

TEACHING STATEMENT

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I have had the opportunity to teach a variety of mathematics courses, including College Algebra, Trigonometry, and Contemporary Mathematics. In these courses, I have encountered students with feelings towards mathematics ranging from fear and loathing to comfort and ease. I hope to instill in my students an appreciation for mathematics regardless of their major. My goal is to provide students with the tools and confidence to apply what they learn in class to the problems they confront in their homework, quizzes, and exams, as well as real life problems that they may face as they leave the classroom. In addition, I hope to instill in them the ability to explain mathematics to others. As not all students learn the same way, I use a variety of methods to help each student reach these goals.

One of the best ways to master mathematics is by practice. This means getting students in the habit of working out problems - not only in the classroom, but also at home. To encourage students in this way, I always give a variety of suggested homework problems beyond that which will be collected in class. Regularly scheduled quizzes covering the same material as the homework further help students to remain on schedule with the syllabus. Whenever possible, I allow students a few minutes after being presented with a new tool or method to practice with a problem of their own at their desks in groups or individually. For example, when teaching students how to prove identities in a trigonometry class, after introducing the sum formulas for sine and cosine, I give the class a few minutes to determine the double angle formulas. I have found that being able to walk around the room as students are working gives me an opportunity to immediately see where students may be struggling and to answer individual questions that a student may not have been comfortable asking in front of the whole class.

During the fall of 2010, I have had the opportunity to teach a freshman calculus workshop called Math Excel. Meeting twice a week for two hours at a time, this class is structured as a companion to a Calculus 1 lecture course. Math Excel has provided a unique opportunity to cultivate students' abilities to read and understand mathematics, identify solutions, and explain mathematics to their peers. The majority of the class time is spent with the students working in groups on problems designed to solidify the students' understanding of the material discussed in lecture and to challenge them to take that understanding further. I used the last 20 minutes of each class period to allow the students to present solutions to their classmates. In teaching this course, I have learned how to equip students with the necessary tools and guide them to a solution without directly giving them the answer. I also found it very rewarding for me and the students when they were able to discover a solution on their own and share it with their classmates.

I have found projects and writing assignments to be helpful tools in nurturing students' mathematical communication skills. When teaching Contemporary Mathematics, I used both projects and journals to get the students writing about math. At the end of each chapter, I gave the students a 1-2 page writing assignment related to the material they had learned. For example, when teaching about fair division, I gave the students a journal assignment to research the Spratly Islands dispute. This not only gave them a chance to explain mathematics in words, but also to see how the mathematics they learned could be applied to a real life situation. I believe that the writing journals were especially helpful for the "fear and loathing" students. One student wrote "I have always been terrified of math and the stress that the subject has always seemed to put on me. After taking this class...I feel a bit [more] at ease with mathematics." Another student said "the

writing journals were an interesting aspect to a math class. They kind of made everyone a little more talkative, I thought, and allowed you to gain a better understanding of who your students were.” Group projects are another opportunity for students to apply what they’ve learned in the classroom while working with others. When teaching Contemporary Math in the spring of 2008, I assigned a project in which the students had to schedule a campaign tour for their favorite candidate. This project used skills such as Hamiltonian circuits and scheduling that they had learned in class and had students excited to use these skills as it was relevant to current events going on in our nation.

I strive to give students ownership over their learning in any course. I try to create a constant dialogue between students and myself during lectures by consistently turning to the class for feedback and encouraging questions in class, during office hours or via email. This consistent feedback allows me to get a sense of how the students are progressing and to make adjustments if necessary. I find that fitting in time for group work and encouraging students to direct me in solving a problem at the board or to present solutions at the board themselves further gives students control over their learning. In some courses, at the end of each class period I have assigned a “reading problem” on material to be covered in the next class period. To solve the problem, students must read ahead in the book and identify which tools are relevant to the problem at hand. Although I have not required students to participate in this exercise, as time allows, I have invited a student to present a solution to the given problem at the board to the class for extra credit. Not only does this get students thinking about course material before it is presented in class, but I believe it teaches them to explain their solutions to others and instills in them the confidence to approach new problems with the tools they have learned in class.

My experiences with IMMERSE, a six-week summer program at UNL for students entering graduate school in the fall, and leading an analysis qualifying exam workshop have given me glimpses into what I might experience teaching more advanced math courses. In IMMERSE I had the opportunity to work with beginning graduate students, preparing them to read research papers in algebra and analysis by reviewing the tools necessary to read each paper and aiding them in proving exercises related to these tools. The analysis workshop provided me with a chance to write worksheets focusing on various analysis topics and to guide students in how to study for a qualifying exam. I find it rewarding to teach students *why* a particular problem holds true and how we can prove it. Many questions in my own research concerning the Hilbert-Samuel polynomial can be posed in the setting of a polynomial ring over a field. This situation would be accessible to a bright undergraduate student and would make an interesting undergraduate research topic. I look forward to the opportunity to lead students in research and to teach more advanced courses in the future.

Becoming an effective teacher requires constant adjustments in the classroom. To improve my technique, I have taken a teaching seminar and worked with teaching mentors from the Mathematics Department and the Office of Graduate Studies at the University of Nebraska-Lincoln. The advice that I have received from these mentors as well as student feedback from mid-semester and end of semester teaching surveys have helped me to increase my effectiveness as an instructor. For example, when a mentor from the Office of Graduate Studies evaluated my teaching, he recommended that I start each class period with a brief outline on the board of what I planned for the day. I discussed the idea with my students and found that it made them more comfortable and kept them more alert when they knew exactly where the class was headed.

My hope is that when a student leaves my class, they are able to identify the abstract mathematical tools necessary to solve a specific problem and are confident in their ability to do so. I believe that the constant opportunities to discuss math with their peers individually and in front of the class help to improve their ability to clearly communicate mathematics. Moreover, the use of a variety of teaching methods helps to reach students at different points in their understanding and aids them in their quest to be successful in the course.