Math 212: Math For Elementary Education Majors
Number Theory and Arithmetic
MTuWThF 8-9:30 am, Math 0421
Instructor: Juliana Belding, Email: jbelding@math.umd.edu
Office Hours: Math 4301, Tu & F 9:30-11 am or by appt.

Textbooks:
*Mathematics for Elementary Teachers*, Sybilla Beckmann (includes Class Activities Manual)
*Course Packet for Math 212*, Karen McLaren (purchase at the Armory 0127)

Course Purpose:
- review the arithmetic of the elementary school curricula (place value, decimals, fractions, addition, subtraction, multiplication and division)
- explore basic concepts from number theory (properties of numbers, GCF, LCM, primes, other number bases, divisibility rules)
- build your ability to explain the “why” and the “why not” behind mathematical procedures
- develop tools and techniques to help you illustrate mathematical ideas to young children and encourage them to think and explore mathematically

Course Philosophy:
As with many things in life, mathematical skills and ways of thinking, as well as attitudes toward the subject, are formed from a very young age. As an elementary educator, you have a unique opportunity to help students develop a good relationship with mathematics.

Mathematics is an active, creative, and sense-making activity. Even the number system and the basic methods of arithmetic that we use everyday took centuries of human creativity and logic to develop. However, when arithmetic is taught merely as a set of facts and procedures to memorize, students may come to see math as passive, boring and frustrating activity. Furthermore, their lack of real understanding will make it harder for them to learn new mathematics.

Therefore, the focus of this course is not on whether you can “do the math”, but on how you do the math and on why it makes sense. You will be expected to think about why the methods you use work and why the answers you give are correct. You will be asked to explain this reasoning to others, in classwork, homework, quizzes and exams. Throughout this course, you should continually ask questions, try to make connections and work to understand the “how” and “why” behind arithmetic, so that you can someday help your students do the same.

Grading

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<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework and Classwork</td>
<td>25%</td>
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<tr>
<td>Quizzes (3)</td>
<td>30%</td>
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<tr>
<td>Midterm Exam (June 26th)</td>
<td>20%</td>
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<tr>
<td>Final Exam (July 13th)</td>
<td>25%</td>
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<td><strong>Total</strong></td>
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Note: The final is cumulative.

Note: As this is a summer course, everything is condensed; we will explore multiple concepts and do multiple hands-on activities every day. You will have homework every day and a quiz or exam almost every week. It’s especially important to keep up with the material and homework. If you feel like you are falling behind for any reason, you should speak with me immediately.
The class activities are a key part of this course, as they provide the chance to explore the material and practice explaining mathematics to others. Therefore, it is important that you not only attend class regularly but *actively participate*.

**Homework**

Homework will be assigned almost every day and collected the next day. Generally, the goals of the homework problems are to...

- check that you understand the concepts and computation methods.
- extend your understanding of ideas we developed in class activities.
- give you practice writing problems or designing activities to illustrate concepts.
- give you practice explaining common student misconceptions.

Working with others on homework is allowed. However, it is strongly recommended that you attempt the problems *on your own* first. Furthermore, all work you turn in should be your own. The words you use and the examples you give should be different from those of other students.

**Late Work and Make Up Exams**

In the case of a planned absence, you are expected to notify me at least a week in advance. In the case of emergency, you should contact me as soon as possible. The following are recognized as excused absences: illness, death in the immediate family, religious observance. Other circumstances will be considered on a case-by-case basis. In all situations, you may be required to supply appropriate documentation. Late work may be subject to a deduction of 10% per class period.

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*I hear, I forget.*  
*I see, I remember.*  
*I do, I understand.*

*Chinese Proverb*
Syllabus- my notes

The quizzes should primarily test procedural and brief explanation knowledge- ie diagrams to solve problems followed by numerical stuff.

Midterm and Final test that as well as (1) making up problems, (2) solving more involved problems perhaps in lieu of a fourth quiz, do a 5.

The 2000 NCTM Standards state “Students in grades 3-5 should frequently make conjectures about mathematical relationships, investigate those conjectures, and make mathematical arguments that are based on their work.

The NCTM standard for Number and Operations for PreK-2 states that “compute fluently and make reasonable estimates. ... all students should use a variety of methods and tools to compute, including objects, mental computations, estimation, pencil and paper and calculators.”