

## MATH 2008

### Foundations of Numbers and Operations

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- Instructor:** Kyunghhee Moon, Ph. D.
- Office:** Boyd Building, Room 216
- Contacts:** Email: [kmoon@westga.edu](mailto:kmoon@westga.edu)  
Phone: 678-839-4151
- Office hours:** 10:00-12:00 and 2:00-3:20 (T, Th)-Carrollton Campus  
11:30-1:00 (F)-Newnan Campus

**Textbook:**

Billstein, R., Libeskind, S., & Lott, J. (2012). *A Problem solving approach to mathematics for elementary school teachers*, 11<sup>th</sup> Edition. Pearson Addison-Wesley: Boston, MA.

**Goals and Objectives of the Course** include, but not limited to,

1. Apply and adapt a variety of appropriate strategies to solve problems.
  - 1.1 Identify how a sequence (in both numeric forms and in diagrams) grows and find the general term of sequence using the pattern in the sequence. Explain how Gauss method works and generalize the method to find the sum of terms in a sequence with a pattern.
2. Construct numeric systems for various bases and explain the role of place values and zero in the systems. Be able to convert back and forth numbers in base 10 to numbers in base other than 10.
3. Identify and explain various strategies and algorithms for number operations (addition, subtraction, multiplication, and division) and use those in calculation.
4. Be able to model operations using various representations (visual and verbal) and explain how multiple representations are connected.
5. Explain how mathematical properties, such as the distributive, commutative, and associative properties, are embedded in various strategies in operations and use the properties efficiently in problem solving.

6. Define and find multiples and factors including the greatest common divisor (GCD) and the least common multiple (LCM). Be able to explain how prime factorizations of numbers are associated with the GCD and LCM.
7. State the divisibility rules and explain why those rules work. Apply the rules to determine if numbers are divisible by certain numbers and to list numbers that satisfy the rules.
8. Explain and compute integer operations using various models.

#### **Attendance and Classroom Rules:**

- Students must be **punctual** and **always** attend class. There could be unforeseen emergencies that do come up. However, anyone missing classes **FIVE times or more** during the semester **might not** receive a credit for the course. Medical excuses are only accepted when provided with documentation.
- Students cannot enter the classroom once the class starts and should wait **SILENTLY** outside of the classroom until the door is reopened. In such cases, students will be recorded as tardy. The first two tardiness combined will be considered as one absence. After two tardiness, each tardiness will be considered as an absence.
- Students who disrupt the class for any reason will be escorted to outside of the classroom, disallowed to return for the day, and marked absent.
- Students who have 0 or 1 absence (with **NO** exception for medical issues) OR who make a considerable contribution to the class will be given an extra credit of 5 points toward the final grade.

**Use of Electronics:** Calculator is the only electronic device students can use in the classroom. **Calculator as a phone accessory is NOT allowed.** In fact, in no circumstance are students allowed to use any types of electronics other than calculators. Students who do not abide by this rule will be escorted to outside of the classroom, disallowed to return for the day, and marked absent.

**Grading:** Your final grade in the course will be based on your performance on quizzes, a mid-term exam, a final exam, and the extra credit of 5 points.

Quiz	30 pts
Midterm	30 pts
Final Exam	40 pts
(Extra Credit)	5 pts
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	105 pts

- A quiz will be given on Thursdays, in particular in the Weeks 2, 3, 4, 5, 6, 9, 10, 11, 12, and 13. Students will be allowed to drop one lowest score (**No makeup quiz in any case**).
- The midterm exam will be on Thursday of Week 7. The final exam will be on the final exam week. (Check the date and time on the UWG academic calendar.) No make-up exam is permitted except for medical emergencies that can be documented.
- Students are expected to do homework in a timely manner. However, homework will be neither collected nor graded.
- Final Course Grade:

A	90-105
B	80-89.99
C	70-79.99
D	60-69.99
F	Below 60

**Overall Philosophy:** You are required to provide detailed explanations of the mathematics on all group investigations, quizzes, and exams. This course emphasizes the conceptual framework of mathematics and is designed to avoid the "turn the crank" style of computation that is typical of many mathematics courses. Just getting an answer is not enough. You are expected to explain your ideas. If you are stuck, work with classmates, bring questions to class meetings, or come and see me during my office hours. It is crucial that you explain what you are thinking. It is possible to receive a poor score for a correct answer if you do not explain your ideas. On the other hand, a clear exposition with a minor computational error can receive a good score.

What I expect from you as learners:

1. Attend every class. Since much of our class time will be spent to construct mathematical ideas through class work, it will be hard for you to catch up if you miss class.
2. Respect other students' ideas and be ready to justify your reasoning.
3. Keep up with homework. You will deepen your understanding of mathematical concepts by working on extra problems on your own. It will also provide a good opportunity to locate where your misunderstandings are.
4. Be an advocate of your own learning. Seek assistance for help. Come and see me during my office hours if you have any questions. You can also go to Mathlab for assistance.

**Common Language Link:** <http://tinyurl.com/UWGSyllabusPolicies>

### Tentative Schedule

Week	Topics	Materials
1 & 2	<ul style="list-style-type: none"><li>• Problem Solving Using Patterns</li><li>• Sets: Equivalent Sets, Cardinal Numbers</li></ul>	Textbook-Ch. 1.1 & 1.2
3 & 4	<ul style="list-style-type: none"><li>• Logic</li><li>• Sets: Subsets, Set Operations</li></ul>	Textbook-Ch. 1.3, 2.2, & 2.3
5 & 6	<ul style="list-style-type: none"><li>• Numbers with Various Bases</li><li>• Properties of Whole Numbers</li><li>• Addition and Subtraction with Whole Numbers</li></ul>	Textbook-Ch. 2.1, 3.1 & 3.2
7 & 8	<ul style="list-style-type: none"><li>• Midterm</li><li>• Multiplication and Division with Whole Numbers</li></ul>	Textbook-Ch. 3.3 & 3.4
9 & 10	<ul style="list-style-type: none"><li>• Divisibility</li><li>• Prime and Composite Numbers</li><li>• GCD and LCM</li></ul>	Textbook-Ch. 4.1, 4.2 & 4.3
11 & 12	<ul style="list-style-type: none"><li>• Integers and Operations with Integers</li></ul>	Textbook-Ch. 5.1 & 5.2
13 & 14	<ul style="list-style-type: none"><li>• Rational Numbers and Operations</li><li>• Review</li></ul>	Textbook-Ch. 6
15	<ul style="list-style-type: none"><li>• Final Exam</li></ul>	