I have always been interested in mathematics, but my passion for it came from having great professors. These professors had the ability to inspire understanding, curiosity and confidence. They motivated independent thought, showed the beauty and power of mathematics, and taught students from all disciplines the skills necessary to understand complex ideas and tackle difficult problems. At Augustana College, a small liberal arts college in the Midwest, I first encountered these teachers. They became my mentors and encouraged me to reach for a greater understanding of mathematics. Through my teaching and mentoring, I aspire to do for my students what those great professors did for me. To indicate how I turn this aspiration into practical results, I will detail the three teaching goals I consider most important: creating active learners; helping students develop conceptual understanding and problem solving skills; enhancing students' communication skills. In my Research Statement I address undergraduate research and mentoring.

I. Create active learners.

Math courses often blend majors with non-majors and those comfortable with mathematics with those who find it very daunting. It is important to understand the diversity of the class and to structure the lectures and course materials so that each student becomes actively involved in the course.

My goal when teaching is to have my enthusiasm for mathematics radiate from the front of the classroom so that I draw the students in. After I have their attention, I then try to inspire their natural curiosity by connecting the course material to familiar topics or important ideas. This may include presenting a historical perspective on an important example, motivating new material with connections to other disciplines, or illustrating the clever idea that unlocks a powerful theorem. This gives the students something to grab on to and the ability to conclude for themselves, "Now that's interesting!"

Many students believe the classroom is educational theater where they are the passive audience. However, learning mathematics is an active process that requires active participation. As a result of a guided discussion, my Finite Mathematics class was able to progress from considering the question of a mailperson's optimal delivery route to discovering Hamiltonian paths and understanding why it is important to know when these paths exist in a graph. This sense of mutual discovery helped the material come alive, gave students confidence in their abilities and motivated curiosity and independent thought. The positive classroom environment we established in Finite Mathematics carried over to office hours and to the students' interactions with each other; they felt comfortable "talking math" with their peers and collaborating on group assignments.

I am an advocate for my students' success and openly celebrate their accomplishments. Positive reinforcement in class and in my office builds confidence, alleviates anxiety and encourages students to commit themselves fully to the class. Along with engaging discussions and lectures, I work hard to build a strong course structure. I carefully craft syllabi to communicate my goals for a course, the policies concerning assignments and grading, and my expectations of the students. I use email and a course website to disseminate material, field questions from individual students, and maintain an up-to-date course calendar. Moreover, I am available to help students when they need it. Besides office hours and lecture, such help might include meeting individually with them, providing extra feedback with assignments, or discussing various study strategies.

II. Develop Conceptual Understanding and Problem Solving Skills.

A math course is a narrative with complex characters and often surprising interactions between them. To connect with the mathematical storyline, students must continually be reminded who the characters are, how they interact with each other, and how those interactions fit into the larger story. Doing so ensures that when Calculus students finally see the Fundamental Theorem of

Calculus they think, "Wow! That's a big deal."

In my lectures, introducing a new concept involves:

- Reviewing recent material in the context of the larger storyline
- Posing a question students recognize as the natural next step
- Motivating the question with insightful examples
- Leading the class to postulate answers to the question
- Identifying correct answers and formalizing them on the board
- Providing a variety of examples illustrating the new formalized objects and ideas

All of this is carefully organized on the board so that new objects and terms are set next to examples and step-by-step computations.

Most difficult problems in the world are solved by intelligent, dedicated people working side by side. This collaborative spirit is encouraged in my classes and is a fundamental part of the way I teach problem solving skills. When solving a problem in class, the students formulate ideas out loud and, similar to the conductor of a symphony, I bring the correct suggestions together at just the right moment to build a clear progression from question to answer. I then walk back through the solution, identifying the key concepts and tools used. Many problems require creative thinking or a subtle "trick." Whenever I interject a trick into the discussion I remind the students of something a mentor of mine repeated regularly, "It's only a trick the first time. After that it's a technique." These techniques allow them to develop strategies to use when tackling problems and show them how to apply their own creativity to problem solving. Along with collaborative assignments, I incorporate plenty of assessment tools that test individual competency with the material.

III. Enhance Students' Communication Skills.

I believe it is essential that students are able to communicate mathematics. While assisting with an outside evaluation of Washington University's Calculus II curriculum, I interviewed 15 students at length about their understanding of exponential growth and decay. The students who were best able to verbalize their understanding of the material were also the students with the deepest understanding. As mathematicians are well aware, thoughtful communication with others is the best way to reinforce what we already understand and identify what we don't.

In small classes I like to meet individually with the students throughout the term. During these meetings the students talk through their answers to a few homework exercises. I ask them to provide details for all of the computations and explain the concepts involved. Gradually we deconstruct the exercise and its solution into fundamental pieces. As we chat, I complement their strengths, address their weaknesses, reinforce the conceptual storyline, and point out problem solving techniques. One student in Matrix Algebra commented, "I was a big fan of the weekly meeting portion of the class as it sort of told you where you were at in the class and allowed for more in-depth discussion of the material."

In my Finite Mathematics course, the students were given 45 minutes in class to work in groups of three on three problems. Though the groups generally began by working at their desks, most soon found their way to a corner of the blackboard where they would scribble ideas and have animated deliberations about problem solving strategies. The elegant and ingenious solutions they discovered were points of great pride for the students. At the end of class, each student was assigned one of the problems. They then had to write a one-page essay using complete sentences and well-structured paragraphs detailing their strategies for tackling the problem and the key concepts involved in the solution.

These three goals are deeply interconnected. Classroom discussion engages the students in the material and also teaches them how to articulate their ideas. Individual meetings and group activities enhance students' communication skills and allow me to assess students' conceptual understanding and problem solving skills.

The manner in which I apply these three teaching goals depends on the subject material and the level of the course. In lower level courses, it is especially important that students develop basic problem solving skills, thus I spend more time working with examples in lecture and I require the students to solve more problems in their homework. In higher level courses, I emphasize the mathematical storyline at a deeper level and place more importance on developing their communication skills. Each new teaching experience brings with it opportunities to grow as an educator. My teaching philosophy is continuously evolving and I look forward to learning from experienced educators, teaching a variety of courses, and mentoring students.

Further information on my teaching experience and philosophy, including course evaluations and sample course materials, can be found at `http://www.mbhenry.com`