Math 151: Mathematics for the Elementary School Teacher I
Winter Semester, 2005

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Brief Description of the Course:

This course is an extension of MA 150 and is likewise designed to examine elementary school mathematics from an advanced standpoint. The emphasis is on probability, statistics, and geometry and the language, models, concepts, and operations associated with these topics. Quantitative thinking skills are developed through applications and problem solving situations.

Prerequisite: A "C" or better in Math 150.

Course Objectives:

I assume that all of you know the computational algorithms for much of the mathematics we will study in this course. I hope that you will begin to develop what LiPing Ma calls "Profound Understanding of Fundamental Mathematics" (PUFM). In her book, *Knowing and Teaching Elementary Mathematics*" (1999), Ma says PUFM "goes beyond being able to compute correctly and to give a rationale for computational algorithms." Thus, we will explore *why* algorithms work as they do. In doing so, we will develop flexibility in: probabilistic reasoning; how and when to use statistical models and tools; geometric figures and relationships among them; and thinking about operations in terms of the actions they model.

Much of the course will be devoted to engagement in *doing mathematics*. In large part, mathematics is about abstraction and generalization. Solving individual problems by themselves is not learning mathematics. After solving one or more problems, students (at every age and grade level) must think about and use what they learn in that process to extend their understanding of mathematics in general. This is done through analyzing methods of solution--what worked & why, what didn't work and why not. I hope that you develop a new perspective on (and, for many, a new appreciation for) mathematics. Through this process, I expect you will develop new perspectives on the teaching of mathematics.

While I hope and expect you will find the course helpful in thinking about *teaching* mathematics, this is a **mathematics content** course and NOT a methods course. Our emphasis will be on the content.

Textbooks and Materials required:

Billstein, R., Libeskind, S., & Lott, J.W. (2004) *A problem solving approach to mathematics for elementary school teachers*. Eighth edition. Pearson: Boston.

A scientific calculator. This is ***required*** for all in-class tests and quizzes. **Do NOT expect to borrow a calculator from me or from a classmate—you will not be permitted to do so.**

Student Responsibilities:

- Attend every class session. Roll will be taken daily. The in-class activities are essential for developing a deeper mathematical understanding which is not developed by merely reading the text.

- Do all reading and problem assignments--both those to be turned in and those recommended (you will be responsible for concepts, conventions, and language presented in both types of assignments **even if not covered directly during class**).
- Allocate study time. Studying involves more than merely doing assignments. You should also spend time outside of class thinking about lectures & in-class activities. What made sense? What didn't? If X is true for this case, why is it (not) true for another case? Do these ideas extend to similar objects? & so forth.
- Work with other members of the class. While you will generally turn in individual assignments, I STRONGLY ENCOURAGE you to work on them with others.
- Be willing to "think outside the box." Be willing to try things that may not work. As the saying goes, we learn from our mistakes.
- If you have questions, ask them--in class, in office hours, or via e-mail. I'm not good at answering questions that are not asked.
- When I ask questions in class, volunteer your ideas. Students who participate in class--whether the mathematics in their ideas turns out to be right or wrong--generally do better than students who remain silent. There is NO penalty for wrong answers during class discussions.

Assessment:

Some form of assessment will take place most every week. Forms of assessment include: collected homework, announced/pop quizzes, and tests. There will be three (3) in-class tests and a cumulative final. *Tentative* test dates are: Feb. 7, Mar. 4, and Apr. 8. ***Note: Mar. 4 is the day before Spring Break begins. Tell your parents, rides, etc. you have a test that day & cannot leave early.*** All material in the course is cumulative and once covered in class or assigned is fair game for any test or quiz.

You will be graded on classroom participation. A participant not only attends class every day (and arrives on time), but is prepared and actively contributes to learning activities. You should contribute to the professional conversations of our class. It is your responsibility to notify me in advance if you are unable to attend. Absences negatively affect your grade.

The lowest Homework and lowest Quiz grade will be dropped. No make-ups or late work on homework or quizzes will be allowed. A make-up for a missed test will be given *only* under exceptional circumstances and with my *prior* approval.

Homework (5 @20 pts each)	80 points
Quizzes (6 @ 20 pts each)	100 points
Tests (3 @ 100 pts each)	300 points
Cumulative final	200 points
Participation	40 points

Grading Scale

A	93-100 percent	A-	90-92 percent	B+	88-89 percent	B	83-87 percent
B-	80-82 percent	C+	77-79 percent	C	70-76 percent	C-	67-69 percent
D	60-66 percent	E	below 60 percent				

Note: If you have a need for disability-related accommodations or services, please inform the Coordinator of Disability Services in the Disability Services Office at 2001 C. B. Hedgcock (227-1700; TTY 227-1543). Reasonable and effective accommodations and services will be provided to students if requests are made in a timely manner, with appropriate documentation, in accordance with federal, state and University guidelines.