory, P-adic Number Theory, Coding Theory, Automatic Group Theory, Differential Geometry, Universal Algebra, Relativity Theory, Operator Theory, Word Problems for Groups, Hyperbolic Geometry, Lambda Calculus, Symplectic Topology, DNA Computers, Proof Theory, Graph Theory, Godel's Incompleteness Theorem, Banach-Tarsky Paradox, etc..

- **Teaching Strategies:** Generally, I work with the students in the classroom. I do not lecture often. Students present their projects, homework, or the theorems and problems that they have worked on while in the class. I encourage group work among students who have similar abilities.

My philosophy is focussed on the following: (i) to develop mathematical skills, (ii) to create a proper attitude in students towards mathematics, (iii) to create interest in mathematics in students, (iv) to help students become creative, and (v) to help students develop mathematical maturity.

(i) To increase students skills, one needs to give homework, tests, and quizzes.

(ii) To create the proper attitude in students, one needs to provide students with a challenge and an opportunity to meet the challenge. One needs constantly to remind students that to become a mathematician requires patience and hard work. Becoming a mathematician is not different than becoming a basketball player, a football player, etc. Problems in mathematics usually are not solved easily. Sometimes, it takes years or even centuries to solve a problem. What makes one a mathematician is his/her struggle to solve, to understand, and to con-

jecture mathematics. One can enjoy doing mathematics as much as one can enjoy playing basketball if one approaches mathematics with the right attitude. Of course there are people to whom mathematics comes easier.

(iii) To create interest in mathematics, one has to help students see the beauty and joy in mathematics. Talking about mathematics, mathematicians and their struggles, the history of mathematics, the relationship between mathematics and other disciplines will help build up interest. Having students present a talk about a great mathematician can increase students interest in mathematics. Enthusiasm in the teacher helps to ignite interest in mathematics in his/her students.

(iv) To help students become creative, one needs to help them discover that doing mathematics can be relaxing.

(v) To create mathematical maturity in students is rather tough. First, I realize when I try to read a very difficult mathematical paper and persist at it even though my understanding remains weak, then subsequent papers of slightly less sophistication become easier and more joyful. I have used the same method with students. I have given them two papers, one at their level and another more challenging. When I have asked them to glance at both papers, their response was that both were too difficult to do. Then I have asked them to read the harder paper and kept encouraging them and helping them to go through it. After they finished the harder paper, although their understanding of the article was low, I asked them to read the easier paper. They comprehended it and began telling me, How easy this paper is. We understand it well, now.

Here a concrete example might help. I often teach Abstract Algebra for BA/MA students at SUNY Potsdam. Usually when I get to Sylows Theorems, students feel at loss. One year, I taught Kernel, co-kernel, product, co-product, and exact sequences using a rather abstract categorical approach. Students were not happy, but I kept encouraging them. Near the end of the semester. I taught them Sylows theorem. The process raised the level of their mathematical maturity because they told me,

How easy Sylows theorem are. We like this and understand it. We can follow everything.

- **Programs Created to Help Students:** Other activities and programs which I have created in addition to my regular teaching which challenge students and help facilitate success in their future mathematical endeavors are:

(i) The summer research program (REU) was created to help students do research in mathematics and get ready for graduate work in mathematics. Many of the students who have gone through this program are now working towards their Ph.Ds. in mathematics in very good universities, or have received their Ph.Ds. This program is mainly funded by NSF and NSA.

(ii) Honors courses have been created to help students to succeed in the SUNY Potsdam BA/MA program. I have created honors Linear Algebra and honors Multivariate Calculus.

(iii) Summer Research Experience for teachers has been designed to help our high school teachers with their mathematics, re-ignite their love for mathematics, increase their knowledge of mathematics, and bring them into the mathematical community (by presenting the results of their summer work in national meetings such as AMS-MAA annual meetings). This, we hope, will help in turn their colleagues and high school students.

(iv) Seminars and independent studies exist to help students sharpen their skills and increase their knowledge in the area in which they are interested in pursuing graduate studies. I usually give my students a paper or book to read and present. This will create a platform for them to be launched into appropriate Ph.D programs. Many of my independent study/seminar students have gone to Ph.D programs.

(v) Conference attendance can help students become part of the mathematical community, and increase their knowledge and interest in mathematics.

(vi) Mathematical talks can help increase students interest and knowledge in mathematics.

